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BI-MONTHLY INTERNATIONAL MAGAZINE FOR GLASS MANUFACTURING



YEAR 37 • ISSUE NO. 1/2024

40
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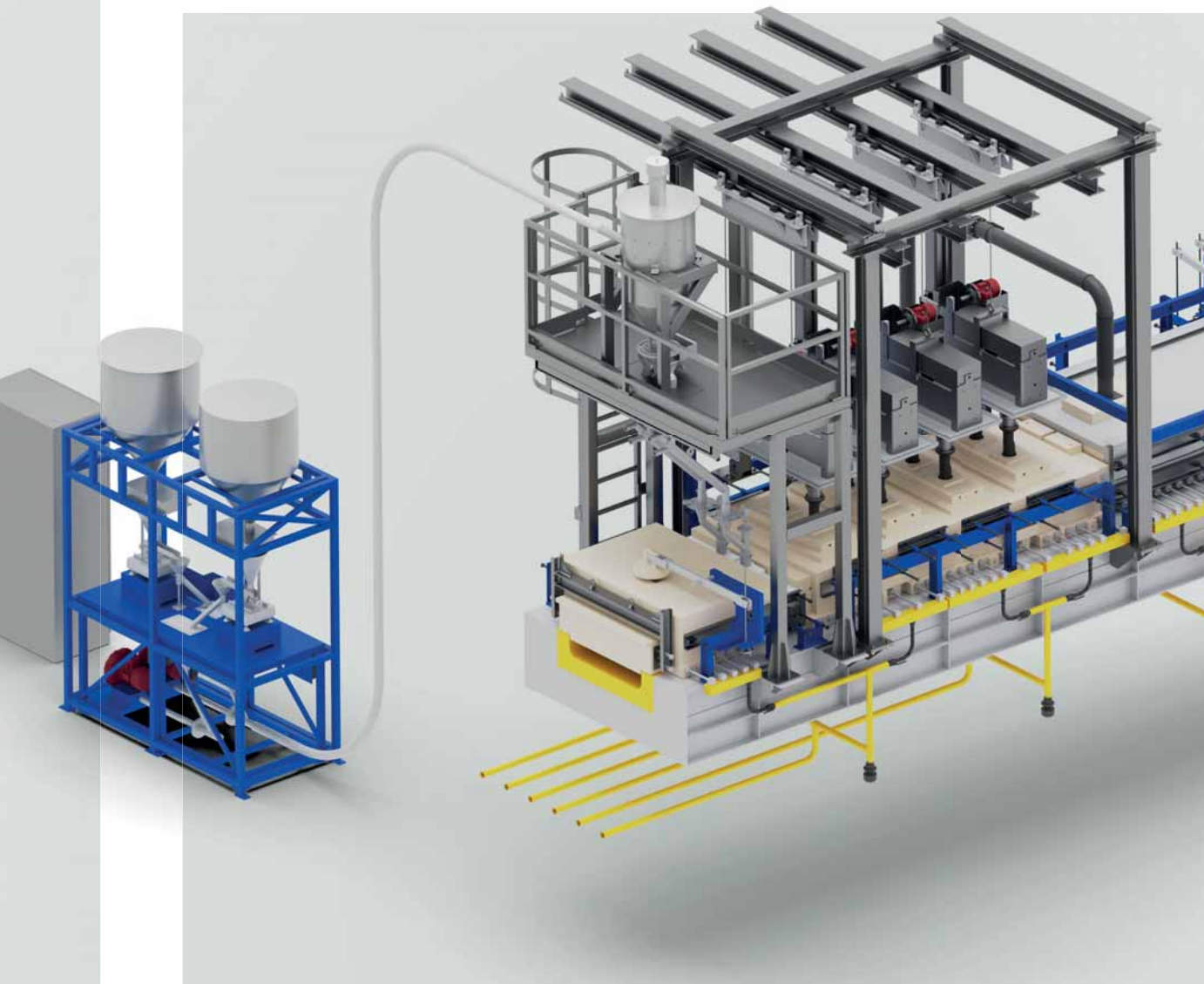
RAW MATERIALS
BATCH CHARGES
REFRACTORIES

Celebrating
the installation
of **CAR-MET**'s
latest furnace
in Sweden

Glass furnace
at Casablanca:
BDF INDUSTRIES
and **SEVAM** jointly
jubilant

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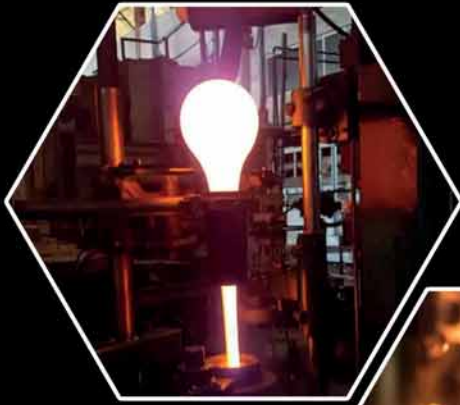
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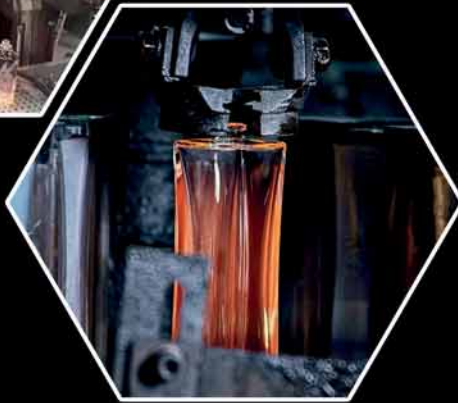
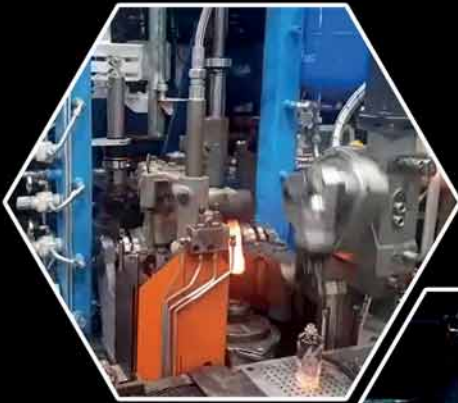
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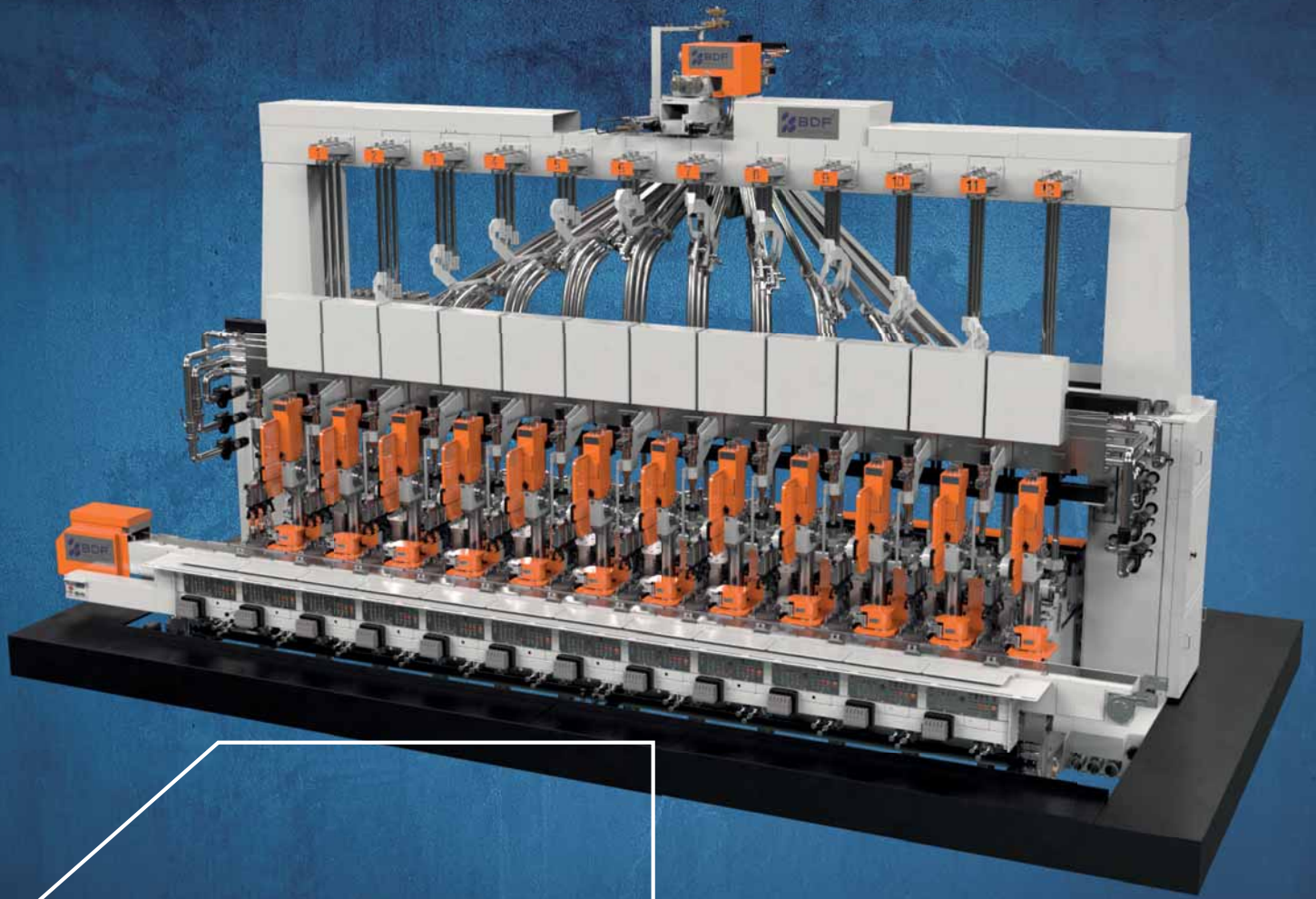
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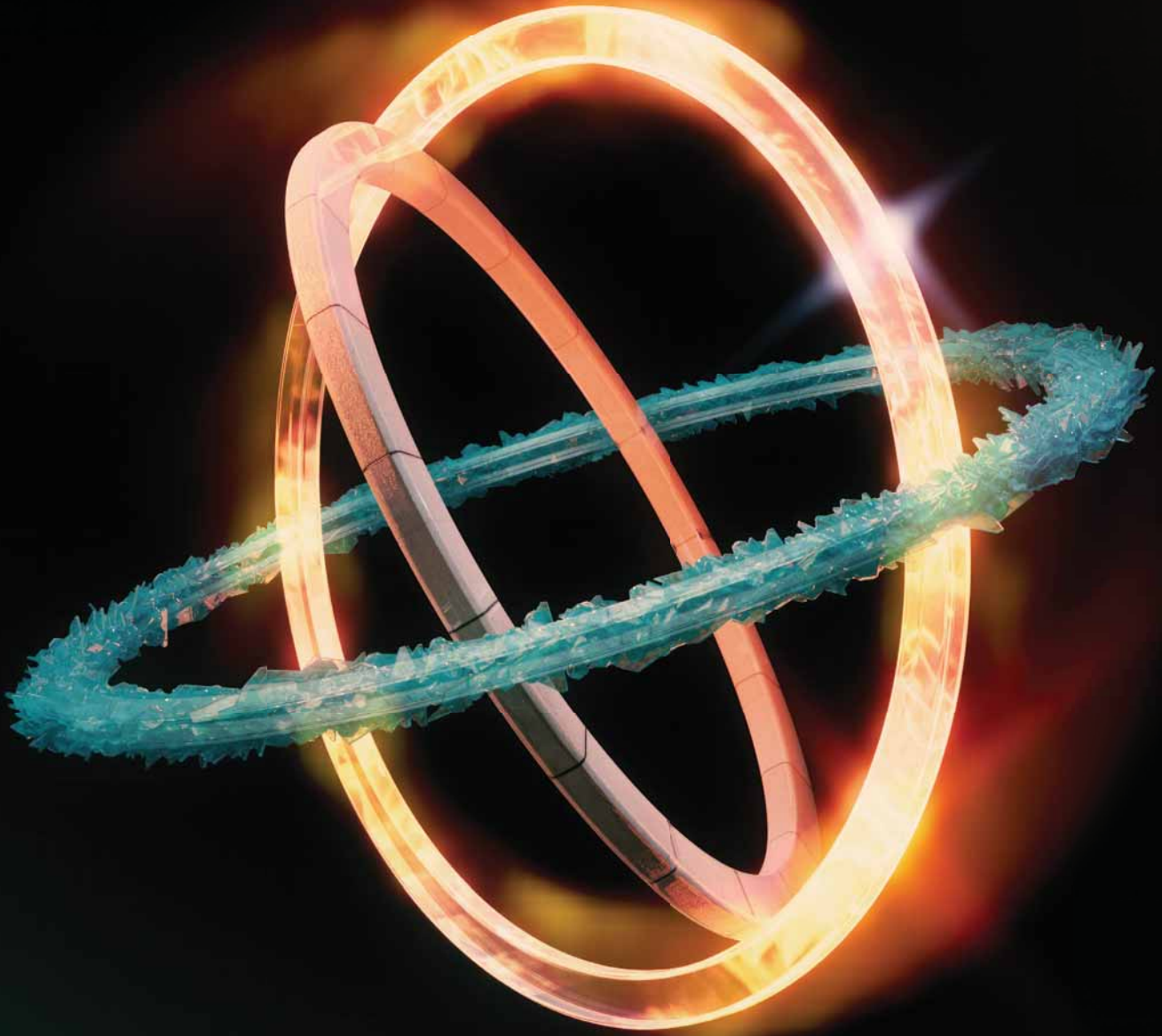
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PRINTED BY:

BICIDI ARTI GRAFICHE
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BACK COPIES: € 29 air mail included | Italy: € 15

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GLASS MACHINERY PLANTS & ACCESSORIES,
N. 211, ANNO 37, 2024, PERIODICO BIMESTRALE.

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	COSMOPACK	21-23 March	BOLOGNA Italy	
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2024 4	ICG ANNUAL MEETING	25-28 August	INCHEON South Korea	Editorial files: 22-07-2024 Deadline Adv files: 29-07-2024
	CONFERENCE ON GLASS PROBLEMS	16-20 September	TOLEDO (OH) USA	
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2024 6	ALL4PACK	4-7 November	PARIS France	Editorial files: 21-10-2024 Deadline Adv files: 28-10-2024
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WALL COLMONOY

85 Years of making metals work harder

A leading global materials engineering group, Wall Colmonoy celebrates 85 years of business. The company employs 600 team members - both across the United States and at its European Headquarters in the United Kingdom.

"We are very proud of our long, storied history, and the successes we've had over the years," said William P. Clark Jr., Chairman & CEO. "Wall Colmonoy has a great future ahead with fourth-generation leadership."

Today, **WALL COLMONOY** remains under the ownership and leadership of its founding family, now in its fourth generation.

Wall Colmonoy commemorates this 85th year milestone with a special anniversary logo along with celebrations at each of its six locations.

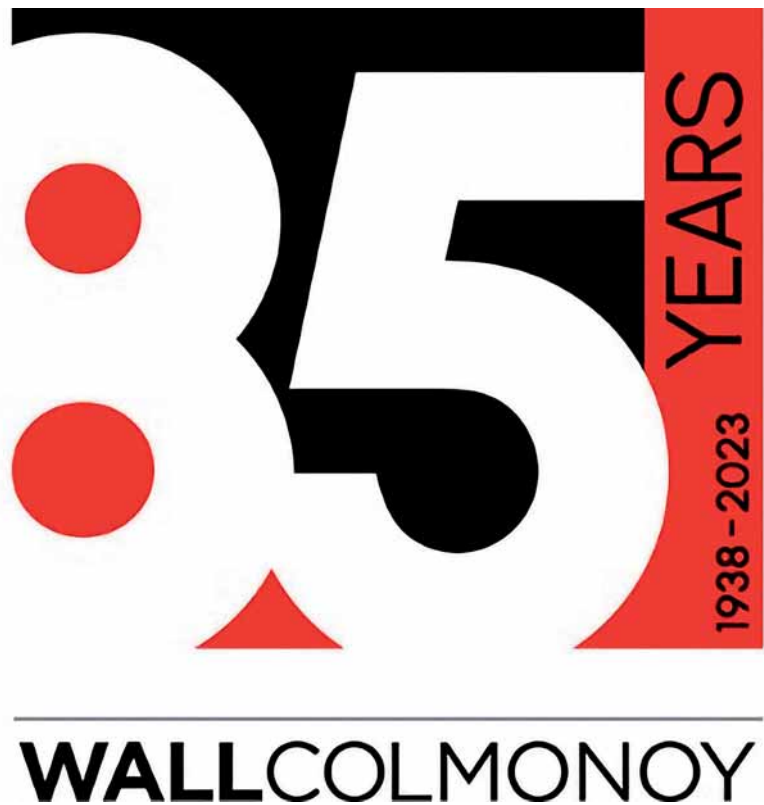
"Our success and growth could not have been possible without our customers, distributors, and committed and talented people," added Nicholas Clark, President and fourth generation family member. "We continue to focus on our strengths of technical expertise, innovation and passion for our purpose serving the critical manufacturing industry."

Today, Colmonoy® hard-surfacing products are applied in a wide range of surfacing and thermal spraying techniques for a variety of industries such as glass container, oil & gas, mining, waste to energy, steel and more.

In 2014, Wall Colmonoy acquired Franklin Bronze Precision Components, a Franklin, Pennsylvania-based investment casting foundry. Initially focused on glass parts, Wall Colmonoy diversified the business into other sectors. Today, the company is a leader in precision investment castings for glass containers, pumps & valves, oil & gas, steel, food and metal processing, transportation and more.

Established in 1969, Wall Colmonoy Limited serves as the company's European Headquarters in Pontardawe, Wales, UK. The facility specializes in manufacturing Colmonoy®, Wallex® and Nicrobraz® products, additive manufactured powders and parts, engineered cast or fully machined components and provides coatings, brazing, and heat treatment. Its products reach Europe, Africa, India, Australia, Middle East and CIS Countries. The state-of-the-art research centre is at the forefront of developing new applications and investing in emerging technologies.

By making metals work harder since 1938, Wall Colmonoy contributes to a more productive, efficient and cleaner world.



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BACCARAT

Inauguration of Furnace F at Lorraine plant announced

Margareth Henriquez, CEO of BACCARAT and Remi Grosjean, Director of Operations and Deputy General Manager, were recently proud to announce the inauguration of Furnace F at the Baccarat plant in Lorraine, France.

Installation of Furnace F required the total reconstruction of a building and is part of the renewal of the manufacturer's industrial tools - combining traditional craftsmanship with the most advanced technologies.

Inauguration of the furnace is deeply rooted in the crystal-making tradition historically called the 'Cérémonie de l'Allumette'. An exceptional event, the inauguration



kicked off Baccarat's 260th-anniversary celebrations, bringing together the entire Manufacture team, as well as the godmother and godfather of the new furnace: Clara Daguin, fashion designer and artist of light, and Gérard Cornier, chemical engineer and former laboratory manager. The presence of the two highlighted the company's intergenerational collaboration spirit as well as the unbreakable link between art, craftsmanship and science. A remarkable technical feat, Furnace F comes as the result of years of research and hard work by the Baccarat's teams - a technological advance that translates into improved energy efficiency coupled with a significant step towards a more sustainable future while marking a stepping stone to the bright creative future of the company's artisans and craftsmen.

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VETROPACK

Sensor locates danger points with maximum precision

Before the vexed question of what fillers and bottlers in the food and beverage sector can do when combating glass splinters or even breakages in the filling line, Vetropack’s customer service can now offer support with both a new service and a sensor that

measures precisely where glass containers are exposed to impact loads.

Indeed one Swiss food manufacturer - a **VETROPACK** customer- recently had to confront these issues. Small splinters of glass were noticed on the line of one filling plant - but there was no obvious glass breakage.

Shedding light on the matter, Vetropack’s customer service team used the new addition to their toolbox for the first time: the ShockQC in-line sensor from Masitek measures the forces and loads acting on a glass container with optimum precision.

Vetropack produced an exact replica of the glass container to be tested for the customer: in this case, a 390-ml European jar. The replica was fitted with a ShockQC sensor calibrated by the manufacturer. It then began its journey along the filling line, together with a batch of other jars. A total

of four tests were performed - each at different belt speeds. Replica and sensor passed through the entire line, starting with unpacking of the jars all the way to the final conveyor belt that carries the jars away in their finished cartons. The measured datasets were transmitted no less than 100,000 times per second to a tablet PC for viewing on an easy-to-understand dashboard.

The result: an impact zone between the filler and sealing station where the jars are subject to shocks that exceed Vetropack’s guaranteed minimum impact strength by as much as 60 percent. The customer was now able to optimise their filling line exactly where improvement was really needed.

Michael Walzl, Technical Customer Service Manager at Vetropack, said: “Following on from the success of the first assignment, we have since used this service for several other interested parties - and we were able to provide rapid assistance every time. Now we’re looking forward to helping the next customers optimise their lines - quickly and easily, with a results-oriented method that involves no unnecessary effort or expense.”

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SGD PHARMA

Celebration the renovation of Saint-Quentin-Lamotte’s furnace N° 2

SGD PHARMA marked the start of the New Year by celebrating the renovation of its Saint-Quentin-Lamotte (SQLM) furnace N° 2 with a lighting ceremony →



← performed by appointed Godmother Vanessa Rade, in accordance with glass-making tradition.

Saint-Quentin-Lamotte, located in France, is a state-of-the-art glass plant which specializes in pharma-grade moulded glass vials. Its newly-designed furnace improves glass properties resulting in enhanced quality and performance.

Last year the site cut CO2 emissions in line with SGD Pharma's recent SBTI commitment and long-term reduction roadmap. The upgraded feeders of the renovated furnace, provided with support from ADEME as part of the Decarb Ind framework, will reduce emissions even further.

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TIAMA

HOT system range can now handle multi-product lines

With more than ten years of experience at the hot end, TIAMA is now considered a major supplier of hot end monitoring solutions. In 2014 the company launched a full range of sensors dedicated to the hot end area - in addition to its historically provided cold end products. Today the Tiama Hot systems range consists of four sensors located in different areas around the IS machine from the gob with the Tiama Hot mass 2, to the exit of the IS machine with the Tiama Hot eye, the Tiama Hot form and the Tiama Hot move.

Since the launch of these products, several developments have been made and implemented on the Tiama Hot eye and the Tiama Hot form such as the integration of the Tiama Hot move features into the Tiama Hot eye software.

Many production lines are now equipped with these systems across the world. And, in order to be fully compatible with all production lines, Tiama recently developed the multi-product management on the Tiama Hot eye, Tiama Hot form and Tiama Hot move.

All Tiama's systems help to monitor and improve the glass process. Defects are detected at the hot end, allowing operators to perform quick corrective actions on the IS machine without waiting for cold-end feedback. And thanks to the glass distribution analysis provided by the Tiama Hot form, defect creation can even be anticipated. In addition, ware handling is also improved with the Tiama Hot move. Jams on the production line are considerably reduced and pushers' settings can be optimized thanks to the information provided by the sensor.

With this last development, mixed production lines now benefit from all the features available on the hot end sensors and the Tiama Hot systems range continues to grow with new features.

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ARDAGH GLASS PACKAGING

North America and CI Renewables plan solar project in California

ARDAGH GLASS PACKAGING North America (AGP-North America), an operating business of Ardagh Group, and CI Renewables are moving forward with plans of a renewable energy solar project in Madera, California. The ten-Megawatt solar project, built and operated by VALTA Energy, will be completed this year. It will supply electricity to Ardagh Glass Packaging's Madera, California glass manufacturing facility, which will account for approximately 25 percent of the facility's electricity demand.

The electricity generated from this project is estimated to reduce demand from the local grid equivalent to

more than 1,500 averaged-sized American homes. (US Energy Information Administration, 2023)

"We are pleased to see this important solar project for Ardagh move forward," said Walter Serafyn, Managing Partner of CI Renewables LLC. "This is the second large-scale solar project we have developed for Ardagh, and we look forward to more opportunities with Ardagh in the future."

Ardagh's Madera, California facility has a long history of responsibly managing its natural resources usage. In 2022, the facility received its ninth consecutive Energy Star® plant certification.

"As an environmental leader in the packaging industry, Ardagh continuously pursues opportunities to increase our use of renewable energy," said Alex Winters, Chief Sustainability Officer at Ardagh Glass Packaging. "Not only does this project advance Ardagh closer to our sustainability targets, but it also stands to aid our wine customers in their sustainability endeavors. By curbing the →



← carbon footprint of bottles sourced from our Madera facility, this initiative aligns with our shared goal of fostering a more environmentally conscious future.”

containers for the US wine market, supplying wineries across the USA.

Ardagh’s Madera, California facility manufactures glass WWW.ARDAGHGROUP.COM



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LA MAISON FRANÇAISE DU VERRE

Géraldine Fiacre appointed new CEO

Parent company of Duralex® and Pyrex® La Maison Française du Verre recently announced the appointment of Géraldine Fiacre as Chief Executive Officer (CEO).

Starting January 10 this year, Géraldine Fiacre has joined **LA MAISON FRANÇAISE DU VERRE** (LMFV) with the mission of leading the Group through the current complex international environment while strengthening the success of the iconic Duralex® and Pyrex brands. These emblematic names, which have been accompanying family meals, school lunches and restaurant tables for decades, stand as quintessential symbols of French industrial excellence and quality.

After graduating from ESSEC Business School, Géraldine Fiacre initiated her career at the PepsiCo Group, holding diverse positions in marketing and sales. With over 19 years of significant contributions to the Barilla Group, she played a pivotal role in developing their brands, particularly in France. Her responsibilities included serving as the marketing director of the French and Western European markets, as well as general manager of Barilla's Swiss subsidiary. Since June 2019, she held the position of CEO at Bolton Food (Saupiquet) and CEO at Bolton Food (Saupiquet), the food subsidiary of the eponymous Italian multinational Group.

Géraldine Fiacre said: "It is an honour for me to bring my international experience in brand management within a competitive global environment, expertise in steering industrial activities and team management to the LMFV Group. The renowned brands Duralex® and Pyrex, symbols of 'Made in France,' have all the necessary resources to fulfill the Group's ambitions for industrial sovereignty and sustainable performance and the Group's ambitions for industrial sovereignty and sustainable performance."

WALTERSPERGER

Five pot furnaces restarted in new factory

Verreries et Cristalleries **WALTERSPERGER** recently announced that five pot furnaces have been restarted. All five had been turned off on December 22 and then moved to the new factory in Blangy-sur-Bresle, Normandy, France.

Waltersperger is numbered among the few companies in the world that uses a semi-automatic process allowing it to produce the most complex and exceptional bottles. Furthermore, the flexibility and adaptability of its industrial tools offer brands the possibility to produce small series, for very high-end projects or niche brands - both in perfumery/cosmetics and for decorative objects or spirits.

Verreries et Cristalleries Waltersperger thanked Jessie Toupin, Paul Doussot, Cyril Bordet and their collaborators - all of whom worked tirelessly in recent weeks.

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BA GLASS

Change of CEO

BA Glass recently announced that Sandra Santos, Chief Executive Officer and Board Member, will step down as CEO on February 22 over which time a transition will start towards leadership of the next CEO, Tiago Moreira da Silva.

Tiago joined **BA GLASS** in 2008 as food key account manager, and since then went through a remarkable career, becoming CMO in 2016, just before the expansion to South-east Europe in 2017. As a member of the Executive Board, Tiago also led Iberian Operations, and recently, Central Europe Operations. Tiago will now lead the Executive Board, driving the company into a new and innovative stage of growth and transformation.

The Executive Board team will welcome new members, Marco Marques and Sylwia Mistrzak, two young and energetic leaders - both of whom have had remarkable careers in BA.

Sandra has been CEO for the last ten years, during which she successfully steered BA Glass through strong transformation and growth. Her leadership, inspiration, perseverance and passion for new challenges characterised the ten years of her mandate, moving BA from a EUR 500M to EUR 1,6 billion turnover company. The board has been extremely impressed with Sandra's ability to lead the company at all times - especially through the Covid Crisis and subsequent energy crisis. Sandra will continue to serve on BA's Board as non-executive Director.

Sandra and Tiago will work closely on the transition of roles, in a strong partnership. Today, with more than 5,000 global employees in Europe and Mexico, BA's Board continues to reaffirm the company's mission of building a future with glass packaging.

WWW.BAGLASS.COM

SEFPRO

Acquisition of GLASS SERVICE Czech Republic definitively agreed

SEFPRO, a business unit of Saint-Gobain Ceramics, recently announced that it has entered into a definitive agreement to acquire **Glass Service a.s.** Closing of the transaction is subject to antitrust approvals and is expected by the end of the first half of this year.

This acquisition is fully in line with the strategy of Saint-Gobain Ceramics, a global innovator in the world of technical ceramics which aims at engineering a better, safer and greener world. **SEFPRO** has a mission to help all glass makers shape a low-carbon glass industry for a brighter future.

Founded in 1990 and established in Vsetin, Czechia, Glass Service a.s. is a leading provider of digital solutions for glass furnaces, including advanced control systems (ESIITM) and

simulation software. Within Glass Service, F.I.C (UK) is proposing leading electric glass melting systems while FlammaTec is offering advanced burners - including the first Hydrogen burning systems.

Laurent Cohen-Scali, Sefpro Vice President, said: "We are very pleased with this new strategic acquisition, which enhances our ability to deliver end-to-end solutions to support our customers in their journey toward decarbonation, for which electrification and digital transformation are key. This acquisition will help us create more value for our customers as it strongly reinforces our offering of Sefpro Guard services, adding predictive, diagnostic, and data-driven solutions to extend furnace lifetime, improve energy efficiency, and accelerate electrification."

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SGD PHARMA

New siliconisation line at French Centre of Excellence

SGD PHARMA, global market leader in moulded glass primary packaging solutions for the pharmaceutical industry, recently announced the opening of a new siliconisation operation at its state-of-the-art Saint-Quentin Lamotte (SQLM) plant, France. In this way the company enhances its already extensive range of in-house services by internalizing its glass siliconisation offer, thereby further ensuring responsiveness, security of supply and improved flexibility of vial sizes.



Glass vials are regularly used for pharmaceutical packaging, though there is a growing market need for primary packaging that's suited to more sensitive, aggressive and viscous drug products. The application of a micro-layer silicone-based internal coating to the container provides a protective barrier that minimizes interaction between the drug product and the primary packaging, while preserving the integrity of sensitive therapeutic products.

SGD Pharma's treatment uses an optimized spraying process that provides uniform coverage of the vial surface - ensuring a higher performance of the internal silicone thin-layer. The process is executed with rigorous quality control under an ISO 8 clean room, in an ISO 15378 certified facility.

This new operation at SQLM is suitable for all glass types in vial sizes ranging from 3ml to 500ml in both clear and amber glass, at a high processing capacity. The treatment is ideal for a wide variety of market applications including: anti-infectives, parenteral nutrition, diagnostics, animal health and oncology to name a few.

SGD Pharma's treatment uses an optimized spraying process that provides uniform coverage of the vial surface - ensuring a higher performance of the internal silicone thin-layer. The process is executed with rigorous quality control under an ISO 8 clean room, in an ISO 15378 certified facility.

WWW.SGD-PHARMA.COM

DSF REFRACTORIES & MINERALS

Ownership change announced

A management buyout of **DSF REFRACTORIES & MINERALS** took place last year on December 19. The new ownership team, led by Paul Hutchinson, acquired the total shareholding of the group.

The main shareholders of DSF, Geoffrey Bell, Chairman, and Neale Parkin, Managing Director, have stepped down from their roles in the business following the acquisition of their shares. DSF thanked Geoff and Neale for their many years of service to the company, wishing them the very best for the future.

Paul Hutchinson will step up to become Managing Director, with the remaining Board making up the new ownership team.

DSF Refractories and Minerals Ltd is an independent refractory manufacturer and processor of refractory minerals, based in Friden, in the Peak District of Derbyshire, in the centre of England. The company is a leading producer of high alumina refractory bricks and blocks in standard sizes and special shapes and has a complete range of products based on mullite, andalusite, chamotte, bauxite, spinel and pure alumina. Shapes are produced by both pressing and casting techniques and products are high temperature fired to give optimum properties in service. DSF is the largest shaped refractory manufacturer in the UK and is recognised as one of the world's leading suppliers of bonded refractories for the glass industry.

WWW.DSF.CO.UK



ENCIRC

Plans welcomed for large scale hydrogen production facility

Encirc Managing Director Sean Murphy recently welcomed the news that Cheshire West and Chester Council has approved plans for the first large scale hydrogen production facility and carbon capture plant in the UK, which will supply low carbon hydrogen to **ENCIRC**'s Elton factory.

Sean said the decision is another step closer to making decarbonisation of the company's furnaces a reality.

He was speaking after councilors on the planning committee at Cheshire West and Cheshire Council approved the development, which is located at the Stanlow oil refinery in Ellesmere Port, Cheshire, England, UK.

Sean said, "This is another important milestone in bringing low carbon hydrogen to the North West. At Encirc, we're looking forward to ensuring glass is the most sustainable packaging of choice for generations to come. With access to low carbon hydrogen, we can decarbonise our furnaces and make that future a reality."

EET Hydrogen, a joint venture between Essar Oil UK, owner of



the refinery, and low carbon energy firm Progressive Energy, is behind the proposal. They revealed in September 2023 that engineering and design work had started on the project. Encirc has been highly supportive and influential regarding the project since its inception three years ago.

It forms part of the wider HyNet hydrogen project which aims to create a low carbon future across the north west of the UK. The facility will eventually supply up to 1,000MW of hydrogen to glass manufacturers Encirc and Pilkington, - as well as soda ash producer Tata Chemicals.

It is estimated the hydrogen hub will enable local industrial and power generation businesses to switch from fossil fuels to low carbon energy, thereby helping to reduce the North West's carbon emissions by 2.5 million tonnes every year - the equivalent of taking 1.1 million cars off the roads.

WWW.ENCIRC360.COM

KRONES

Digital container-decoration business to be discontinued

Krones Group recently chose to cease activities in the field of digital container decoration by the end of 2023. Although the group's subsidiary Dekron GmbH has machines successfully up and running at various customers, the decision is the result of a careful review of business strategy and the current market situation.

Dekron informed its staff, customers, suppliers and business associates of this in November. From 2024 onward, all the service support required for existing lines will be provided by expert service technicians at **KRONES AG**.

Dekron GmbH has developed and manufactured machines from the DecoType series used for digitally decorating containers made of glass, PET and HDPE since 2018, with the group's subsidiary KIC Krones supplying the matching UV inks.

Krones has synergized in Dekron its own development activities and the business operations of Till GmbH, in which the company has had a majority holding since 2014. The subsidiary was liquidated effective December 31 of last year and the facility in Kelkheim closed down as part of the phase-out. A reconciliation of interests has already been negotiated with all members of staff.

WWW.KRONES.COM



AMETEK LAND

Supply of service and calibration support

Ametek Land, a world-leading manufacturer of highly-accurate infrared pyrometers, scanners and thermal imagers, is currently providing a service solution to ensure customers benefit from peak product performance and maximum return on investment over the life of their equipment.

All thermometers, regardless of manufacturer, are subject to damage and deterioration over time. However, this can be limited proactively through **AMETEK LAND's** service and calibration support - providing ongoing confidence in the measurement accuracy of the instruments.

Service support, delivered through Land's worldwide network of regional accredited service centres, helps to maintain peak operating performance over time, while on-site calibration conformance testing maintains the accuracy of the temperature measurement being made.

Victoria Jones, Aftermarket Team Leader at Ametek Land, said: "Many instruments are operated continually with little or zero maintenance, which can affect their performance. Our service and calibration adjustments restore instruments till they're 'as new' - so limiting their deterior-



ation. This not only provides customers with the assurance that their instrument is working as it should. It also protects the investment they have made in that equipment. It's a proactive solution that maximises the availability and uptime of your Ametek Land products."

In addition to its service centres, Ametek Land also operates three accredited ISO 17025 laboratories which provide certification to endorse the accuracy of temperature measurements being made.

ISO 17025 certification provides additional confidence through traceable independent testing and allows the thermometer operator to distinguish shifts in calibration and correct for calibration errors over and above the specification - providing a useful audit trail.

These ISO 17025 certification laboratories can also certify non-AMETEK Land thermometers/pyrometers within the scope of their approval, subject to the provision of necessary power supplies and cables.

WWW.AMETEK-LAND.COM

STARA GLASS

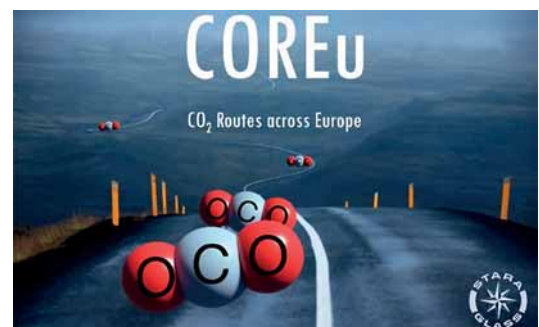
Engagement in the Horizon COREu project announced

STARA GLASS was proud recently to announce its commitment in the Horizon COREu project, which is aimed at fostering the adoption of carbon capture and storage solutions in the glass industry.

An ambitious initiative, COREu aims to accelerate the transition to a low-carbon future by demonstrating key technologies for the entire CCS (Carbon Capture and Storage) value chain in Southern Europe while supporting the development of CCS routes linking emitters with storage sites in Central Eastern Europe.

An important goal of the project is to let every glassmaker in Europe understand what their best technological and logistic opportunities are to get rid of CO2 emission.

WWW.STARAGLASS.IT





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Maref





TRICORBRAUN

Acquisition of German glass packaging provider Glassland

Global packaging leader **TRICORBRAUN** recently announced that it has acquired glass packaging provider **Glassland**. The acquisition grows the German footprint of TricorBraun's premium glass packaging business, **Vetroelite**, while broadening the company's European presence.

Glassland serves spirits and other customers in Germany and Switzerland with an expansive catalogue of high-end glass bottle and closure designs.

"The Glassland team is equally passionate about customer service as they are about design and, as a result, they've built a long-standing business with an impressive reputation," said Declan McCarthy, president of TricorBraun Europe. "We welcome Glassland to TricorBraun and look forward to supporting the team's continued growth."

All Glassland team members will remain with TricorBraun and continue to work out of their Bonn, Germany location. After a transition period, Glassland will fully integrate with Vetroelite.

"TricorBraun has a successful acquisition track record because we partner with strong companies while providing opportunities for both team members and business growth," said McCarthy. "This strategic acquisition provides additional growth avenues for Glassland, Vetroelite, our team members and supplier partners while providing expanded services and local options for customers."

"Joining TricorBraun and Vetroelite is an exciting step in Glassland's history," said Johannes Huth, founder and CEO of Glassland. "Working together provides access to global resources and expertise while preserving our dedication to the highest level of customer service. We look forward to future growth in the beer, spirits and wine sectors in Switzerland, as well as serving other packaging segments -besides glass- with TricorBraun's support."

Since its founding, TricorBraun has partnered with management teams to successfully acquire and further accelerate growth for 41 packaging companies globally.

Financial terms were not disclosed. Proventis Partners, a member of Mergers Alliance, acted as financial advisor to TricorBraun.

WWW.TRICORBRAUN.COM

HWI

Investment in North American manufacturing facilities

HWI, a member of **Calderys**, has been fulfilling its commitment to invest in its operations with consequential upgrades at numerous North American manufacturing facilities. Additional investment projects are planned for 2024.

Investments across the Americas reinforce the Group's global competitiveness and demonstrate the company's

plans for continued advancement. 2023 marked a new era in global refractories, with **Calderys** and **Harbison-Walker International** (now **HWI**, A member of **Calderys**) joining forces as a high-growth, customer-centric refractories provider with global scale.

Michel Cornelissen, President and CEO of **Calderys**, said: "Our investments in the Americas underscore the value we place in our deep, long-time relationships with customers in the region, particularly with our many steel industry partnerships. These investments demonstrate our plans for continued growth and our leadership as a combined organization."

Ross Wilkin, **Calderys** Senior Vice President of Americas, added: "In less than a year under new ownership and since combining with **Calderys** we've successfully inte- →

←grated our Americas operations with the former Calderys operations in the US and Brazil, enhanced our product and service portfolio for customers, and completed massive investments in our manufacturing facilities. We are well-positioned for the future.”

HWI's North American investments help to support customers' growth and energy transition needs by elevating capacity, product quality and innovation.

“In 2023, we more than doubled HWI's typical annual capital investments, and the future is bright as we plan for even further investment and growth in 2024. HWI, as a Member of Calderys, is continuing our 150+ years of industry leadership and dedication to our people, custom-



ers, and communities,” said Kevin Ballard, Vice President, Operations and Engineering at HWI.

THINKHWI.COM

BA GLASS

Acquisition of Recresco Limited glass recycling operations

BA Glass and the Gent Family recently announced that on December 7 they reached an agreement to integrate the glass recycling operations of Recresco Limited into the **BA GLASS** Group.

The transaction represents the association of a leading glass packaging manufacturer, with a glass recycling operation managed by a team with several decades of proven experience.

With this acquisition BA reinforces its commitment to the mitigation of climate change through the reduction of its CO2 footprint and the further development of a circular economy.

For several years, the BA Group has been setting ambitious CO2 reduction targets, incorporating a sustainability roadmap into both its operational and market strategies. The incorporation of Recresco opens the possibility to develop the Group's current recycling operations supported by the extensive knowledge of Recresco's team through collaboration.

Sandra Santos, CEO of BA Glass, said: “The acquisition of Recresco is an extremely valuable opportunity to access high-quality recycled glass, representing a significant step towards our goal of reducing 50 percent of CO2 emissions by 2035. Incorporating a higher percentage of recycled glass in our products, will allow us to be nearer to closing the glass loop and making glass the most sustainable packaging material in the world.”



Tim Gent, Recresco's General Manager, added: “partnering with BA represents a unique opportunity for our team to participate actively in future recycling projects in other geographies, where BA Group has its operations - leveraging our know-how and experience in the recycling of glass.”

BA Glass is the fourth largest glass packaging producer in the world, with a turnover close to EUR 1.6 billion and 5,000 employees worldwide. It operates three glass plants in Portugal, two in Spain, one in Germany, two in Poland, two in Bulgaria, one in Romania, one in Greece and two in Mexico.

WWW.BAGLASS.COM

SCHOTT PHARMA

Investment in new production facility in Serbia



Amid growing market demand, **SCHOTT PHARMA** continues expanding its global manufacturing network, deciding recently to invest a double-digit million amount of euros in a new production site for pharma drug containment solutions and delivery systems in Jagodina, central Serbia.

“With this move, we are strengthening our presence in Europe, improving our competitiveness and increasing our manufacturing flexibility to meet the needs of our customers in the region,” explained Andreas Reisse, CEO of Schott Pharma. The ramp-up for the manufacturing of ampoules for the pharmaceutical industry is expected to start over the course of 2024.

As a pioneer in pharma drug containment solutions and delivery systems, the company supplies the global pharma industry with high-quality solutions to safely store and administer medications. As such, the site in central Serbia, is intended to produce ampoules that are suitable for storing injectable drugs, e.g., painkillers, inflammation inhibitors and anaesthetics. Other product groups might follow based on market demand.

The production site in Jagodina, a town of 35,000 inhabitants and the administrative centre of the Pomoravlje County, is well on schedule. In the first phase, Schott Pharma will create 130 new jobs, and 350 are planned for the expansion phase.

WWW.SCHOTT-PHARMA.COM

FEVE

Disappointment with EU Council’s approach on PPWR

Unlike the European Parliament, the Council of the EU has failed to recognise the contribution that circular packaging can make to competitiveness and sustainable growth in their position on the Packaging & Packaging Waste Regulation (PPWR). The European Container Glass Federation (**FEVE**) urges co-legislators to address waste reduction targets fairly, protect distinctive packaging designs and be more ambitious on recyclability and separate collection during the upcoming trilogue (inter-institutional) negotiations.

Fair effort sharing by all materials to reduce packaging waste

“We are deeply concerned that, although Member States acknowledged the risk of material substitution, the overall packaging waste reduction targets based

only on weight will inadvertently encourage a shift from circular materials like glass to lighter but less recyclable or reusable materials,” said Adeline Farrelly, Secretary General of FEVE.

Protect distinctive packaging designs

“On top of its health and environmental benefits, the characteristics of glass in terms of design, transparency, shapes, colours and versatility often make glass an integral part of a product,” Farrelly continued. “So restricting packaging design disproportionately means that all products will look similar. Brands will lose one of the most important tools to convey their identity to consumers, and to stand out on the shelves.”

Beef up recyclability measures

“Not all recycling has the same environmental value,” said Farrelly. “The introduction of recyclability performance grades rewarding packaging that can be recycled multiple times and that can feed into a closed material loop would have been a major milestone. We regret that Member States missed the chance to incentivise packaging that is infinitely recyclable and which can remain productive in a circular economy over and over again.” →

← Push for separate collection targets for all materials

The industry supports a mandatory separate collection target of packaging waste for all materials and regrets that Member States decided to limit this to a small proportion of packaging formats in scope of the mandatory Deposit Return Schemes (DRS).

“Mandatory separate collection targets for all packaging materials will reduce waste much more effectively. It will also ease the burden on taxpayers and a country’s waste management costs,” added Farrelly.

WWW.FEVE.ORG



BACARDI AND HRASSTNIK1860

Carbon footprint of glass bottle production cut

A member of the Vaider Group and one of the leading global glass manufacturers, **Hrastnik1860** recently joined forces with **BACARDI** - one of the world’s leading spirits companies, to unveil the world’s first industrial campaign using the hydrogen glass melting process. This ground-breaking collaboration aims to transform the glass industry by substantially decreasing its carbon emissions and propelling the shift towards a greener, more sustainable tomorrow.

The bottle, which for the purposes of the trial was the iconic ST-GERMAIN® elderflower liqueur bottle, is identical in appearance to the same bottle produced using traditional methods and will reach bars and stores in the coming weeks.

Over the course of the trial, which produced 150,000 of the brand’s 70 cl glass bottles, hydrogen contributed more than 60 percent of the fuel for the glass furnace, cutting GHG emissions by more than 30 percent.

“Piloting this lower carbon glass production is another example of Bacardi leading the industry in environmental best practice,” said Rodolfo Nerví, Vice President, Safety, Quality and Sustainability for Bacardi. “We will take the learnings from the trial to help shape a pathway to hydrogen-fueled glass production and create a blueprint for others to follow. It’s only through making change as an industry that we can bring significant change to our impact on the environment.”

Peter Čas, CEO of **HRASSTNIK1860**, added: “Successfully producing lower emission, premium glass bottles at a commercial scale,



with absolutely no compromise on quality, has made all the hard work worthwhile. Like Bacardi, we are committed to developing new innovations that lower emissions while maintaining premium quality. This revolutionary technology proves the two can go hand in hand and we are now taking the first steps in bringing it to market.”

WWW.HRASSTNIK1860.COM

VETROPACK

Company joins the virtual power plant

Vetropack Straža, Croatia, has joined the operation of the Koer virtual power plant, which will actively contribute to the stability of the Croatian energy system. This cooperation is an additional support to the system for connecting new capacities of renewable energy sources and transition to more sustainable energy production and consumption.

The virtual power plant unites producers, consumers and battery storage systems within the Croatian power system. It enables



end users to actively participate in the electricity market while helping the Croatian Transmission System Operator to optimally manage and balance the power system.

Mario Berc, Director of the Technical Sector at VETROPACK Straža, emphasised that Vetropack is already actively contributing to sustainability through initiatives such as Science Based Targets and the Supplier Leadership on Climate Transition programme. Vetropack Straža is also continuously improving its energy efficiency and investing in renewable energy sources.

Two solar panels installed on the roofs of the finished goods warehouse produce 1 GWh of electricity per year, which is used to produce compressed air.

Berc said: “We have provided the flexibility of the production process to maintain the balance of the Croatian electricity system, while supporting the green transition of the Croatian economy towards a more sustainable energy system.”

As a leader in energy innovation, Koer has created the first virtual power plant in Croatia, and Vetropack Straža is proud to be part of this platform. Marko Lasić, Director of Koer, pointed out that cooperation with companies such as Vetropack Straža opens up new opportunities for the economic sustainability of renewable energy sources.

WWW.VETROPACK.COM

BA GLASS

New furnace inaugurated at Bucharest plant

BA Glass recently announced that a new furnace at the Bucharest plant in Romania has been officially inaugurated.

Equipped with advanced technology this new furnace will enable the plant to boost the production of more sustainable glass packaging.

This marks another significant milestone in the company's history that was shared with the local authorities, clients, suppliers, partners, employees and other stakeholders.

During the event, BA GLASS had the honour of welcoming some representatives from the Romanian Government,

advocating for glass as a sustainable and recyclable material. Furthermore, they expressed their support to BA's energy reduction plan and highlighted the significance of the company's substantial investment in the country, in alignment with ambitious sustainability targets.

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ORORA

Acquisition of Saverglass successfully completed

Following an announcement in September of plans to acquire premium global glass business **Saver**glass SAS, Orora Limited recently completed the process through the acquisition of all of the shares of Olympe SAS, which means the outstanding business is now part of the **ORORA** Group.

Saver

glass is a global leader in the design, manufacturing, customisation and decoration of high-end bottles for the premium and ultra-premium spirit and wine markets. This represents a unique acquisition of a high-quality business - enhancing Orora's strategic advantage, scale, diversification and its future growth opportunities.

Orora has funded the acquisition with the proceeds of its equity raising comprising an institutional placement and accelerated non-renounceable entitlement offer and extended Global Syndicated Facility Agreements. The debt maturity profile of the group is now 4.3 years.

Syndication of the debt facilities was heavily oversubscribed, reflecting the strong support from existing and new lenders to Orora and Saver

glass. This refinance reinforces Orora's debt capital structure whilst also providing financial flexibility.

Orora CEO Brian Lowe said: "We are extremely pleased to announce the completion of the acquisition of Saver

glass. This strategic acquisition further strengthens our existing business, establishing Orora as a global player of scale in attractive premium segments. I am thrilled that Saverglass is now officially part of the Orora Group, and I look forward to working with the Saverglass team, led by CEO Jean-Marc Arrambourg, as we embark on this next exciting chapter in our company journey."

WWW.ORORABEVERAGE.COM

ARDAGH GLASS PACKAGING

Nigel plant in South Africa heats up N3 furnace

ARDAGH GLASS PACKAGING-Africa (AGP-Africa) recently announced the heat-up of the N3 furnace at its Nigel production facility in Gauteng, South Africa. The delivery of another ZAR 1.5 billion mega-project, within budget and on time in just over 12 months from approval, is a great achievement by all involved.

The Nigel 3 (N3) expansion was announced shortly after the commissioning of the N2 expansion project at the same facility. It comprises a new furnace and four production lines. The expansion will add 50 percent more output to the facility's production, making Nigel the largest glass container production facility in Africa and one of the largest and most efficient facilities globally.

Despite declining economic conditions last year, this investment by Ardagh Group has been living up to the ac-



quisition commitments made to government as well as the promise to customers to continue investing in additional capacity ahead of demand growth to ensure sustainable, long-term supply to the industry.

Unfortunately, over the past 12 months during the N3 build, there has been a further decline in demand for glass packaging, mostly due to changes in packaging formats in the beer industry and a large decline in the wine industry in the Western Cape.

"While demand has been disappointing, it is normal for our industry to go through cycles where capacity exceeds in- →



← stalled demand and our facilities need to operate below name-plate capacity for periods of time,” said Paul Curnow, Chief Executive Officer of AGP-Africa. “However, our commitment to long-term growth in South Africa remains unchanged. The recent investments in capacity leave us well positioned, with a modern asset base and reasonable spare capacity to be restarted at short notice when sustainable demand supports additional production.”

Further, the N2 and N3 projects incorporate significant energy, water efficiency and environmental benefits. These rep-

resent important steps in AGP-Africa's journey to decarbonise glass production, reduce emissions in the communities in which the company operates and provide customers with packaging that supports localised closed-loop recycling. Beyond the investment in additional glass capacity, more than ZAR 150M is being invested in air emissions treatment systems at Nigel to ensure no production impact on air quality. The Nigel facility will also house the company's single largest renewable project to date – a 10MW solar PV array.

WWW.ARDAGHGROUP.COM

SEFPRO

New generation production line

In the second half of 2024 Sefpro is set to inaugurate a new-generative electro-fusion furnace at its Le Pontet site in southern France. Its flexibility will enable **SEFPRO** to produce a variety of products to offer solutions and support customers in their sustainability journey.

With the low carbon objective of the glass industry, glassmakers are exploring ways to reduce their CO2 emissions. In line with this goal, and to open up new development opportunities, Sefpro has designed a unique production line. Innovative, highly flexible and automated, it will be able to manufacture various standards of refractory solutions.

The advantages of a flexible refractory line

Initially, this automated line will increase production capacity for Cruciforms® refractories, which are installed in the regenerators of glass furnaces to boost heat exchange.

Thanks to their unique shapes and because they are made of fused-cast material, Cruciforms® checkerpack enable the reduction of energy consumption by several percentages from the very beginning of a furnace's campaign while increasing the lifetime of the regenerators. Their corrosion resistance reduces ageing, thus increasing the thermal performances of regenerators with less energy. These solutions, which are unique on the market for their environmental performance and durability over time, celebrated 50 years of success in 2023.

Later, this production line will be extended to other fused-cast standard solutions such as paving tiles - essential for reinforcing the bottoms of electric or electrically boosted furnaces -or arch stones- suitable for oxy-fuel or hydrogen furnaces. All these solutions have one thing in common: they aim to support Sefpro customers' transition to low-carbon glass manufacturing.

Supporting Sefpro sustainability roadmap

Beyond strengthening Sefpro's ability to provide sustainable solutions to its customers, the investment is fully in line with its sustainability roadmap - both in terms of carbon emissions and respecting circularity. Compared with traditional furnaces, energy requirements for annealing can be reduced by 65 percent. The furnace will use up to 20 percent hydrogen instead of natural gas, allowing energy saving using new methods for glass melting with decarbonized energy.

WWW.SEFPRO.COM



VIDRALA

100 percent Vidroporto acquisition completed

Vidrala recently announced the acquisition of the entire share capital of **Vidroporto S.A.** for EUR 384M at current exchange rates. This figure includes the minority stake acquired at the beginning of 2023, the remaining majority stake acquired now and the debt assumed in the Brazilian company.

With this transaction Vidrala continues its internationalization process and expects it to contribute positively to the group's consolidated profits and cash generation from the start of its integration. The acquisition of Vidroporto represents an important step for **VIDRALA's** long-term strategy, as it boosts the diversification of the business towards the growing Brazilian market and represents a base for potential future development in regions that will offer interesting opportunities and will strengthen long-term alliances with strategic customers. Gorka Schmitt, CEO of Vidrala, said: "We continuously analyse and assess the different opportunities that arise in the various markets. This strategic move lays the foundations for establishing a platform for the future, in regions that show promising potential for the growth of our people and our project."

Vidroporto, with its subsidiary Indústria Vidreira do Nordeste, is a competitive Brazilian producer of glass containers, founded on an excellent industrial heritage. It has an experienced management team and strong business relationships with strategic customers. It also operates two high-tech plants located in Porto Ferreira, São Paulo state, southeast region, and Estância, Sergipe state, northeast region, from where it supplies containers to some of Brazil's leading brands in segments such as beer, spirits and soft drinks.

Vidroporto calculates its sales of last year to be worth approximately BRL 850M and EBITDA approximately BRL 300M. It is worth noting that the Porto Ferreira plant received a significant expansionary investment in 2023, which is fully-disbursed through local debt amounting to approximately BRL 900M at the date of the closing of the transaction. The new facility, which has increased Vidroporto's total production capacity by 35 percent, started operations at the beginning of the second half of 2023 and is expected to have an impact on results in 2024.

WWW.VIDRALA.COM



SGD PHARMA

2024 growth strategy defined as company strives for leadership

SGD PHARMA recently announced its goal to become the global market leader in primary pharmaceutical glass packaging. CEO Olivier Rousseau explained that SGD PHARMA intends to grow significantly over 2024.

Underpinning this objective, Rousseau outlined the investment achievements already notched up in 2023 to illustrate how SGD Pharma has paved the way for this planned growth.

“The start of 2023 brought a new partnership, with the announcement of our



joint venture with Corning, supported by investment from the Telangana state in India. This collaboration combined Corning’s state-of-the-art coating technology with SGD Pharma’s glass-converting expertise to manufacture Velocity Vials, Type I borosilicate glass tubing.”

The construction of a new tubing plant officially began with a celebratory ground-breaking ceremony at the plant in Vemula, India, back in June 2023. On completion, the new facility will expand pharmaceutical packaging manufacturing in India and access to the Corning Velocity Vial technology in the region.

Another key area of progress for SGD Pharma last year was the company’s sustainable efforts and decarbonization strategy. SGD Pharma was awarded a gold EcoVadis sustainability rating and made a number of modifications throughout the year to improve its high score for the 2023 award.

As well as the new line for Vemula, India, other site investments include the renovation of one of two furnaces at SGD Pharma’s Saint Quentin Lamotte (SQLM) plant in France.

Furthermore, a Memorandum of Understanding was signed with the Mayor of Zhanjiang in China for SGD Pharma to invest in the rebuilding of the plant furnace at Zhanjiang and a new siliconization operation line will become operational at the SQLM plant to increase flexibility and capacity.

Sterility range of ready-to-use vials

In terms of products, SGD Pharma launched the extension of its Clareo range to include 10 ml as well as its Sterinity range



of ready-to-use vials in sizes 10 ml and 20 ml. The second half of the year saw the announcement of the company’s pharmaceutical vial thermosealing offering, PROSEAL+.

Additionally, SGD Pharma celebrated 30 years in China at its Zhanjiang manufacturing plant, which produces moulded glass and is market leader in glass for cosmetics and beauty packaging.

WWW.SGD-PHARMA.COM

SCHOTT PHARMA

New vials launched for mRNA and gene therapy

SCHOTT PHARMA is introducing glass vials optimized for deep-cold storage of drugs. These life-saving vaccines, such as gene therapy and mRNA medications must be frozen and transported at temperatures down to below 80 degrees Celsius. Due to the high thermal stress and other factors in the freezing and thawing process, conventional vials are prone to glass breakage during the process, which results in costly downtimes and drug loss. To prevent this, Schott Pharma's EVERIC® freeze vials feature improved strength thanks to optimized glass tubing, vial geometry and production process.

"Our scientific strength tests have shown that the new vials outperform standard vials, making them a dedicated solution for frozen medications used to treat infectious diseases, cancer and central nervous system disorders," said Andreas Reisse, CEO of Schott Pharma.



Pharma companies are looking for an experienced partner in terms of drug containment and delivery systems, who can provide the right solution to help shorten the time to market.

"By expanding our portfolio with the new vials, we are now the only partner to leading pharma companies, who can offer both polymer and glass solutions for deep-cold storage requirements," added Reisse.

Additionally, drug manufacturers want to ensure that the drug remains stable until it reaches the patient. For this, the container closure integrity (CCI) is crucial. However, it, too, is at risk in deep-cold temperatures because the stoppers can shrink and lose elasticity, which could affect the drug's efficacy. Through vigorous scientific testing with eight variants, Schott Pharma found a zero percent failure rate for all configurations, showing that CCI can be maintained for all combinations within ISO dimensions, including EVERIC® freeze vials.

The new vials are manufactured in Müllheim, Germany, which is also where SCHOTT Pharma's competence centre is located, can be supplied as ready-to-use (RTU) if requested and are available in two to 30 millilitres. The solution is the newest member of the established EVERIC® portfolio, which allows pharma companies to flexibly combine features to address different needs and enhance efficiency.

WWW.SCHOTT-PHARMA.COM

Celebrating the installation of **CAR-MET**'s latest furnace in Sweden

With demand now soaring for plants that can use cleaner energy while driving growth, CAR-MET recently rose to the occasion by overcoming logistical challenges to successfully install a 47-metre, electrically-heated furnace at Ardagh, Limmared. Assembled in just six days, its double-belt allows for simultaneous operations at various temperatures and glazes.



SUCCESS STORY



After the years of Covid, during which many in the industry had the collective sensation that everything had to come to a halt, the leadership team immediately noted a high demand from the market for new plants such that, as of today, the company has orders in-house spanning the entire 2024. The hope here is that the trend continues, that the innovative push persists - and, above all, that current need to reduce energy consumption and drive production with clean energy leads more companies to consider the opportunity of modernising existing plants to become more efficient and less energy-consuming. Here Car-Met can already report a recent success story, which had it installing a new plant at Ardagh in Limmared, Sweden. Electrically-heated, and at 47 metres, it is perhaps the largest in the world. The plant itself consumes approximately 2350 kW of electrical energy for heating and a further 140 kW circa for motor management and other purposes. Renewable energy sources are used to power the furnace, which will primarily be used for decorating Absolut Vodka bottles as well as other products.

DESIGN CHALLENGES

Being a large-size plant, one of the first challenges to overcome was that of finding the right delivery method to make everything fit. Each module of this plant filled a truck. Indeed it took a total of 19 trucks for transportation. This treats a double-belt furnace measuring 2.40m x 2.40m when divided precisely in two. A single structure that contains two furnaces, its design allows for greater flexibility for the glassmaker - who

is essentially the producer. Within the left furnace, a product requiring a certain temperature can be placed while simultaneously using the right furnace for a different product that requires a different temperature. This way the two furnaces can operate simultaneously with two different cooking temperatures and different glazes. As such, it comprises two furnaces in one, with a length of 47 metres and two parallel belts of 47 metres. An enormous, extended





furnace which was assembled in just six days by a team of eight people, the plant itself now consumes about 1000 kW instantaneously.

PREHEATING TIMES

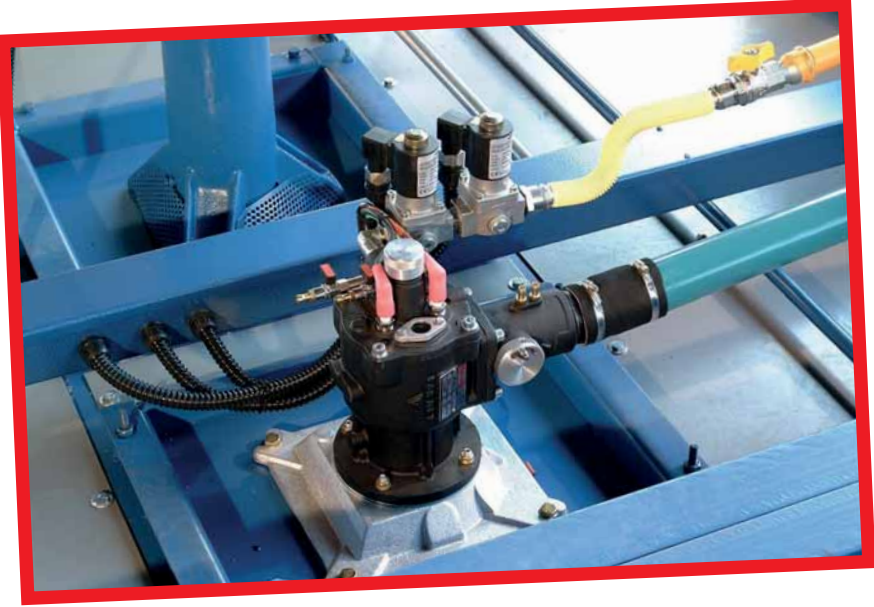
While preheating times are the same as other furnaces, for Car-Met the decoration temperature is always important as a reference. Once the first part of the furnace reaches the temperature of 680°C, the furnace is ready. By the time the glass reaches the end of the tunnel, the furnace has widely stabilised in temperature terms. Time varies depending upon on-site conditions but it typically ranges from one hour to about one and a half hours. The company always offers pre-testing to its customers at its facility. The furnace is fully constructed and preassembled. Car-Met conducts all the tests to ensure that everything conforms to technical specifications.

THE DECORATION PROCESS

The decoration process is more sophisticated as it involves higher working temperatures that range from the 550 degrees required for annealing to the 675 degrees needed for decoration - which reaches



SUCCESS STORY



the limit of grading beyond which there is risk of material deformation, which would necessitate technical expertise and the application of more precise and sophisticated technologies. Over the years the company has specialised in tunnel furnaces for glass tempering. It also introduced to the market a system that performs both tempering and decoration functions - resulting in significant energy saving, given that tempering involves a substantial energy consumption. The company's founder, Antonio Zanin, sadly passed away in March of this year - prior to installation of the new 47-metre-long furnace. As today's leadership team reports, his popular admonition to 'never

stop' is now remembered especially today - which includes the willingness to accept challenges untiringly, to strive for continuous improvement and, above all, to always keep promises. To quote Zanin himself: 'A promise made is worth more than a signature.'

CONTINUATION OF A PRIZED LEGACY

Following in the footsteps of Zanin's proud legacy, all Car-Met products are now attentively followed and checked throughout production from design to realisation to the final step of on site start-up. The company is also committed to researching and developing cutting edge technical solutions that are aimed at

simplifying product use, reducing energy expenditure and increasing life span over time. With a view to guaranteeing quality, all this has it looking after even the smallest detail.

IMPROVING GLASS QUALITY

For a global market in which quality is necessarily a strategic element, Car-Met deems it to mark the point of convergence between productive and commercial challenges, which are faced continuously - driven by the company's seasoned experience and state-of-the-art technologies. By this approach, Car-Met meets the future with confidence thanks also to its extremely flexible industrial track-record as well as the advantage of its continuing innovation - all within a framework that affords Car-Met the possibility to provide clients with the key ingredients of its signature quality whilst providing the plants they need and guaranteeing that delivery times are met.

ANNEALING LEHRS

Annealing lehrs are fed by gas, electricity or liquid fuels where the exchange may be direct, indirect or mixed. Not only. Plants are suited to working with the most precious of crystals and the most elaborate bottles - spanning all table glassware types. Here Car-





Met satisfies the needs of modern glass companies, putting both its experience and its technology fully at their service. Indeed, with a belt width ranging from 60 cm to over five metres, the company can satisfy every kind of production requirement.

DECORATING LEHRS

The delicate world of decoration requires great attention to detail. Nothing is left to chance, with everything carefully planned and researched with a view to reaching the best results. Here Car-Met has been offering its service for the decoration of hollow glass since the earliest days of the market. The company's uniform temperature has grown jointly with its developing relationships with clients as they excel at decorating -both together as well as individually- in applying new tac-

tics to reduce expenditure while facing the modern needs of new applications - an exceptionally successful triptych to which Car-Met is now proud to lay claim.

TOUGHENING

Whereas annealing process removes tensions from the glass after forming, a toughening line restores the tension of the glass itself. By means of this toughening process, the plant -both on belt and spindle- facilitates an increase in mechanical and thermal resistance of hollow glass articles - making each safer for use as well as application in our modern day lives. Thanks to this process the article becomes two to three times more resistant to mechanical shock than any other annealed product with fragmentation after a fall being also controlled - the glass pieces being extremely small

and therefore not as dangerous. Of course, this process will select the products of the highest quality. Either way, scrap tempered glass or recovered glass would be recycled countless times and can be mixed at the time of composition. This signifies important advantages for the everyday use of glass articles to which glass industries necessarily will have to pay attention. Here's why Car-Met believes that this process, especially if applied to tableware and to technical glass, offers great possibilities for the future. Indeed the company provides careful development and accurate planning, having even created a suitable division that's dedicated exclusively to the toughening market and its applications.

INSTALLATION

Car-met's dedicated techni-

SUCCESS STORY



cal team is dedicated to both machinery operation and site direction - ensuring careful spare part management, professional customer care, helpfulness and collaboration at all maintenance interventions as well as change and reconditioning of plants related to its production range

- even when produced by other companies.

Stackers

- 2 axes mechanical driven
- 3 axes servo driven

With a water or air-cooled bar, and upon request, with a counter-bar.

Cross-conveyor

With water-cooled supporting beam - guaranteeing linearity and performance.

Mould preheating ovens

- Gas or electricity-powered heating with electronic temperature control;
- Provided with a cart to down-load and load moulds into the chamber.

(internal dimensions cm 100x130xh. 50, variations on request)

Scrapers

- With wear-proof steel bottom
- Without the use of basalt
- Provided with special blades, activated by a high resistance concrete chain, built exclusively from our own design.
- Complete with rotation control device, torque limiting device and emergency stop.

Brush

- Special brush for belt cleaning

Control cabinets

Upon request of the client, all company plants may be provided with different control systems:

- Only thermal regulators
- With thermo regulators and plc
- With pc onboard the machine
- With pc supervision from a distance

Both brands and component models can be agreed upon with the client. ■

IN FOND MEMORY OF ANTONIO ZANIN

Born in 1931, Antonio Zanin is remembered in the glass world today as a true pioneer. After migrating over his work life from metalwork to glass, Zanin applied his great dedication to glassworkers worldwide - overseeing production at the company's premises while constantly visiting clients worldwide. Always proud of his creations and the results he achieved, Zanin passed away in March 2023. His extraordinary know-how lives on now in the hands of his heirs to continue along his path based upon the signature principles that characterized his exemplary professionalism. Zanin established Car-Met in 1972 together with two partners. Initially operating as a metal carpentry company, it was the company's proximity to a glassworks that soon led to its involvement in supplying the glass industry. With Zanin's oversight, Car-Met evolved over the years from providing metal structures for warehouses and buildings to meeting the demands for metal structures in melting furnaces. As time passed, the company expanded its operations to include proper annealing furnaces, with the transition from annealing furnaces to decoration furnaces and tempering lines occurring swiftly.



CAR-MET

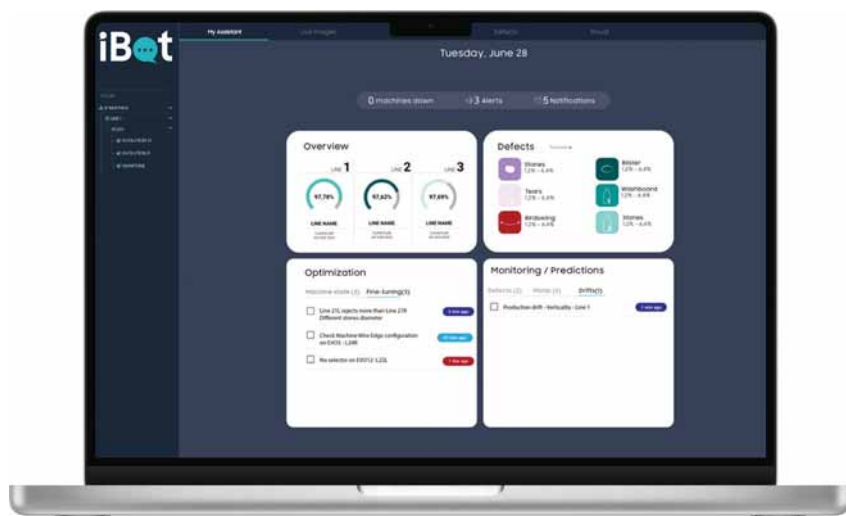
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Towards environmental optimisation: IRIS shifts glass inspection paradigm

A transformative technology, AI is not merely refining inspection processes. More significantly, it is orchestrating its own 'strategic dance' by which waste is being minimised while the carbon footprint of glass production is diminishing. The imperative to enhance environmental performance within the industry extends beyond commercial success - likewise resonating with the crucial need to conserve energy and curtail emissions. Non-saleable glassware, which is notoriously wasteful in time, money and resource terms -not to mention raw materials and energy- underscores the pivotal role of production efficiency. Here the metric of choice for efficiency assessment is the pack-to-melt ratio, widely embraced by glass manufacturers as the quintessential measure in refining environmental impact - whether the power source be renewable or finite. The entire glassmaking process from quarrying and raw material supply to batch mixing, melting, forming, transportation, pack-

As was recently explained at ASEAN Glass' 45th Conference by Asia Technical Support Manager for IRIS Inspection Machines Asia Alexandre Tan, inspection was seldom highlighted as a linchpin of decarbonization within the world of glass manufacturing - until artificial intelligence quickly proved itself a game changer in the area.





ing and inspection generates carbon emissions. While it may seem that inspection machines indirectly contribute these emissions through electricity consumption – as compared to the hot end – further investigation shows a potential to catalyse decarbonization throughout the entire production process.

THE COLD END: PRECISION IN DEFECT REJECTION

Refinement in inspection processes goes beyond a mere superficial enhancement of reject rates. Instead it translates to a meticulous rejection mechanism – elevating the pack-to-melt ratio. This, in turn, facilitates swift responses at the hot end, the primary CO₂ emitter – thereby enabling source-level rejection reductions. Here precision in rejection, driven by improved communication with the hot end, ensures that only bottles that meet the specifications will reach customers. It simultaneously accelerates changes at the hot end – resulting in the production of fewer unsaleable bottles from the outset. While

the industry once prided itself in reusing factory cullet, false rejections impose the need to melt glass twice in order to produce a single flawless bottle. Nuances in the market further complicate the imperfection tolerance equation. Industries with stringent cosmetic quality requirements, such as perfumes, naturally expect higher rejection rates in comparison with sectors like food and beverages. Here, for IRIS, eliminating false rejection comes as a key objective as the company sets its sights on



leveraging artificial intelligence to overcome such challenges.

GLASS INSPECTION AND THE WONDERS OF AI

A stalwart in AI integration within its systems, IRIS has been

at the vanguard of its development since 2018. Indeed the company's foray into empowering its technology through 'learning capacity' has masterfully revealed the intricate workings of the human brain. With its ability to discern critical defects from imperfections, AI assumes the role of a discerning glass expert – with ramifications extending beyond productivity and quality to a more subtle impact upon the energy footprint of glassmaking.

AI-driven inspection introduces a richer classification of defects, discernment of critical defects, a calibrated tolerance for acceptable blemishes and a significant reduction in false rejections – all accompanied by expedited corrective actions. Besides, the precision achieved by AI in defect identification stands in stark contrast to the legacy approach that had inspection machines lumping together various defects under a single rejection rate.

THE EVOLUTION OF IBOT: PINNACLE OF AI INTEGRATION

With R&D endeavours at IRIS delving deeper into the glass manufacturing process, their culmination has been the creation of iBot – an intuitive tool tailored to offer ultra-comprehensive analysis for operators and managers across hot-end, cold-end and quality control teams. iBot transcends the capabilities of conventional Manufacturing Execution Systems (MES), providing real-time predictions of process defects as well as immediate communication with hot-end leaders and operatives for corrective action. iBot's prowess lies in its ability to assimilate data from all Evolution machines connected to it, encompassing adjustment parameters and measured values for each inspected bottle. This





real-time processing equips iBot to offer adjustment priorities for each machine while prioritising the main defects. Yet beyond mere defect identification, iBot identifies production drifts section by section - facilitating proactive corrective actions as it averts critical limits and rejection. Here iBot essentially harnesses the full potential of AI to deliver exceptionally-detailed analyses, repeatability, accuracy, predictions of drifts and systemic defects, as well as accurate information regarding defect origin and criticality. Its seamless setup

ensures swift adaptability for job changes - making it a potent tool for monitoring performance and effecting prompt changes.

Indeed comprehensive AI deployment translates into error prevention - signalling a boost in the pack-to-melt ratio whilst offering critical insights for future manufacturing and conservation of energy, effort and resources - all to enhance productivity ultimately. Recognizing the pivotal role of inspection in the industry, IRIS remains confident that reducing rejection rates as a high pack-to-melt ratio is maintained

will positively impact the carbon footprint of the glass industry - and profoundly at that. ■

IRIS Inspection machines

IRIS INSPECTION MACHINES

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Glass furnace at Casablanca: **BDF Industries** and **SEVAM** jointly jubilant

BDF INDUSTRIES and SEVAM recently marked a milestone together with the successful ignition of a glass furnace at Casablanca after a winning collaboration that started just under two years ago. Showcasing technical expertise and a dynamic partnership, their shared project overcame challenges thanks to seamless cooperation – a veritable beacon of excellence for the glass manufacturing industry.



In a successful collaboration with SEVAM, BDF Industries recently marked a significant milestone in the glass manufacturing landscape. Ignition in Casablanca, Morocco, of the SEVAM glass furnace symbolises the realisation of a project that was initiated back in mid-2022. It underscores the synergy, trust and shared commitment between these two major players within the sector. Transcending conventional business dealings the partnership evolved into a harmonious collaboration characterised by mutual respect and a shared vision for excellence.

TEAMWORK THAT EXTENDS BEYOND COLLABORATION

Here BDF Industries took on the intricate task of engineering, supplying and constructing Furnace 1 - a task entrusted to it by SEVAM. This is a cutting-edge End Fired Furnace with three production lines - all dedicated to meticulous container glass manufacturing. The comprehensive scope of supply covered such critical components as refractory materials, precision steel structures, vital equipment, advanced combustion systems, state-of-the-art batch chargers, conditioning zones, water cooling systems and the processes of erection, tempering and commissioning. Indeed the success of BDF Industries extends well beyond tangible results to the exceptional

quality and innovation incorporated into the project itself. Thanks to SEVAM's unwavering trust, the collaboration was more than a transaction - being also a dynamic partnership that was fueled by open communication, shared objectives and a mutual commitment to excellence.

A RECIPE FOR SUCCESS

Expressing gratitude for the collaborative spirit that defined the partnership, BDF Industries acknowledged SEVAM's pivotal role in the project's success. Here seamless cooperation between the two companies, in strategic decision-making and on-site execution, significantly contributed to the efficiency and timely completion of the project. Despite the challenges posed by the relatively brief worksite period, including a demanding erection timeline, the dedicated efforts of both teams and unwavering support from SEVAM

allowed BDF Industries to successfully navigate and conquer these challenges. This ensured adherence to the meticulously planned schedule.

BENCHMARKING ACHIEVEMENT

In sum, as the flames flicker in the SEVAM glass furnace, casting a warm glow over Casablanca, the collaboration between BDF Industries and SEVAM emerges as a beacon of excellence in the glass manufacturing industry: an achievement that is not only a testament to technical prowess but also to a celebration of a partnership that has been founded on trust, collaboration and the pursuit of elevated quality. Here's why BDF Industries recently expressed its gratitude to SEVAM for being such a valued collaborator along this journey of innovation and success. ■




The future we see through

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Hydrogen revolutionises commercial glass production: **HRASTNIK1860** breakthrough



Setting current industry trends in sustainability, HRASTNIK1860 has become a leader in green glass. With packaging that includes premium bottles fueled by 60 percent hydrogen – which reduces the carbon footprint by over 30 percent – the company now plans to expand low-carbon glass production – cementing its commitment to environmental responsibility as it continues to shape the industry’s future.

In a groundbreaking achievement for the glass packaging industry, Hrastnik1860, a member of Vaider Group, recently accomplished the successful industrial production of premium glass bottles - all while using hydrogen as a primary energy source. A truly historic milestone, not only does this mark a pioneering integration of hydrogen into the glass manufacturing process. It also positions Hrastnik1860 as a leading European producer of top-tier glass packaging - thereby spearheading a green transformation within the industry.

BREAKING RECORDS

With its impressive 60 percent hydrogen content employed in the glass melting process, Hrastnik1860 has succeeded in reducing the direct carbon footprint of the melting procedure by over 30 percent - a feat that significantly surpasses standard industry practices. Such a triumph not only solidifies the company’s standing as a trailblazer in high-quality glass production. It further underscores its commitment to environmental sustainability.

Addressing previous reservations about the feasibility and economic viability of producing premium glass with a substantial proportion of hydrogen,



Hrastnik1860 has unequivocally dispelled these concerns through its groundbreaking development. Indeed the company’s success here affirms that the replacement of natural gas, the conventional energy source in glass production, is not only possible but entirely in alignment with existing quality requirements.

WORDS FROM THE LEADERSHIP TEAM

Said Tilen Sever, Director of Development, Technology and Innovation: ‘Tilting the hydrogen content in the mixture with natural gas beyond 50 percent significantly affects the combustion characteristics of the mixture. However, we have success-

fully used hydrogen on individual burners up to 100 percent, with an average usage of 62 percent for melting.’ Crucially, too, Sever emphasised that ‘the combustion efficiency when using hydrogen was similar to that of natural gas. Indeed hydrogen had no significant impact on the clarification and discolouration of the glass, thus allowing us to maintain product quality within existing technological limits.’

Said Matevž Fazarinc, Executive Director of Steklarna Hrastnik: ‘Reducing the carbon footprint has been one of our central strategic goals for a long time. Prior to the use of hydrogen, other steps were taken, such as reducing the proportion of natural gas consumption

ENERGY

in favour of electricity produced from renewable sources (photovoltaics), including a significant portion from our own production. Now, we are adding hydrogen to demonstrate that we can truly introduce alternatives in production processes to reduce the use of fossil fuels.'

The strategic move towards sustainable practices aligns seamlessly with the evolving preferences of end consumers, who increasingly seek environmentally conscious products. This trend has not gone unnoticed by Steklarna Hrastnik's strategic partners and prestigious brand owners, reinforcing the notion that continuous innovation towards decarbonizing production is becoming a pivotal competitive advantage in the glass industry.

Peter Čas, CEO of Steklarna Hrastnik and Vaider Group, expressed confidence in the company's trajectory by asserting 'its rightful place among the leading producers of premium glass packaging, which is not only of exceptionally high-quality and aesthetically refined but also the most sustainable.' Čas went on to say that 'this market position is by no means given to us;



we earned it through strategically-planned and successfully-executed transformation of the glassworks years ago, targeted and extensive investment cycles, hard team work, and continuous innovation. All of this has led to proudly presenting the best practices of sustainable production, pushing boundaries in the entire industry, and thereby setting new trends. These are excellent foundations for the continued successful development of

the Vaider Group and Steklarna Hrastnik.'

LOOKING AHEAD

Steklarna Hrastnik plans to build upon this success by initiating new production series for strategic partners in 2024. Initial estimates project that the share of low-carbon glass packaging, produced with hydrogen and other sustainable technologies, could constitute up to 15 percent of the company's total production in the coming years. This ambition not only solidifies the company's commitment to sustainability but also expresses the joint ambition of Vaider Group and Steklarna Hrastnik to shape the future of environmentally-responsible glass production.

ABOUT HRASTNIK1860

A member of Vaider Group with two production units located in Hrastnik, Slovenia, and more than 160 years of tradition, Hrastnik1860 is a renowned global partner in the development and manufacturing of world-class engineered glass products. The company is famous for creating technically-demanding bottles, primarily in the spirits segment, and offers an extensive range as a full-service solution partner - from R&D and consulting to innovative design, prototyping, manufacturing, decoration and reliable delivery.

Being made of top-quality glass, HRASTNIK1860's products are acclaimed for their perfect crystal shine and are entirely free of heavy metals. These products are distinguished by a combination of style and quality, ranging from traditional designs to innovative, award-winning solutions that have received recognition and won prestigious awards such as the Red Dot Design Award, German Innovation Award and other design-related honours. Hrastnik has also been honoured with the EcoVadis Gold Medal and Platinum Certificate for its sustainability efforts.

HRASTNIK1860

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ThicknessPen™ - an easy way to measure thickness, courtesy **AGR**

A must-have for competitive industries that prioritize quality control and productivity, AGR's ThicknessPen™ has dual-mode precision. Whether in magnetic or capacitance mode, this portable device ensures both accuracy and versatility. Its rugged, water-resistant design suits diverse environments, while Bluetooth connectivity and its very own app enhance operational efficiency.

ThicknessPen™ is designed to provide high accuracy measurements yet withstand the rigours of the industrial environment whether in the laboratory, on the factory floor or in the field





ThicknessPen™ can be used in its docking station for bench-top measurements or on its own, as a portable device wherever critical measurements are required.

There's now a new tool on the market to help manufacturers measure thickness and manage material distribution. The ThicknessPen™ from AGR international offers an innovative approach to portable thickness measurement - providing easy, non-destructive and highly accurate thickness measurement of all types of non-ferrous products. The device was developed to address the multiple and diverse thickness measurement applications of the production environment, featuring a lightweight compact size that offers unlimited portability. Its rugged design is water and drop resistant, making it ideal for use anywhere from the laboratory to the plant floor to a wet environment at some job site in the field.

DUAL MODE DESIGN

With its patent-pending, dual-mode operation the ThicknessPen™ differs from other measurement devices, offering users the option to measure using either a magnetic or capacitance mode - whichever is most appropriate for the application. This affords a unique advantage - offering versatility in comparison to so many products in this marketplace while still providing the precision necessary for the laboratory, as well as the portability, ruggedness and safety for use on the production floor.

With its magnetic mode, a target ball is used during measurements that are similar to other magnetic gauges. This offers pin-point measurement with a level of precision equal to or exceeding traditional magnetic devices but with greater

simplicity and reliability. Unlike other magnetic-based systems, there is no need for multiple ball sizes to span the measurement range. On the ThicknessPen™ only a single ball size is used over the entire range, thereby eliminating the need for multiple calibrations and decisions regarding the proper ball to use for an application. Advanced design of the device incorporates a low strength, integrated magnet that remains unaffected by nearby ferrous items and doesn't carry the risks associated with probes that use strong magnetic fields. This mode is ideal for laboratory work, measuring intricate areas of a product where either pin-point or routine measurement of all types of non-ferrous materials is desired. The low-strength magnetic approach is also advantageous when measuring such soft

materials as foam and paper-board products.

The capacitance mode, on the other hand, provides the means to perform single-sided measurement without the need for a target ball. This is ideal at-the-line or for measurements in the glass plant or at customer sites where portability is desired and the risk of product contamination or inconvenience of using a target ball or ultrasonic coupling fluid is a concern. This mode offers a quick, 'touch and go' approach and is compatible with most non-metallic items. It's especially applicable for measuring large containers as well as such products as glass and plastic sheets and panels or large parts where the use of a target ball is impractical. In many cases, measurements traditionally performed with ultrasonic methods can also be performed with the ThicknessPen™. Its portability and rugged construction provide further advantages as well as compatibility with the production environment.

So whether using the magnetic or capacitance mode, the ThicknessPen™ can be adjusted to take measurements in several ways. These include the capture of a single measurement, a scan over a surface to collect multiple samples or min/max measurements that will identify the thinnest or thickest points over a measurement area.

APP-BASED, BLUETOOTH ENABLED

With the ThicknessPen™ App, a laptop or tablet becomes both data display and work centre for system management and operations. Through the App, an operator can do a host of operations, such as job creation and naming, recall of an existing job, data capture and storage. Measurements can be viewed



With the ThicknessPen™ App, a laptop or tablet becomes your data display and work centre for system management and operations.

in real-time and easily captured for data processing. In addition, all basic ThicknessPen™ management functions can be conducted with the App - including calibration, unit and mode selection. With the App, system software never goes out of date and upgrades are easily managed.

Utilizing Bluetooth technology, the ThicknessPen™ requires no cables or wires for its operation. When the pen is used remotely without a phone or tablet, data can be easily transferred from the pen and stored in the App upon return to the base station. However, if a wired connection is preferred, a USB cable is supplied with the device.

AGR products are designed to assist container producers, converters and fillers to stay competitive - all whilst meeting the increased quality demands of today's changing world. As an industry leader, AGR is committed to providing the

container and filling industry with technologically-advanced products for quality control and productivity improvement.

In sum, the most notable features of ThicknessPen™ include:

- Dual mode operation
- Compact and lightweight
- Rugged, drop and water-resistant construction
- Easy, intuitive operation
- Bluetooth-enabled
- tablet compatible ■

AGR®

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Crafting distinction: OCMI-OTG advancements for vials and cartridges

Introduced just under two years ago, OCMI-OTG's FLA18-9-LF518 line raises the bar for borosilicate glass tube pharmaceutical container processing. Achieving a whopping 55 pieces per minute, it offers flexibility, efficiency and superior automatic production quality. The modular platform, servo-driven system, OPTIVIAL camera and integrated components all account for its high-flying industry recognition.

A worldwide leading supplier of borosilicate glass tube processing lines for pharma and medical containers, OCMI-OTG recently shared its insights and the technical specifications on its FLA18-9-LF518 vials and cartridges complete line - a breakthrough technology the group launched less than two years ago, it has already been chosen and appreciated widely on the market, which quickly recognized it as a major step forward in vials and cartridges automatic pro-

duction lines - even setting new standards.

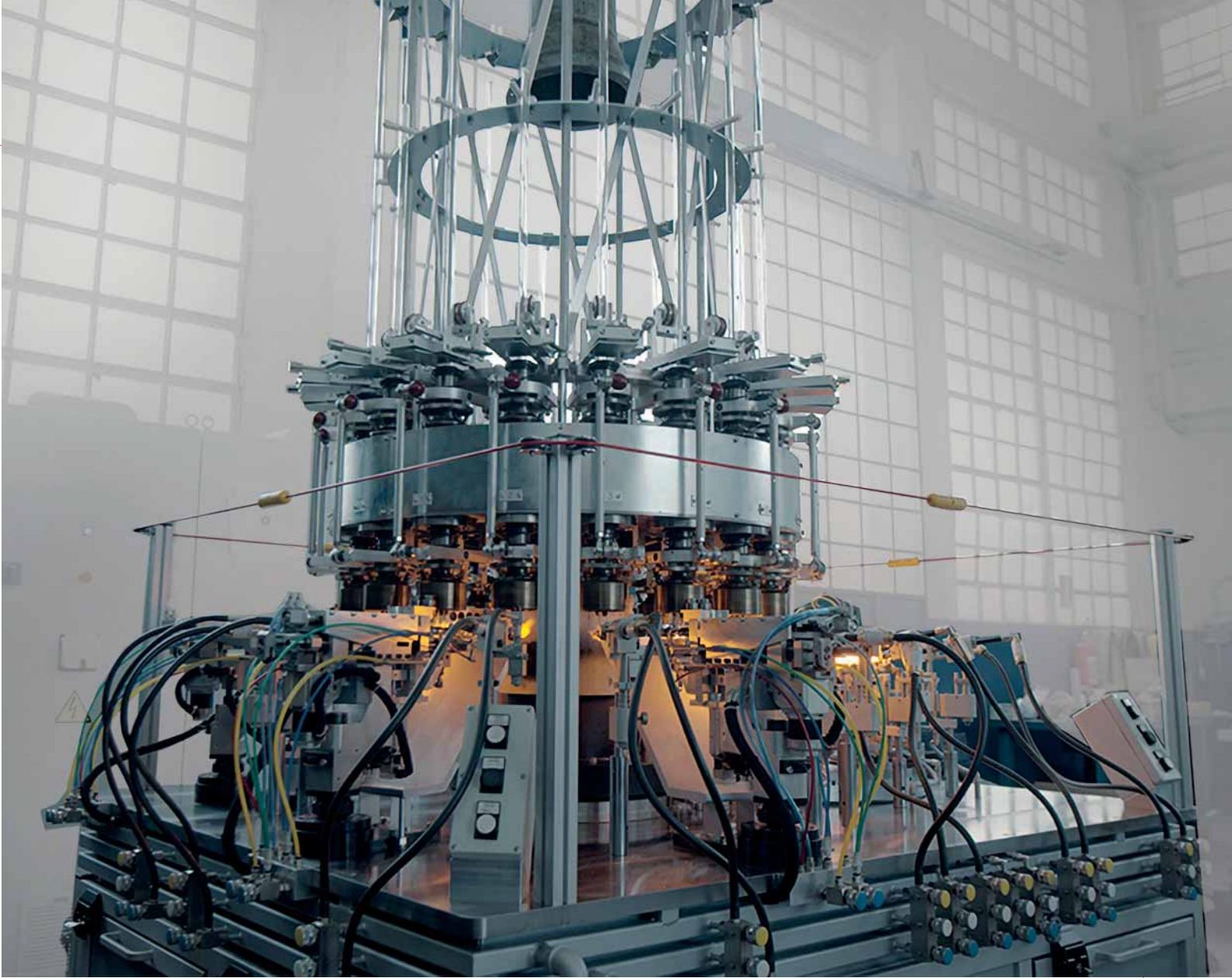
The core of the production line is the index rotation forming machine FLA18/9 which, combined with the after-forming line LF518, ensures maximum flexibility in terms of product formats and specifications - all while granting superior quality accuracy and line efficiency.

THE FLA18/9 AND FORMING

By way of last generation servo and torque control technology,

the FLA18/9 forming machine maximizes the index rotation working concept advantages, thereby meeting and exceeding OCMI traditional continuous motion performances. Indeed the FLA18/9-LF518 line can reach a maximum output of 55 pcs/min with 2R vials as well as a capacity to process vials with diameters ranging from 9 mm to 30 mm and lengths from 30 mm to 100 mm.

Furthermore, the complete line FLA18/9-LF518 was originally conceived as a new complete modular platform -



leveraging a new design and engineering approach to afford OCMI customers the chance to select and combine, whether at fabrication stage or after installation, any standard or customized accessory within the extensive OCMI portfolio.

FORMING CONFIGURATION

FLA18/9 forming machine is equipped with 18 stations on the upper mouth forming crown and nine stations on the lower bottom finishing turret. This optimizes both upper and lower configuration while combining with the working turret to assure maximum performance and productivity in all conditions.

The rotation of turrets is

driven by torque-motors which are provided with a relative water chiller to maintain ideal motor-operating temperatures while simultaneously allowing active cooling of the onboard forming tools.

Glass tube forming operations are performed by three dedicated stations, each dedicated to roughing and shoulder preparation, profile pre-finishing and finishing respectively. Through bearings equipped with individual forming heads the stations follow the upper chucks mechanically. Consequently, there's no need for any manual chuck alignment or adjusting. Through dedicated quick-lock devices and docking blocks all three tooling stations can either be easily turned for quick access

or else removed for maintenance and job-changes.

PRECISION OPERATIONS

All FLA18/9 tools, plungers and rollers are independently servo-driven, which really makes all setting and forming operations extremely accurate and smooth. Internal lubrication on tooling is implemented to avoid oil spreading while guaranteeing a very clean machine and smooth operations. Servomotors also power both the setting of tube receiving plates and the cutting station. Before unloading the device, a dedicated station flattens the bottom through a containment buffer - a key feature, especially for large size vials. Lower chucks are equipped with blowers that

TECHNOLOGY BREAKTHROUGH

are managed by solenoid valves. These aim to remove smoke from inside vials so that alkalinity remains within the limits determined by current ISO standards.

Additionally, developed for connection with the OCMi after-forming line the take-out transfer system is servo-driven as well.

Thanks to this extended, smart use of servo motion and control, operators can easily and quickly adjust every FLA 18/9 parameter for all machine devices - directly from HMI with its wide screen and improved user experience, which is based upon the intuitive OCMi icon-based interface.

FLA18/9 can be featured, as a standard option, with a complete set of last generation mass

flow meters, thereby replacing traditional manual mixers. All gas setting parameters are saved in a recipes library before being automatically recalled/changed during job changes while having any gas mix manually-adjusted by operators during production. This includes gas consumption optimization, savings and monitoring as well as automatic capability and insurance that gas mix administration follows all forming machine transitories such as acceleration, deceleration, start/stop ramps, etc. Indeed this feature definitely offers OCMi customers major process advantages, together with quality insurances and cost savings.

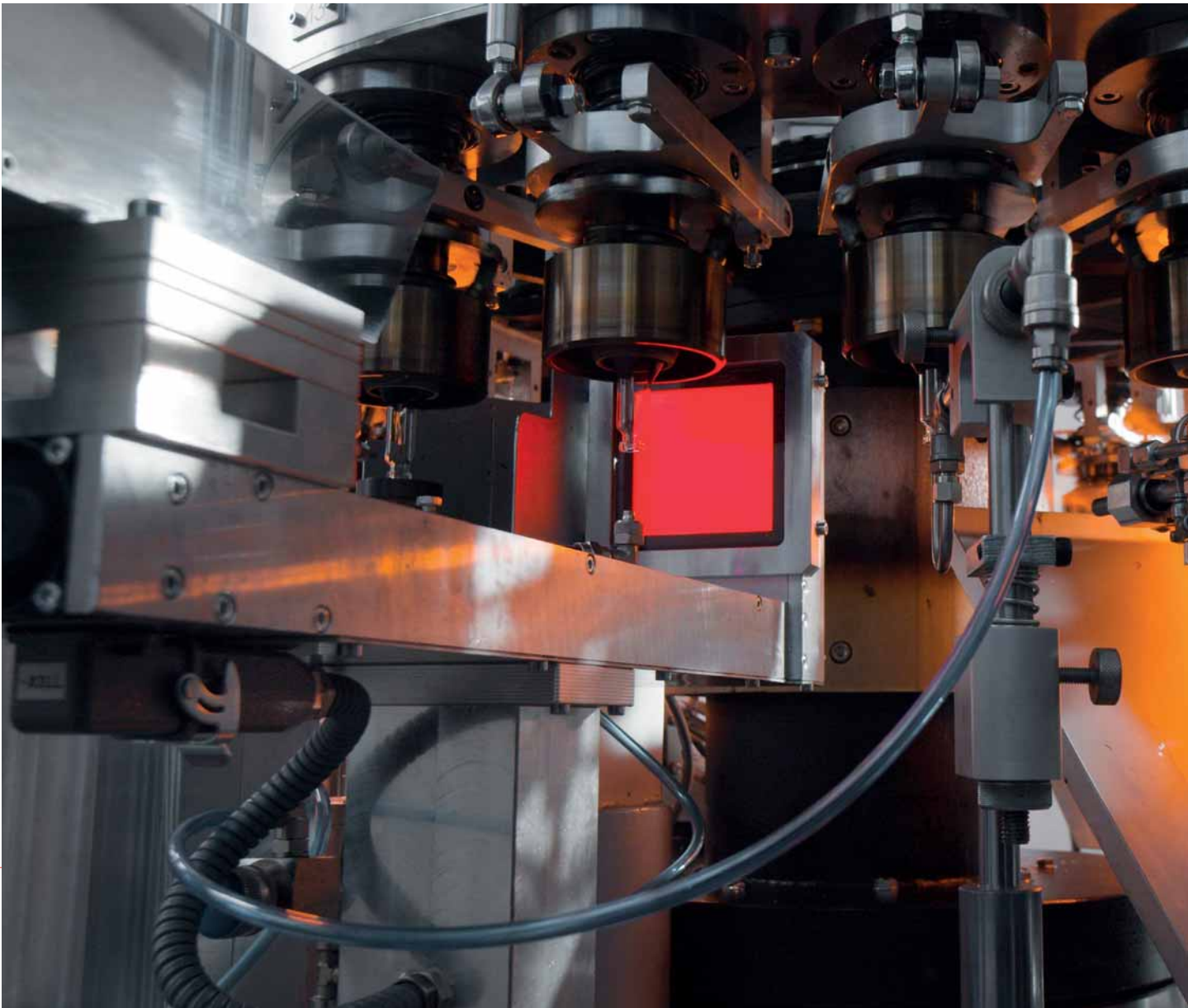
VIAL DIMENSIONS

During FLA18/9 forming operation, vial dimensions can

be controlled 100 percent by the OPTIVIAL device, OCMi's specific vial hot-end camera system developed within same technology and experience as that of the OCMi OPTISTEM, which is highly regarded in the market for ampoules hot-end control.

The OPTIVIAL last generation camera takes 15 pictures within its revolution for each product - providing very accurate average measurements on all required dimensions. The device is fully integrated within the HMI line where dedicated pages allow easy recipe configuration, automatic self-calibration and immediate live check on ongoing machine quality output.

The FLA18 machine, too, is fully-predisposed to be



connected with the OCMI R-ATL4 loader, an anthropomorphic last generation multi-axes robot which allows for single tube picking from a multi-bundle high capacity magazine. This combination ensures maximum flexibility and minimizes contact/friction between tubes, which will effectively troubleshoot even minor cosmetic defects on finished products.

THE LF518 AND AFTER-FORMING

The OCMI after-forming line LF518 was specifically developed to be connected with the forming machine FLA18, with the same philosophy and design approach. Servo-motors drive all line mechanisms - including the completely renovated print-



ing station, which is available on customer request.

The LF518 post forming line includes a latest version annealing lehr that's directly developed at OCMI's Italian headquarters. It's electrically powered and will assure total removal of glass surface strains thanks to the optimal distribution of heating elements along the three specific oven sections, which are individually controlled. The oven is sourced by a servo-feeding manipulator with six mechanical grippers - a device which picks the vials from the cooling conveyor and places them in a horizontal position upon drilled metal trays. Oven length and width can be selected according to standardized configuration based upon customer production area layout and the required number of vials per row. The pick-place manipulator, with adjustable gripper jaws, is designed to process vials from a minimum length of 30 mm to a maximum of 100 mm. After the annealing lehr and relative cooling section, a vision conveyor module can be provided. This has different length options in order to fit different types/models of camera inspection systems so that any cosmetic or printing defect type can be controlled on a case-by-case basis prior to packing as per customer request.

LINE INTEGRATION

As for automatic packaging, the LF518 makes provision for the OCMI PM-V plug and play option. This fully-automatic, modular, servo-driven packaging machine is available with either four or five box filling stations placed upon a rotating table - which is meant to replace and improve traditional manual packing operations, thereby completely solving the problem of friction between vials and consequent scratches. The line-integrated

logic of the automatic packing machine PM-V allows companies to save multiply-dedicated recipes, including all specifications concerning vials, boxes, number or rows to be positioned in the box as well as vial number per row. Job changes are very quick and easy for the operator - all thanks to a vacuum picking arm modular design, with blocks that get added or removed according to box length and the number of vials to be picked from the machine racks. Delighted that primary multinational groups and glass industry opinion leaders are choosing this technology, the group recently witnessed and confirmed that the OCMI FLA18/9-LF518 line is showing itself to be an optimum option for producing any type of vial in a completely automatic process that ensures accurate dimensional and quality control while affording superior performance, flexibility, efficiency and ease of use. ■










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EMISSIONS BUSTERS

NextGen Furnace sees AGP paving the way to low carbon glass manufacturing



Supported by:



Federal Ministry for Economic Affairs and Climate Action

on the basis of a decision by the German Bundestag



Funded by the European Union
NextGenerationEU

Ardagh Glass Packaging (AGP) recently unveiled its groundbreaking NextGen Furnace in Obernkirchen, Germany - showcasing the furnace's inaugural production of amber bottles using innovative low-carbon technology at a momentous event that welcomed customers, suppliers, policy makers, media and key industry partners.

As a global supplier of infinitely recyclable metal and glass packaging for brand owners around the world, Ardagh Group operates 63 metal and glass production facilities in 16 countries, employing more than 20,000 people with sales last year reaching over USD 9 billion. Part of the Group, AGP is a global supplier of recyclable glass packaging for brand owners in the beverage, food, pharmaceutical and chemical sectors. It operates 39 production facilities in North America, Europe and Africa and employs approximately 14,000 people.

SITUATED SUSTAINABLY

Obernkirchen was selected as the NextGen Furnace location due to its electricity grid connection capacity and its oxygen generation capacity for oxy-gas fired hybrid furnace technology. It is among eight AGP glass packaging manufacturing facilities in Germany (the others being Lünen, Germersheim, Drebkau, Neuenhagen, Wahlstedt, Nienburg and Bad Münder). The furnace's operational mode started conventionally, fuelled by 20% renewable electricity and 80% gas. Now, embarking on a meticulously-planned startup sequence, it's set to transition over the months ahead to an ambitious 80 percent renewable electricity target and 20 percent gas - a deliberate progression that aims to achieve both unparalleled energy efficiency and substantial decarbonisation.

FEDERAL BACKING

The NextGen Furnace is funded via the 'Decarbonisation of Industry' programme of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) - a funding programme managed by the Competence Centre on Climate Change Mitigation in Energy-Intensive Industries (KEI). BMWK supports energy-intensive industries in Germany in their efforts to reduce process-related greenhouse gas emissions. The project is also supported by the European Union's 'NextGenerationEU' fund.

LIFE CYCLE ANALYSIS

Operations Director at AGP-Germany Jens Schaefer expressed his satisfaction with the performance of the furnace during its initial startup phase, was proud to see the amber-coloured bottles produced - an achievement that underscores

AGP's dedication to pushing the boundaries of glass manufacturing technology. An independently verified life cycle analysis was conducted which revealed that once the NextGen Furnace operates at its targeted 80 percent renewable electricity and 20 percent gas mix, there will be an astounding 69 percent reduction in CO2 emissions for a typical 330 ml glass bottle produced in the NextGen Furnace.

FIRING AHEAD AS A TEAM

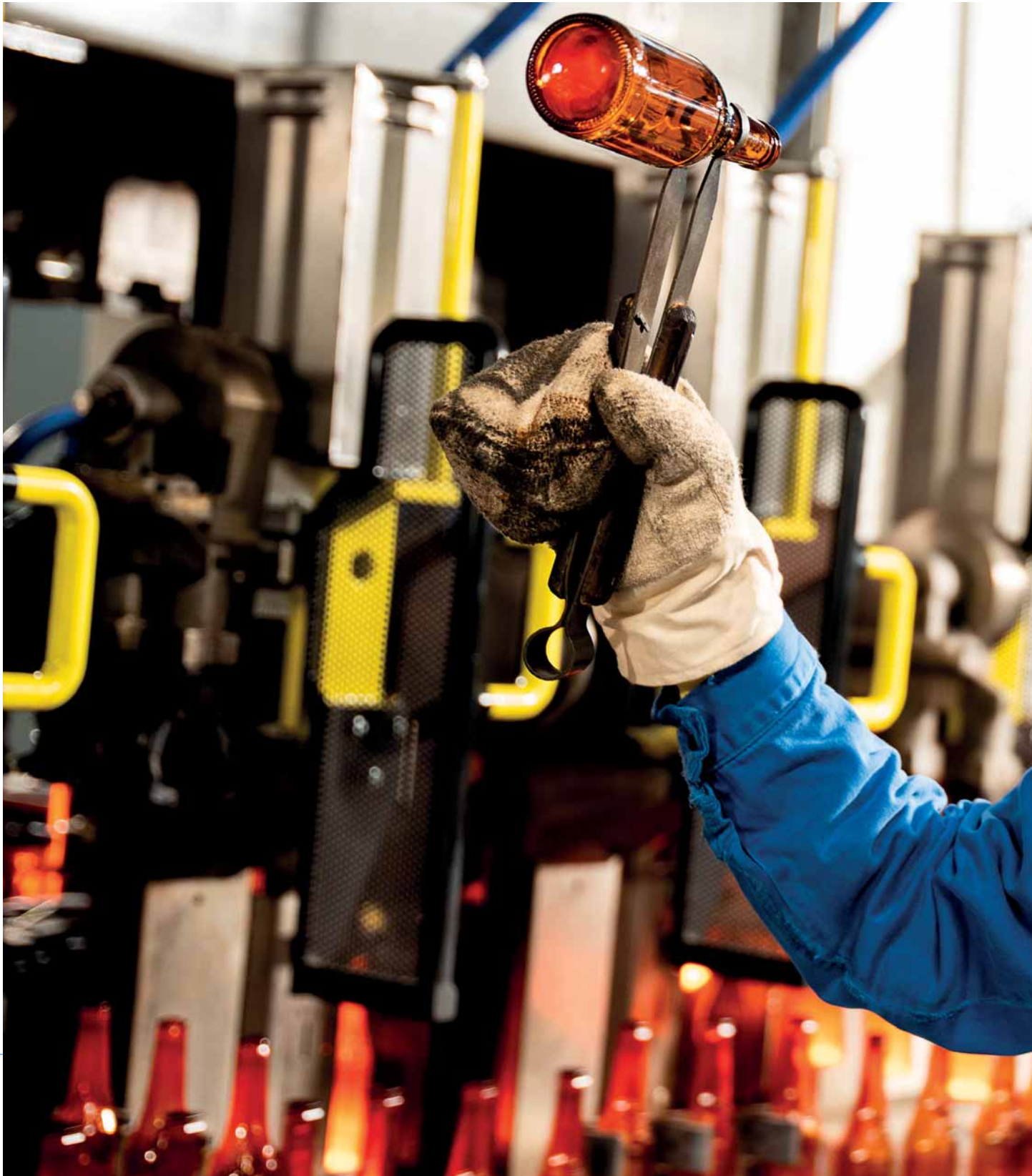
AGP-Europe CEO Martin Petersson hailed the breakthrough as a great achievement for the glass industry - emphasising the transformative potential of achieving a 69 percent reduction in CO2 emissions. Petersson further acknowledged the collaborative efforts with SORG, AGP's chosen furnace supplier, by crediting its expertise in reaching such a pivotal milestone. He also expressed

ABOUT AGP-OBERNKIRCHEN

- Founded in 1799 as Heye Glass
- Acquired by Ardagh Glass in 2003
- Plant Director: Andreas Kehne
- Employees: Circa 280 (FTE)
- Portfolio: Beer, special beer, wine, sparkling wine, spirits - approximately 700 million bottles per year
- Site area: 489,000 m²

LIFE CYCLE ANALYSIS

The 2023 Life Cycle Analysis demonstrates the carbon savings per glass bottle to be produced in the NextGen Furnace as compared to a bottle from a conventional AGP furnace. A typical 330ml glass bottle produced in the conventional AGP furnace at Obernkirchen produces 140.1g of CO₂ in comparison with one that will be produced in the NextGen Furnace once fully operational at 80 percent renewable electricity and 20 percent gas - which will instead produce 43g of CO₂. That amounts to a 69 percent reduction across Scope 1, 2 and 3 emissions. Depending on the production mix, the NextGen Furnace could save up to 45,000 tonnes of carbon every year compared to a conventional furnace.



the AGP's commitment to ongoing collaboration with SORG throughout subsequent operational stages. Depending on the production mix the NextGen Furnace could save up to 45,000 tonnes of carbon every year compared to a conventional furnace, making it a beacon of sustainability in glass manufacturing. ■



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Packaging

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All fired up for more, FAMA celebrates a 2023 of triumphs

FAMA continued to advance last year with its development of machinery for the glass industry. The first prototype of a Full Servo Machine, designed 100 percent in-house, has been in operation for more than 30 months at Vitro Envases Toluca plant (Cosmos). This

machine has produced over 20 million containers, including perfumery bottles, condiment dispensers and similar items - all using Blow-Blow processes. In this latest stage, improvement projects are being implemented on this prototype machine to reach its maximum operational

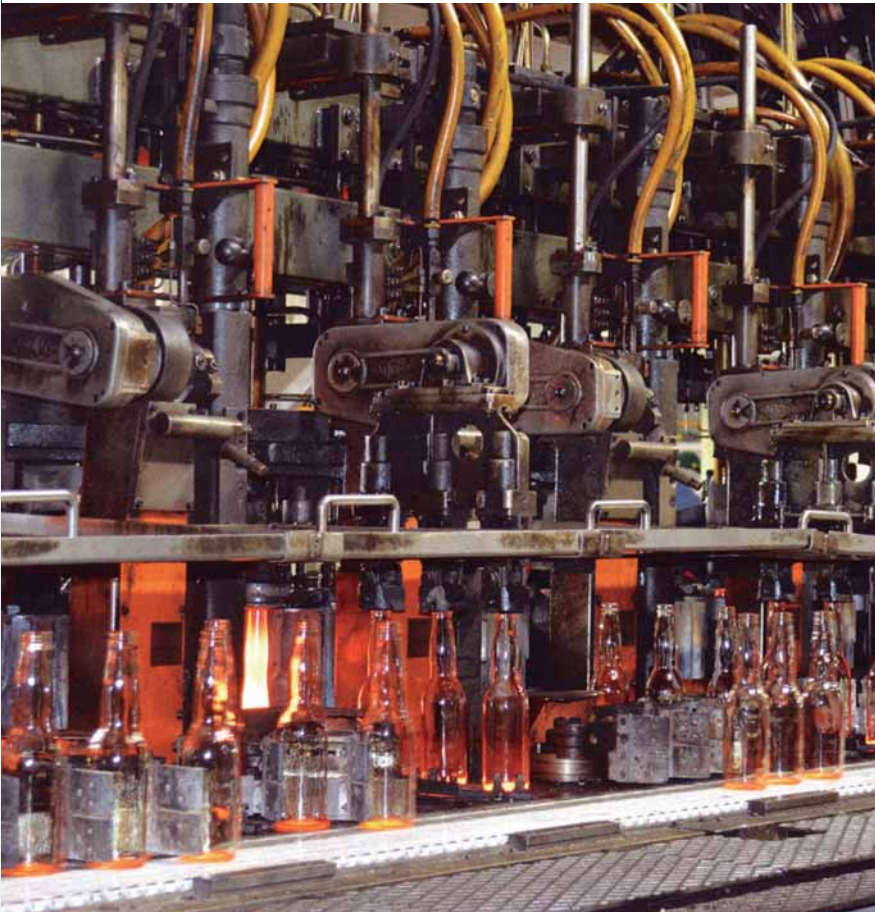
potential. This is part of the maturation process for the release of the development. Work is also underway on the Technological Independence project as part of the strategy to expand the company's product portfolio and involves developing proprietary mechanisms for standard Servo-Pneumatic Machines (I.S. 'SF').

DRIVING INDUSTRY 4.0

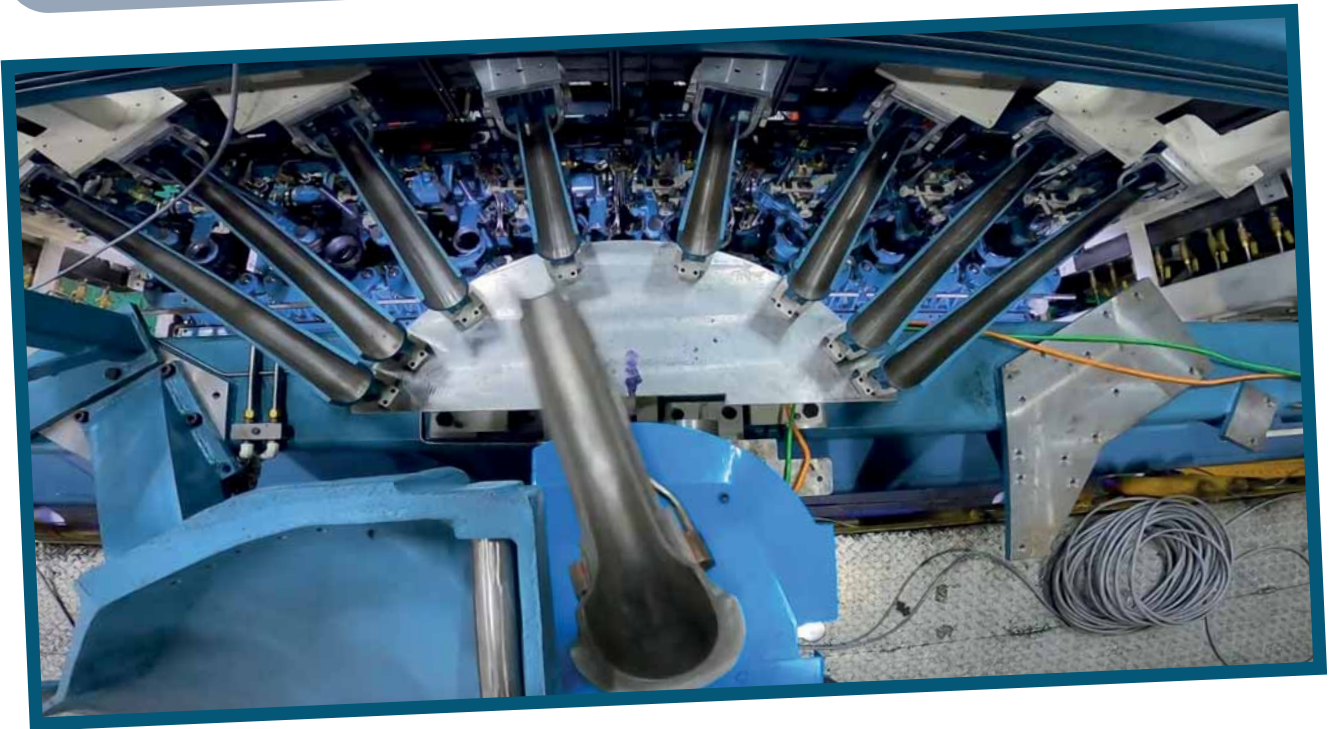
Throughout the years, FAMA continues to advance as an Industry 4.0, focusing on its customers. The implementation of the first machine with in-house developments, the Next Gen 4.0 machine, is equipped with 100 percent servo mechanisms. The Next Gen 4.0 machine was optimised using tools like the Digital Twin, which allows for the early observation of improper behaviours in mechanical and electronic designs related to servo motorised parts.

PATENTS

Among the innovations patented, there is a new servo gob distributor, as well as a servo mechanism for opening and closing moulds and/or blanks, which integrates all sections of the machine. Other big wins include a servo invert mecha-



With a focus upon Industry 4.0, technological independence and service excellence that positions it as a driver of innovation in the glass industry, FAMA once again made great strides last year with its full Servo Machine prototype - as well as other innovations that include a Next Gen 4.0 machine and patented mechanisms.



nism, a servo funnel mechanism, baffle and blow head, a servo take out mechanism using the new servo motor technology and a new mould cooling system.

A STRATEGIC VISION

In achieving these results, the division followed various strategies, namely:

- Automated commercial standardization: Strengthening FAMA as a driver of technological innovation in the automated equipment processes and driving commercial growth by offering its capacities to customers in non-laboratory industries and products.
- FAMA machine services: taking advantage of the growth

in the company's machinery business, building a solid team that turns industry needs for engineering, repair, maintenance, and spare parts services for the IS machinery market, into growth opportunities.

- Commercial development and training: FAMA formulated a commercial development plan to build the technical and commercial capacities necessary to serve its customers.
- Technology-independent IS Machine: The company completed implementation of its FAME technology, which is now introduced 100 percent into the IS machine market.
- Supply flexibility and strategic sourcing development: FAMA



INDUSTRY TRACTION

ABOUT FAMA

Born in 1943 as a subsidiary of Vitro for in-house machinery manufacturing, FAMA has a proven track record of creating forward and innovative industrial technology. The company later expanded its products and services to the market, providing integral solutions for the glass industry. With over 75 years of experience to stand on, FAMA now looks ahead as it extends into other industries to offer machine manufacturing, equipment and bespoke solutions - all to make the most of its capabilities.

worked on developing a more flexible, efficient, and resilient supply chain by building strategic suppliers and inventories.

- Service excellence: The company improved quality and service with its internal and external customers by perfecting delivery times, communications and solutions.

QUALITY POLICY

FAMA is committed to its interest groups in complying with and consistently communicating all agreements, standards, applicable regulations and quality objectives. Faithful to its continual improvement and quality management system, it also strives for customer satisfaction based upon the value it seeks to bring. The company has a cul-

ture of operational excellence, mindful that the participation and competence of all company employees are fundamental to its processes.

SUSTAINABILITY

FAMA also works tirelessly to ensure that all operations preserve and protect the environment and the community. As such it offers sustainable solutions to meet the needs of both its customers and its consumers. Supported by three pillars and framed by a Responsible Corporate Management, the Vitro Sustainability Model promotes initiatives which aim to secure optimal conditions that can generate the best economic, social and environmental development of stakeholders.

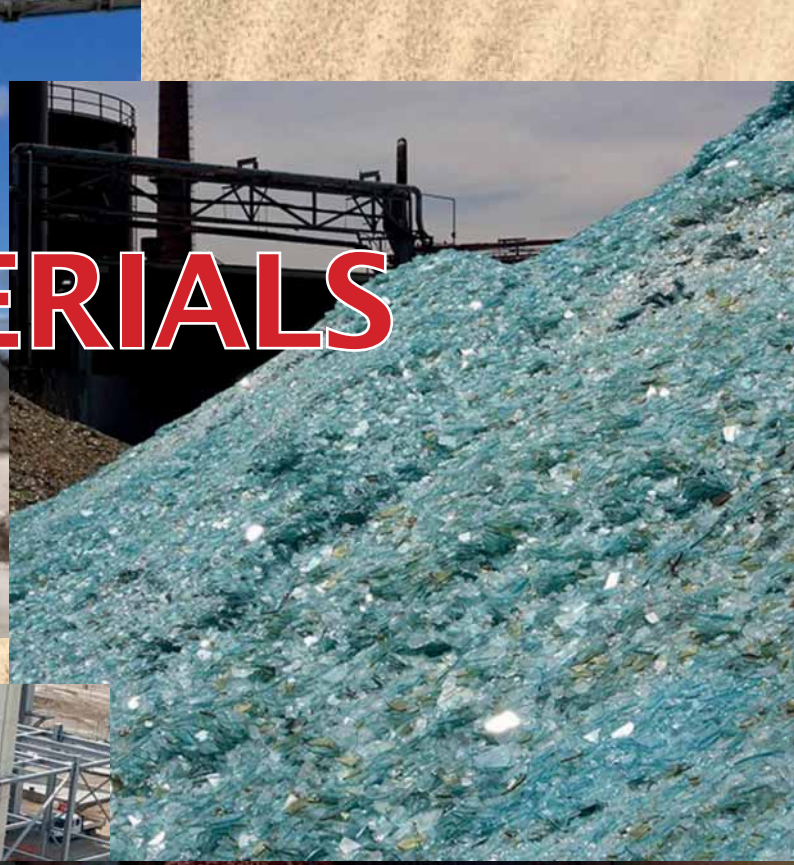




by 

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RAW MATERIALS



BATCH PLANTS



REFRACTORIES

Innovations position RHI MAGNESITA brightly on the refractories map

RHI MAGNESITA – A SUSTAINABLE PARTNER FOR THE GLASS INDUSTRY

Sustainability, especially the path to decarbonization, is the key aspect of the entire basic industry. This path and the corresponding measures can be only successful once the different stakeholders proactively anticipate the challenges and start working on it. However, as we are talking about complex production processes that have been developed over decades, several problems will arise when changing the technology and, consequently, the operational conditions. To overcome these problems and to boost the activities significantly, it's essential to have partners with a commitment to sustainability coupled with technical know-how.

For the refractory industry RHI Magnesita (RHIM) recently reported to GMP&A that it espouses precisely these aspects and is already supporting the glass industry greatly. Acquisitions help to extend the product portfolio while advancing lining solutions. Two concepts are described here that help to bolster sustainability and meet future industry requirements. Thereafter, additional measures will be explained that are connected to a clear offer to the global glass community to take sustainability forward more swiftly and efficiently.

Addressing challenges by way of its technical expertise, RHI MAGNESITA emphasises sustainability along the industry's decarbonization journey. The company's state-of-the-art glass furnace lining concepts, its transparent carbon footprints, recycling initiatives and tailored customer support all highlight its commitment to innovation in the refractory industry.

STATE-OF-THE-ART LININGS CONCEPTS FOR MELTER CROWN AND MELTER BOTTOM

The most important task of a refractory producer is to manufacture products and design lining concepts that are suited to their purpose. As the requirements in the glass industry vary significantly, both by application and within different regions, it is essential to

have an in-depth understanding of the requirements as well as a sufficiently-sized toolbox of products that can support the creation of different concepts in a cost-effective manner. Besides well-known regenerator (INNOREG) solutions in Asia and Europe, similar tool boxes have been created for the melting tank - especially for the melter crown and melter bottom. Indeed in that

context, the integration of Preiss-Daimler Refractories (PDR) has helped to further finetune the RHIM concepts:

MELTER CROWN LINING CONCEPT

RHIM has developed an efficient lining concept for soda lime glass furnaces based on highly corrosion-resistant materials with an elevated efficiency concept design.

If standard silica is the traditional material used as lining for conventional soda lime glass melting furnaces, a longer lifetime is achieved using the lime free silica as lining in direct contact with the furnace atmosphere. It can resist even the most aggressive furnace operating conditions; the high corrosion resistance to alkali attack enables Stella GNL and RHIM-Si 100 NL to endure higher temperatures (up to 1650°C) but also lower temperatures (such as those in hybrid furnaces), when the risk of alkali condensation is higher. Additionally, thermodynamic simulations, combined with the experience gained with oxy fuel furnaces, indicate a very low attitude to chemical reaction with alkalis - even in very humid atmospheres (as in case of hydrogen combustion).

The high efficiency is dually attributed to smart shape/addition of special components on one side and insulation concepts on the other.

The traditional smart honeycomb

shape can increase crown emissivity - promoting fuel saving in the range of approximately four percent as reported by the company's customers. Similar results are achieved with the epsilon crown as proven by CFD modelling. In both designs, the increased efficiency is based upon extension of the heat exchange area and increase in emissivity. This latter feature is related to honeycomb shape design which is applicable to

standard silica, lime-free silica or any other material required by the operating conditions for crown melting. The epsilon crown adopts special additives - enabling the use of a simpler and more economic shape but with more limited fields of application. The two shapes included in the company's portfolio can be alternatively selected according to advantages-costs ratio and in consideration of operating conditions.

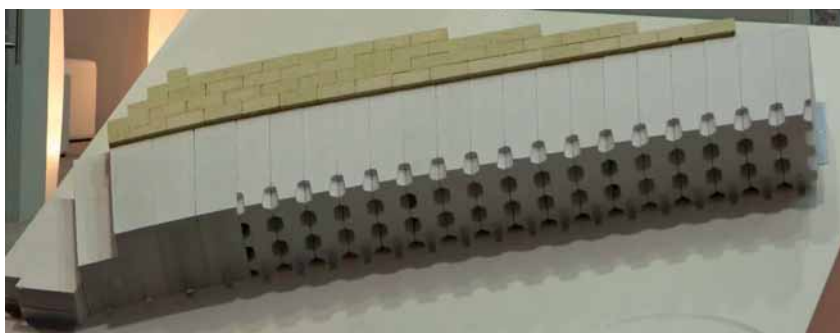


Fig 1. Melting crown lining concept with honeycomb lime-free silica bricks

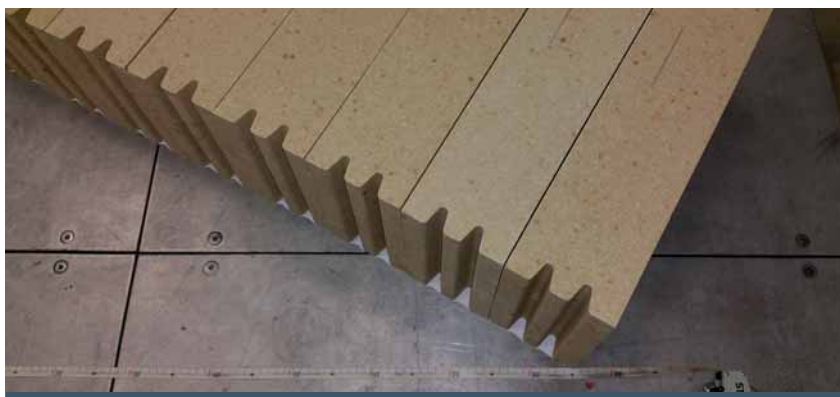


Fig 2. Epsilon silica bricks

Option	Description	Heat Loss	Delta CO ₂	Delta Energy
RHIM std brick insulation design (reference)	450mm - Stella GGS 64mm - Legral 55/0 3x64mm - Legral 50/05 30mm - Stellit GH 0-1-DE	1.567 W/m ²	0	0
RHIM recommended brick insulation design (new)	450mm - Stella GGS/RHIM Si96 64mm - RHIM LiSi-08 3x64mm - RHIM LiSi-06 30 mm - Stellit GH 0-1-DE	1.183 W/m ²	- 67 t/y	- 336 MW/y
RHIM improved monolithic insulation design	450mm - Stella GGS/RHIM Si96 150 mm - Compac Sol FS99G-3-DE 135 mm - Legrit 135-1,0G 0-6-DE 150 mm - Legrit 105-0,5E 0-2-AT	1.028 W/m ²	- 94 t/y	- 472 MW/y

Table 1 - Different configurations for the melter crown insulation using RHIM and PD products

Once again, the integration of PDR products allows for the building of different proposals with reduced heat loss compared to RHIM's standard brick solutions and consequent CO₂ emissions, reduced as calculated in Table 1.

Each solution performs differently in terms of energy saving, installation time, etc. It should be noted that the RHIM monolithic solution is not only the most efficient in terms of energy saving, but it provides a complete sealing of the melter crown, preventing development of the ratholing process, prolonging the crown lifetime and keeping efficiency stable during the furnace campaign. It is also applicable on damaged crowns - prolonging the furnace campaign and restoring the melter crown thermal profile and heat losses.

MELTER BOTTOM LINING CONCEPT

Among the challenges arising from glass furnace operations is that of an increased share in electrical boosting, which leads to increased wear in the melter bottom and requires an improved bottom concept.

The most common concept in the market consists of a glass corrosion resistant layer (usually fused cast AZS 33 percent ZrO₂ and AZS 41 percent ZrO₂ for the most solicited areas), positioned on a monolithic layer to stop glass infiltrations and a safety layer which has the added task of contrasting the metal drilling. The layers below the safety layer have the main purpose to limit the heat losses.

As opposed to the melter

crown, where the higher the insulation, the better the performance and lifetime, the melter bottom insulation should be properly calibrated to reach a temperature below 1000°C at the interface of the super-duty fireclay level, thereby freezing the glass and preventing corrosion in case of glass leakages below the glass corrosion resistant layers.

With the increase in electric boosting share, this concept should be greatly improved, considering that the new operating conditions will increase bottom temperatures of approximately 100°C. Higher temperatures and forced convection induced by the high electrodes concentration will generate more corrosion, erosion and higher risk of glass infiltration. Higher heat losses are expected (due to higher temperatures) and the insulation design must be a good compromise between low energy losses in agreement with the latest recommendations for CO₂ emissions reduction and a long furnace campaign.

Compilation of a toolbox dedicated to the melter bottom will permit selection of the proper materials and lining according to operating conditions.

The concept lining for the melter bottom is thus improved as shown in Fig. 4:

The main improvements involve:

Monolithic layer(s)

This layer should be applied according to the 'sandwich' configuration as shown in the picture, to stop glass infiltration and to move in a lower position, at a lower temperature, the castable in order to reduce the risk a shrinkage during the operation; a self-flowing grade should be considered to fill all the gaps, especially around the electrode blocks, speeding up the installation process.

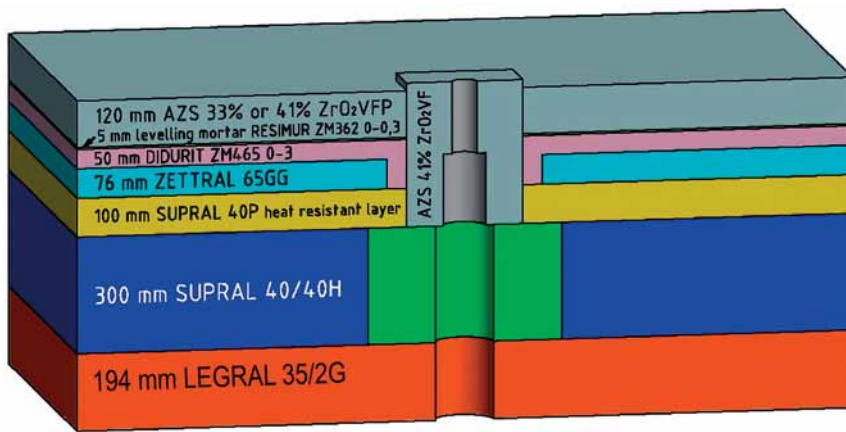


Fig. 3 Standard melter bottom lining concept

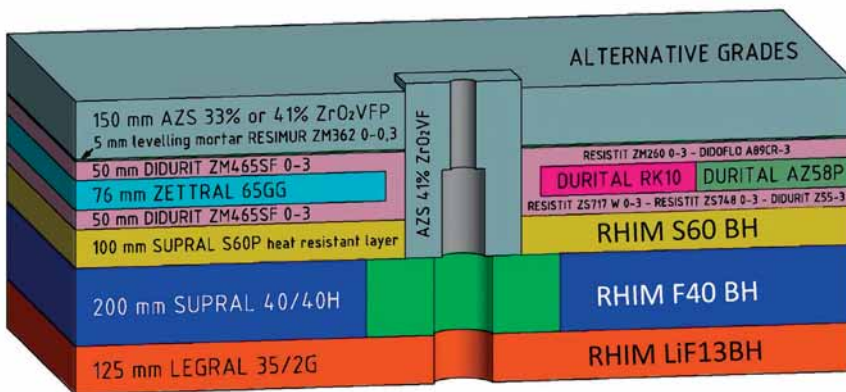


Fig. 4. Improved bottom lining concept

The quality of the mass can be chosen according to the approach to the metal drilling resistance: encapsulation or corrosion resistance (see next point) as zirconium silicate or zirconia mullite mass; a chromium corundum self-flowing mass is also available in combination with a chrome corundum safety layer.

Safety layer

This layer must be resistant to glass and metal corrosion. Here RHIM has developed two approaches to metal drilling: corrosion resistance and encapsulation; the encapsulation approach, based on the use of zirconium silicate, is recommended in case of high amounts of metals contaminating the cullet; in this case the encapsulation prevents from glass defects (bubbles and seeds may develop at the surface of the metal pieces) and from risk of electrical connections between the electrodes: if the metal layer is connecting two or more electrodes, the current will travel preferentially on it, causing overheating of the refractories and accelerated corrosion. If the metal content is reduced, the corrosion resistance approach can be adopted, based on the

use of zirconia mullite or, in case of coloured glasses, on chrome corundum grades. These two grades have shown a good resistance to metal corrosion and glass corrosion, in addition to high electric resistivity which in case of highly boosted furnaces is an additional advantageous feature to prolong the furnace campaign.

Insulating layers

Insulating layers design should be improved too, according to the following considerations:

A sillimanite layer should be introduced for better resistance to high temperatures and glass corrosion: in case of glass infiltration and higher bottom temperatures, sillimanite can offer the highest chances for a longer life span.

The lower insulating layers should be designed to reduce heat loss as much as possible. That said, the temperature limits already described (<1000°C at the interface between the sillimanite layer and fireclay layer) should be kept in mind so as to reduce the risk of bottom corrosion/collapse in case of glass infiltration. It is clear that the requirements for a safe operation and long campaigns contradict the requirements of lim-

ited energy loss: higher bottom temperatures will increase heat losses, which cannot be limited indefinitely.

A good design must be able to find the correct balance between heat dispersions (meaning CO₂ emissions), investment costs and furnace life span. Therefore, the solution represented in fig. 4 is one of the possibilities offered by the company's product range, more configurations are possible and can be developed according to customer requirements.

Further improvement is made by applying unfired blocks for the insulating layers, which helps to reduce the CO₂ footprint of the lining. These grades, integrated from the PDR portfolio, can provide the same mechanical and thermal properties compared to the fired blocks. As such, they represent a more sustainable and economic alternative without downgrading relevant performance.

REFRACTORY CARBON FOOTPRINT TRANSPARENCY

In the context of the melter bottom lining concept, RHIM shows the carbon footprint of each single product on the corresponding technical data sheets (see Fig. 5).

RESISTAL S60

General information			
Classification	High alumina product type HA55 ISO 10081-1		
Main raw material components	Andalusite		
Bonding type	Ceramic		
Main Application(s)	Container glass, Flat glass, Special glass		
Environmental indicators			
Product Carbon Footprint	0,932	[t CO2e/t prod.]	ISO 14067
The Carbon Footprint of the Product (CFP) has been calculated following the principles of ISO 14067.			

Fig. 5 Typical example of Environmental Indicator on a RHIM product data sheet

RHIM pioneered this initiative, which helps to raise awareness on the question. Here indication of the carbon footprint supports customers in the proper selection of refractory materials for the CO₂ footprint reduction of equipment.

For example, a typical CO₂ footprint associated to the refractory lining of a 100 m² melting furnace has been calculated in Table 2.

Area	Tonnes	CO ₂ footprint (tonnes of CO ₂ emitted to produce the relevant refractories)
Melter bottom	284	513,5
Melter tank	87	229
Melter superstructure including port neck	164	382
Melter crown	141	142
Regenerators and checkers	1323	2102
Waste gases channel	106	121,5

Table 2: calculation of CO₂ emitted to produce the relevant refractories materials

NOTE: this calculation is an estimate for a 100 sqm furnace. Refractory quantity depends upon specific design.

RHIM completed a major project in 2022 to disclose the CO₂ footprint of each of its ~200,000 refractory products. Production and delivery technologies of greenhouse gases and, from raw material extraction to production and packaging are included in the calculations, which follow ISO 14067 standards principles. The carbon footprint includes all Scope 1 and Scope 2 emissions as well as part of the Scope 3 emissions associated with the manufacturing of the product. The largest share of Scope 3 emissions arises from the purchase of refractory raw materials that are not sourced from within the Group. The CO₂ footprint data enables the company to:

- I. Better address customer needs with the most suitable technical and sustainable products and solutions;
- II. Gain a competitive edge via

sustainability criteria in tender processes;

- III. Incorporate sustainability and environmental indicators into product design and production cycles.

RECYCLING CONCEPTS

RHIM has made significant progress in reusing refractories, especially in Europe with the Joint Venture company Mireco. This has helped to increase the recycling

share of RHIM globally in 2023 to up to 12,6 percent. Today, RHIM is offering, in principle, to take back complete glass furnaces worldwide. Materials resulting from the demolition are sorted, cleaned, crushed, sieved, washed and finally reintroduced in the production process. When the material is too contaminated to be recycled it goes to landfilling.

In this regard RHIM calls attention to its research project, ReSoURCE, to which it is participating with other partners like Fraunhofer ILT Institute for Laser Technology, SINTEF AS, Montanuniversität Leoben, LSA - Laser Analytical Systems & Automation GmbH among the other internationally-renowned players from the fields of research and industry. Funded by EU Horizon programme and led by RHI Magnesita, the four-

year 'Refractory Sorting Using Revolutionising Classification Equipment' (ReSoURCE) project aims to ensure the green and digital transformation of the refractory recycling value chain. The initiative will innovate the full process chain with an AI-supported multi sensor sorting equipment as its core technology. Combining laser-induced breakdown spectroscopy, hyper spectral imaging with optimised pre-processing, and automated ejection, it will lay the foundation to set a new state-of-the-art for refractory sorting, starting with particle sizes down to below 1 mm.

Additionally, RHIM is working on an increase of secondary raw materials in products for the glass industry. This needs to be done accurately as certain characteristics cannot be jeopardised, e.g. creep resistance of regenerator casing material. Based on the experience of the cement industry, which uses 'washed' MgO, RHIM has already held positive trials for regenerator materials.

The company is also committed to developing a circular economy in the refractory industry - aiming at a zero-waste product life cycle to preserve natural resources. RHI Magnesita's 'NetZero Brick' project addresses both of these priorities, reducing CO₂ emissions by 85 percent and fully utilising reclaimed raw materials to create a refractory containing up to 100 percent recycled raw materials, excluding graphite and binders.

There are currently six 'Net Zero' products being trialed with non-glass customers in real-world conditions. The Group has also successfully developed basic gunning mixes with its suppliers. The ANKERJET XW low-carbon gunning mix has achieved an 85 percent reduction in carbon footprint with no loss of performance compared to conventional products. The increased use of recycled materials improves raw material availability while reducing the cost and resource-

intensive process of raw material extraction and processing and significantly reducing CO₂ emissions - as each ton of recycled material used saves approximately two tons of CO₂ emissions.

The Group's emission reduction plans target a 15 percent reduction in CO₂ emission intensity for Scope 1, 2 and 3 (raw materials) emissions by 2025, compared to 2018. Here the climate strategy is based upon:

1) reducing the carbon footprint of raw materials, including via the increased use of circular raw materials;

- 2) increasing energy efficiency in all operations;
- 3) using alternative energy sources to reduce their carbon intensity;
- 4) providing innovative solutions to reduce customer emissions.

The company is also conducting research and development on carbon capture and storage technology and the use of hydrogen as an alternative to fossil fuels. In 2022, total CO₂ emissions (Scope 1, 2 and 3 - raw materials) were 4.2 million tons and emissions intensity was reduced by eight percent.

RHIMS SERVICE CONCEPT FOR THE GLASS INDUSTRY

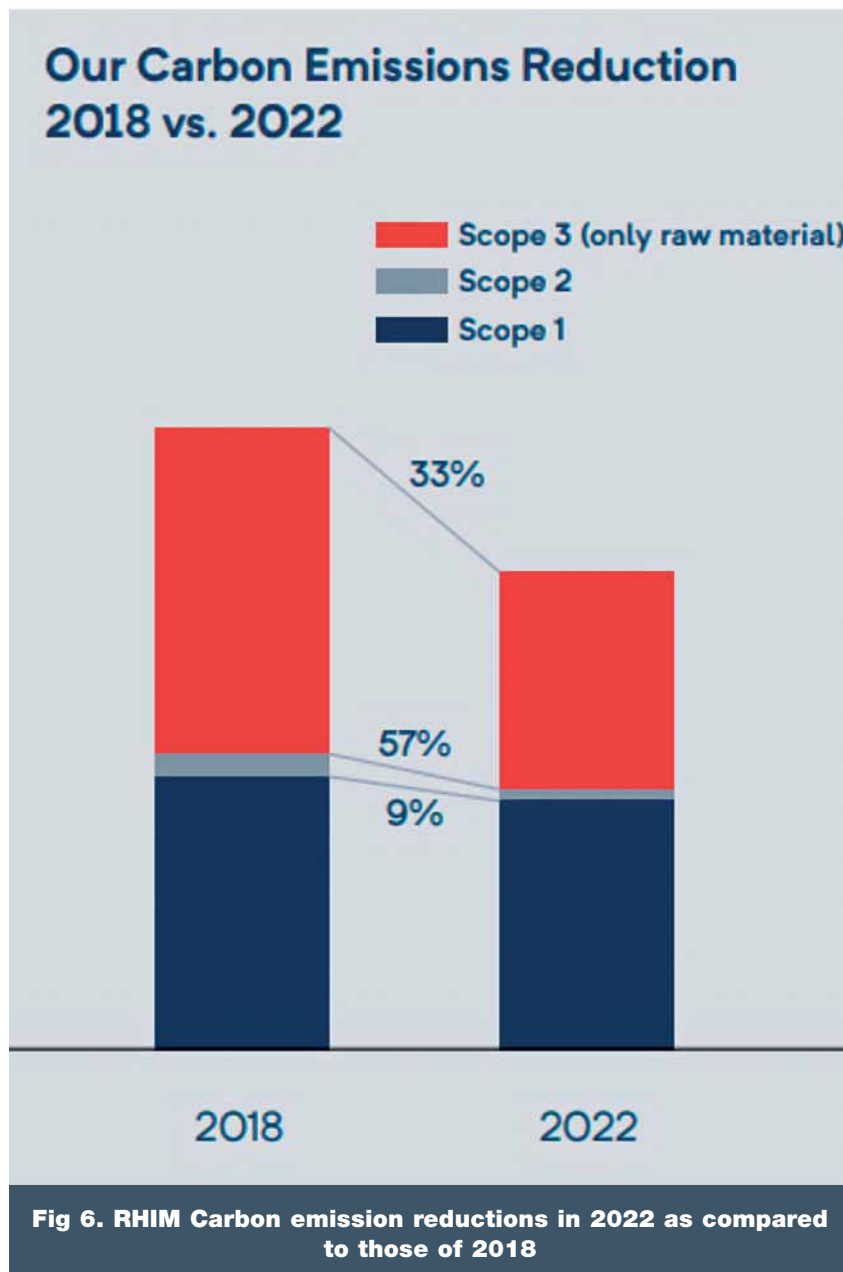
Services are already an integral part of RHIM's glass industry sales strategy. Here INNOREG is the tool concept for optimum, tailor-made regenerators, where RHIM supports the layout of checkers and the material selection.

Similarly, RHIM can support customers for an accurate selection of refractory products for the glass-melting furnace lining. It also offers refractory audits and analysis of furnace weaknesses to achieve CO₂ emission reductions through process efficiencies and wear monitoring.

Moreover, RHIM on request will periodically monitor the refractory lining wear, adopting the proper physical equipment. One example is the company's endoscopy service: integrated by the technical support of its specialists, it is able not only to detect the most critical areas, but to also address the proper recommendations and procedures for repairs where necessary. This process will also enable extension of a safe refractory linings working life.

Possible maintenance solutions include gunning repairs on which RHIM has gained seasoned experience. For example, dry gunning on damaged melting crowns has been successfully performed on some customer furnaces - aiming to not only prolong melting crown lifetime but also to restore significant energy savings for glass producers. Respecting this last aspect, an extensive range of repair materials is available globally - which allows fast reaction times.

An example of a successful project, completed at Isover Lübz, is given by the hot repair of a melting furnace crown, heavily damaged with large ratholes. Here the damage was responsible for a high risk of crown collapse coupled with significant energy loss.



SPECIAL FEATURES



Fig 7. Damaged furnace crown

Company specialists removed the residual insulation and repaired the large ratholes using hanging bricks.

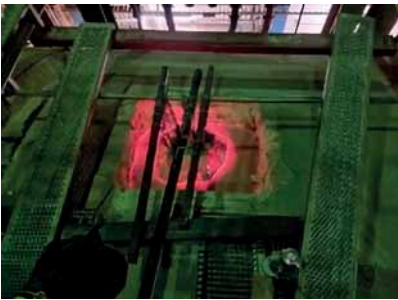


Fig 8. Repairs of the rat holes with hanging bricks

The area around the bricks was filled with our Compac Sol FS99G-3. Compac Sol is a sol bonded 99 percent silica mix, based on fused silica as raw material, with addition of silica sol binder (Divasil). One of the main features is the zero thermal expansion, therefore, is a perfect mix for hot repairs.



Fig 9. Sealing of the repaired area with hanging bricks with Compac Sol

Since the crown showed several similar damages, in order to seal them, prevent further damages and secure a safe melting crown operation after removing the insulation, company specialists installed the Compac Sol F99G-3 mix directly on the crown by dry gunning.

This is an easy installation technology, since it adopts very simple equipment, easy to rent on site or to transport which provides fast installation - even if it requires a restricted team of specialists.

The Compac Sol F99G-3 was installed with a thickness (approx. 150-200 mm) that can give self-supporting ability to the mix such that, should any bricks from the old crown fall, the gunning mix would be able to remain in place safely and in direct contact with the furnace atmosphere.

On top of the Compac Sol

F99G-3, two more mixes were installed with the same application method: Legrit 135-1,0 G 0-6 and Legrit 105-0,5 E 0-2 - aiming to restore the original melting crown insulation.

Thanks to this hot repair, the furnace was able to conclude its campaign one year later.

The postmortem analysis of the monolithic sealing/insulating mixes showed good bonding to the original melting crown. Regenerator efficiency measurement is also part of the RHIM service portfolio, which provides continuous monitoring of regenerator performance. The regenerators of a glass furnace can recover up to 70 percent of the energy associated with the waste gases. These values refer to new regenerators. However, during the furnace campaign regenerator efficiency tends to be reduced due to dust and condensate deposits. A con-



Fig 10. Complete sealing and insulation of the melting crown with Compac Sol and insulating mixes



Fig 11. Post mortem sample of the monolithic insulation

tinuous monitoring process in combination with a proper maintenance plan will keep the highest levels of regenerator efficiency stable and allow for a prolonging of the regenerator campaign.

Tailormade customer support on the path to sustainability is key to mastering challenges - especially in the face of technology changes. Here technical expertise at RHIM can assist at the outset with solving challenges

before they become a problem. Here one can learn from history that, in many cases, changes to technology have heralded changes to operational conditions which have led to huge problems. Indeed, such support hardly ends with support during the period of technology change, instead affecting the entire campaign - which includes the planning phase right from the beginning until disposal of the used refractories at the end. ■



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Fine-tuning excellence:

GLASS SERVICE ITALY

unpacks batch houses

CRITICAL ISSUES AND RELATED SOLUTIONS

In batch house design, quality demands for specialised glasses are rigorous - particularly those used in pharmaceutical and thin screen applications such as TFT. This includes ensuring high stability in such geometrical parameters as outer diameter (OD), internal diameter (ID) and thickness (TH). Chemical stability, resistance and physical properties of the batch glass formula are also crucial. Here stringent requirements extend to minimising cosmetic defects, inclusions, bubbles and air lines - emphasising the need for meticulous attention to detail

throughout the design process. (diagram 0)

Here's why the process requires very accurate control through every production phase. Good glass quality requires high precision in process control. Without excellent process control high quality glass needed in high added value applications cannot be produced. This necessitates a rigorous quality plan that makes provision for many inspections by skilled technicians. Taking the entire production process from raw materials to final product into account, it's possible to identify the critical points and thereupon implement each respective action. (diagram 1)

When focusing upon the first step in the glass manufacturing process the importance of ensuring the best glass batch quality becomes immediately clear - a target only achievable with a well-designed Batch House that's equipped with the best available devices and solutions. (diagram 2)

Hardly negligible in the rewatching of that result is the effectiveness of know-how directly acquired in the field - the same that Glass Service can provide to its customers thanks to the company's experienced technical staff. Besides design, layout and equipment, the team can share a full set of technical procedures and activities with the

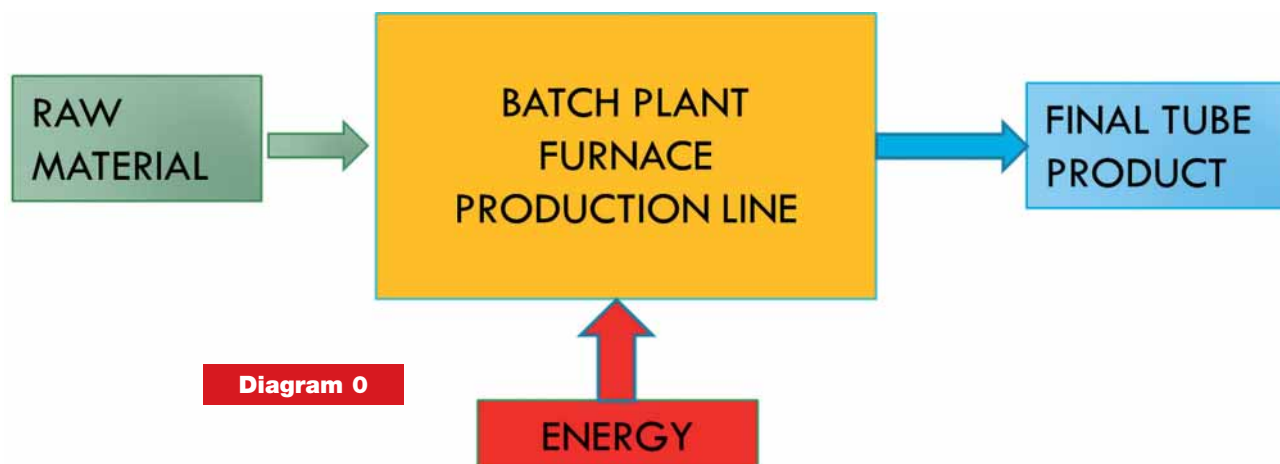


Diagram 0

Both stringent quality and precise control are crucial to the design of any glass batch house. Here GLASS SERVICE offers such solutions as vertical layout, dedicated silos loading, new scale design, microdosing stations and SCADA systems. Stability through control methods, procedures and training is likewise emphasised for all that concerns batches, though a well-controlled process comes as no less indispensable.

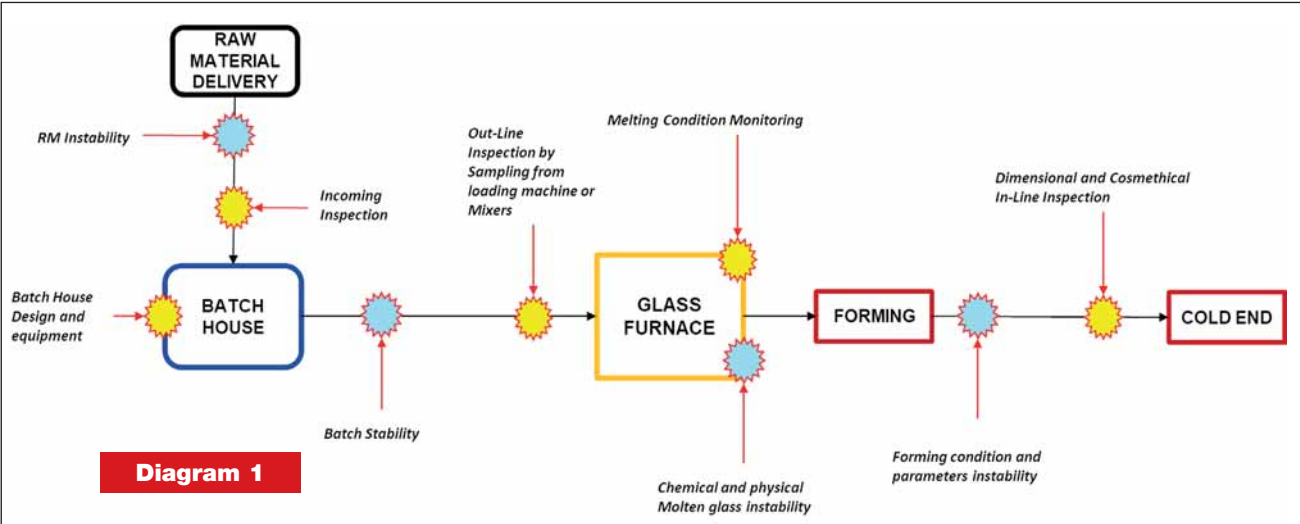


Diagram 1

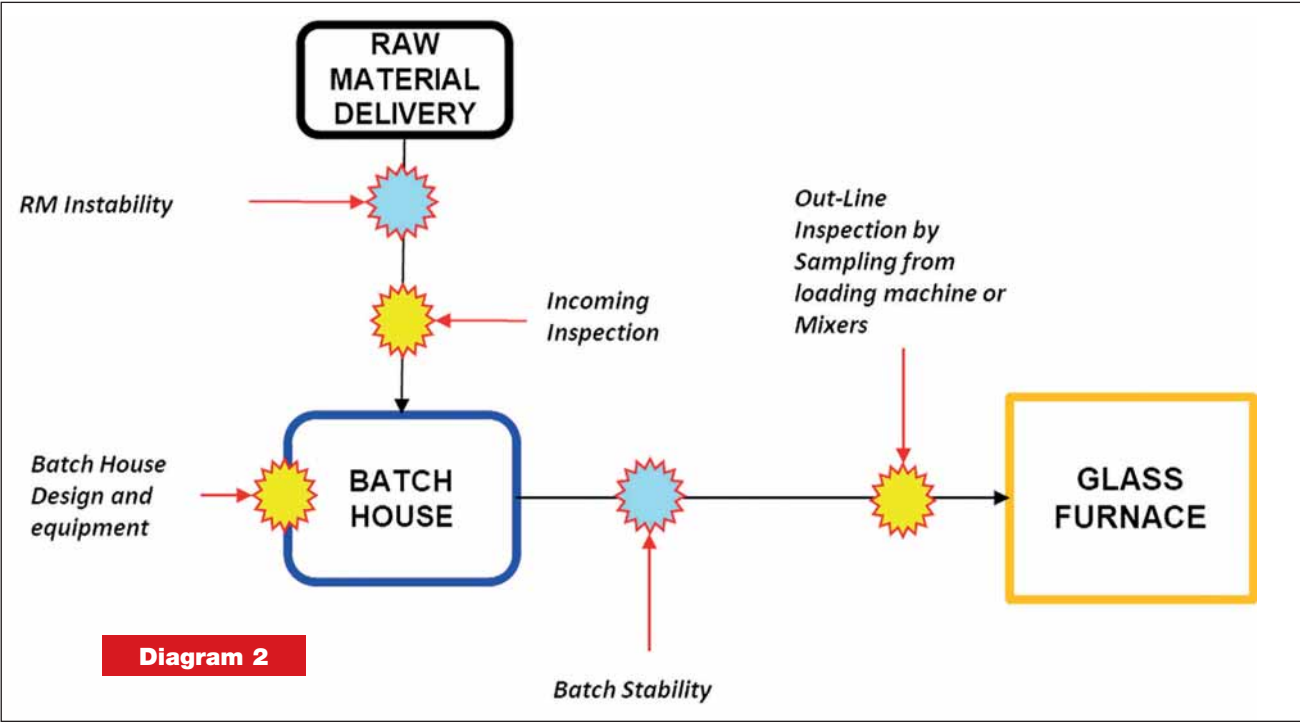


Diagram 2

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customer that will assure optimum results in terms of raw material validation and, by extension, glass batch performance and stability.

RAW MATERIAL, SELECTION, DELIVERY AND STORAGE

The first critical step is that of correct selection/validation of each of the raw materials needed, as well as the monitoring of the process of its stability throughout delivery. (tab 1)

Leveraging our seasoned team,

Glass Service offers comprehensive support, providing the essential expertise to assist customers in selecting and validating the best raw materials and suppliers available in the market. The company's invaluable know-how encompasses technical specifications, operational procedures, and on-field training to ensure optimal material stability

BATCH PLANT CRITICAL POINT AND DESIGN SOLUTIONS (TAB 2-3)

VERTICAL LAYOUT AS VISUAL IMPACT SOLUTION

Glass Service can design a compact Batch House building that's compliant with the current architectural standards and requirements out there. Generally obtained by preferring a vertical development of batch plant, this layout assures consistent saving both in terms of space and structure. (tab 4 - Image A)

CRITICAL POINT: RAW MATERIAL SILOS LOADING Solution: Dedicated silos

Critical Point	Effect	Monitoring Method
RM chemical composition instability	Batch and glass composition fluctuation, thermal instability, glass inhomogeneity	RM Sampling; grainsize and chemical analysis compared with technical data sheet
RM grainsize instability	Silos Segregation, batch demixing, thermal instability,	RM Sampling; grainsize and chemical analysis compared with technical data sheet
RM uncorrespondance	Batch inhomogeneity	RM Sampling; grainsize and chemical analysis compared with technical data sheet
RM contamination	Batch and glass contamination	RM Sampling; grainsize and chemical analysis compared with technical data sheet

Tab 1

Critical Point	Effect	Technical Solutions
Silos and dosing devices positioning	Space impact reducing	Compact design preferring as much as possible a vertical design of batch house.
Raw Material silos loading	Cross contamination	Design a dedicated loading system for single raw material
Sticky Raw Material adhesion	Silos clogging and bridging	PTFE lining or PTFE plate cover of steel.
Cullet homogeneity	Increasing the compatibility between cullet and batch	Dedicated crusher by design and chose the correct crusher design (hammer, screws, cinders) and related sieves if needed
Raw material loss	Batch instability, cross contamination, losses	Reduce as much as possible the use of conveying belt preferring the direct load/unload

Tab 2

Critical Point	Effect	Technical Solutions
Weighing precision	Batch instability	Increase the number of scale dividing Raw Material for chemical compatibility and increasing the sensibility of Loading cell
Scale gross weight	Increase the total weight and the end scale of loading cell	Reducing the weight of scale by separate the cover from the cone (suspended cone)
Dosing devices precision and speed	Reduce the dosing time, increasing precision by avoiding out of tolerance risk	Improve the use of dosing screw simple or with spiller in spite of vibrating channel
System Vibration	Reduce the weighing precision and tolerances	Use cover separate scale and improve the connections between dosing device and scale cover
Scale unloading		

Tab 3

Critical Point	Effect	Technical Solutions
Scale periodical calibration	Weighing stability and reproducibility	On board calibrating system
Micro component dosing precision (Finings)	Glass quality stability	Improve a premix system where needed and design a dedicated micro component station and scale
Sticky Raw material adhesion	Scale unloading issues	Lining the cone of scale whit PTFE
Segregation of batch and effect of vibration	Batch demixing	Avoid any belt after mixer and correct positioning of mixer
Storage and transfer of batch to furnace	Batch demixing and aging	Design of automatic and/or semiautomatic delivery system
Dosing Time saving	Increase the capability of batch plant	Correct choice of extractor and design of managing software.

Tab 4

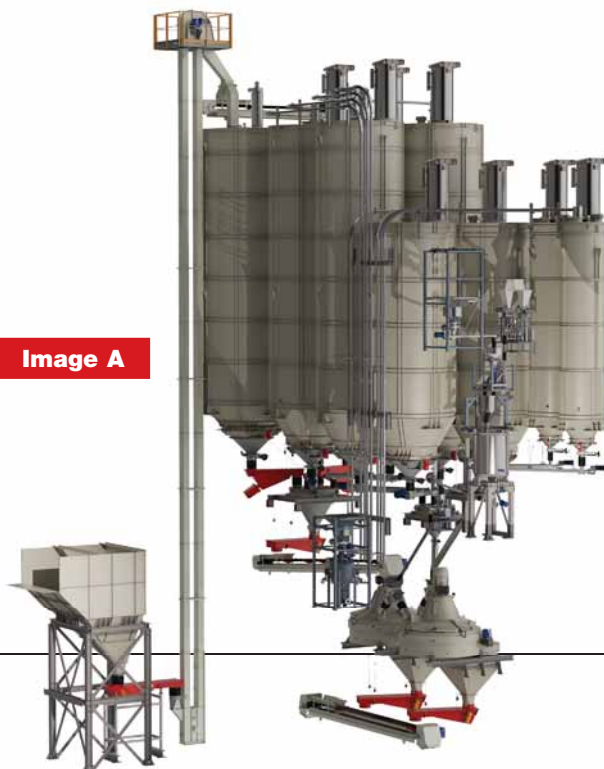


Image A

loading - Automatic/semi-automatic and/or manual

Precise identification of batch constituent raw materials, coupled with Glass Service's technical expertise, ensures the optimal design of dedicated silos and loading systems when meeting specific requirements. These include:

- Raw material delivery (bulk and/or silostainers, big bags, small bags)
- Silos turnover
- Silos loading process and frequency
- Long-term storage considerations for raw materials (ageing), (image B, next page)

SPECIAL FEATURES



Image B

Accurate dosing of fining agents is pivotal in high-quality glass production, with these components added in minute quantities (from 3 to less than 0.5 kg/ton). Glass Service introduces a specialised 'Microdosing Station' with a dedicated scale supporting one to four microdosers and associated finers. Employing vertical unloading directly into the mixer minimises material loss. Each microdoser features a uniquely designed screw that's based on the physicochemical properties of the dosed material. The scale, tailored to the total finings quantity and construction

CRITICAL POINT: WEIGHING PRECISION

Solution: Innovative scale design

When enhancing weighing accuracy, meticulous selection of the appropriate loading cell, full scale and sensitivity are all imperative. To meet such requirements, Glass Service has innovatively designed a lightweight scale, thereby optimising material selection (reducing metal thickness or considering alternative materials) and separating the cover from the scale cone. This design minimises the scale's gross weight, thereby increasing loading cell sensitivity. Furthermore, the separation of the cover from the scale body, coupled with Glass Service's novel design of the discharging cone in dosing equipment (utilising vibrating channels and screws), renders the weighing system impervious to vibrations. This results in a stable, reproducible, and rapid acquisition of the target weight. (Image c - d and image scale diagram, next page)



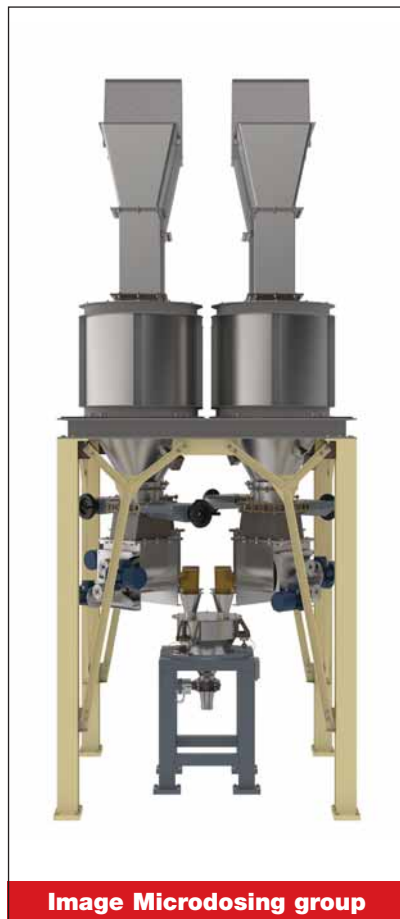
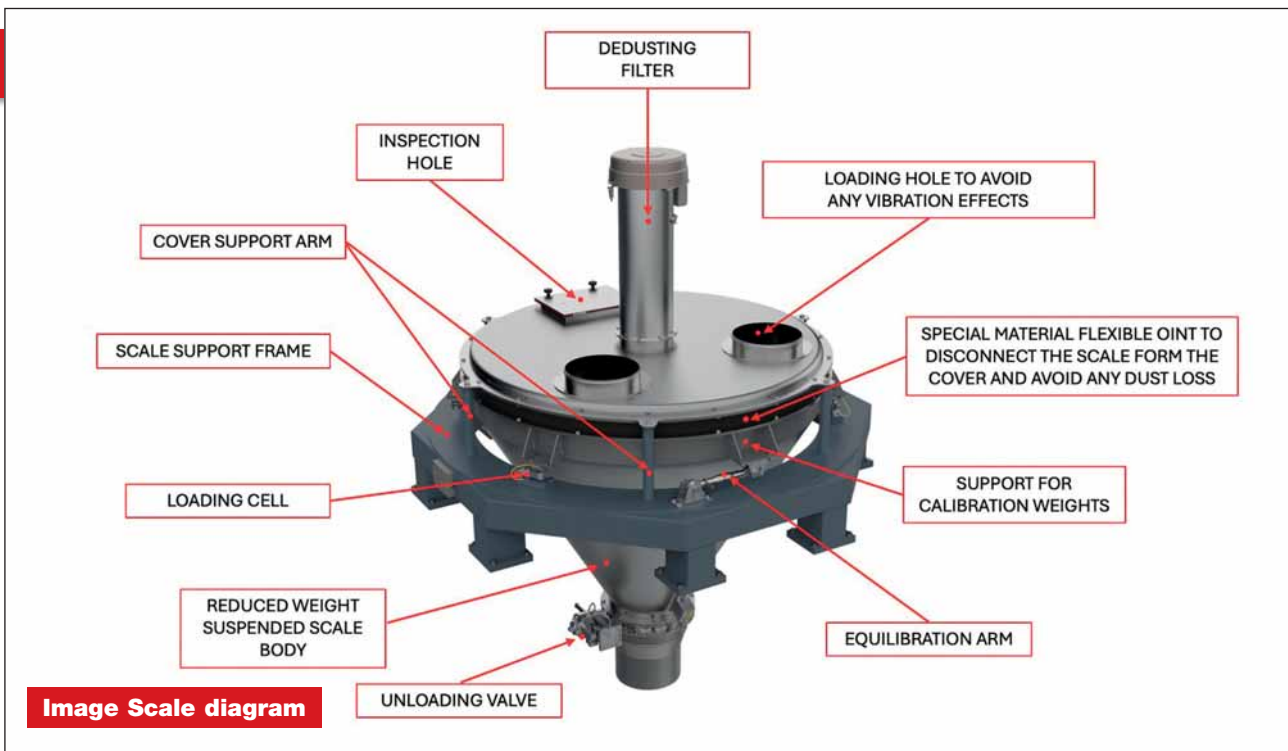
Image C

CRITICAL POINT: MICRO COMPONENT DOSING PRECISION (FININGS)

Solution: Microdosing station (image Microdosing group next page)



Image D



material, may include internal PTFE lining to prevent material adhesion. A premixing station may be installed as an option.

**CRITICAL POINT:
PROCESS CONTROL**
Solution: SCADA system and

software design (image E and image F, next page)

Glass Service provides a control board and Batch Plant SCADA Software. which has been designed based on customer requests and the technical expertise of the compa-

ny's experienced staff. Indeed proper software setup enhances batch plant capability - so reducing both downtime and bottlenecks. User-friendly software, equipped with a touch screen system and dual in-line PCs, ensures operational continuity even in critical situations with HMI redundancy. The control board supports EWON for prompt remote assistance and real-time control. This Glass Service software, developed using its in-house know-how, generates essential reports to ensure batch quality. An algorithm minimises rejected batches, streamlining operator activities to address such dosing issues as excessive weight.

BATCH STABILITY CONTROL METHODS

By leveraging the best preparation of its experienced staff, Glass Service supports customers via the provision of batch stability control methods. Based upon international standard references, essential know-how is hereby delivered through operational procedures, equipment guidance and on-field training. (tab. 5, next page)

SPECIAL FEATURES

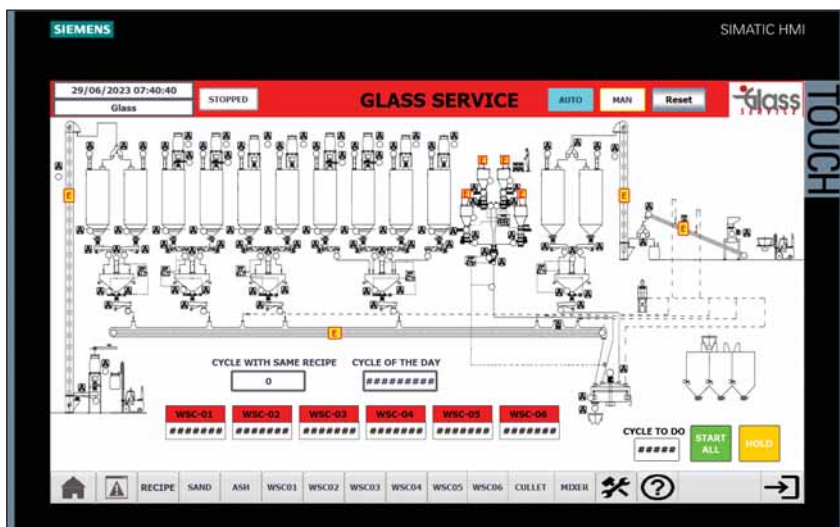


Image E

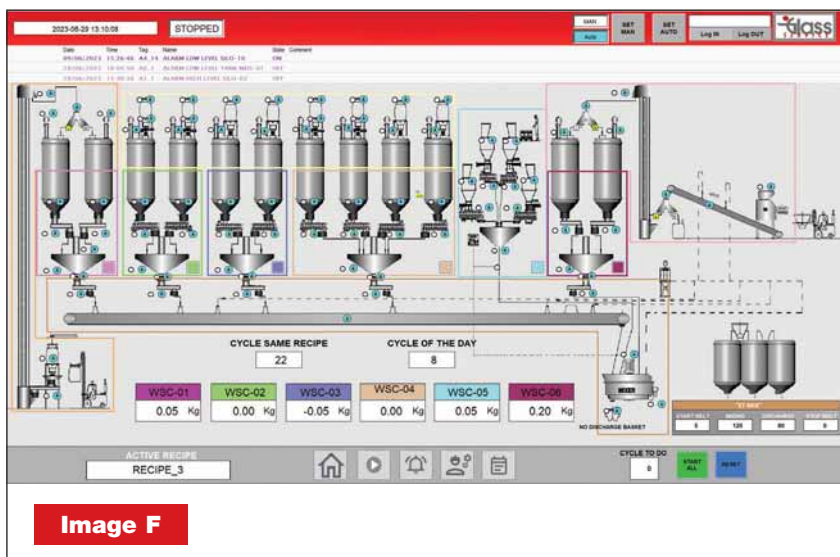


Image F

CONCLUSIONS

Investing in special glass manufacturing demands complex process control. The initial step at batch production is critical, since an unstable batch yields unstable glass. Drawing upon its expertise, Glass Service delivers tailor-made batch plants that are designed for specific glass production needs, minimising batch instability through optimal design while implementing all available solutions. Here Glass Service further aids clients in developing an effective ‘Control Organization’ through direct engagement, knowledge sharing and on-field training - all crucial elements for project success. ■



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Critical Point	Effect	Monitoring Devices
Iron and Sulphur contamination	Colour change, bubble and seeds	Batch sampling; chemical analysis compared with given (or historical) set points
Batch composition stability	Thermal instability, glass level fluctuation, short cut circuit	Batch sampling; grainsize and chemical analysis
Batch unmixing	Thermal instability, glass level fluctuation, short cut circuit	Batch sampling; grainsize and chemical analysis
Batch moisture	Bubble and seeds	Batch sampling; grainsize and chemical analysis

Tab 5



CHINA GLASS 2024

The 33rd China International Glass Industrial Technical Exhibition

Shanghai New International Expo Centre

April 25th-28th, 2024

Organizer: The Chinese Ceramic Society

Executive Organizer: Beijing Zhonggui Exhibition Co., Ltd.

Supporter: China Building Materials Federation

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SPECIAL FEATURES

Company focus

A trajectory of innovation: **SIGMA GROUP'S** inspiring path to growth

A global leader in bonded refractories, SIGMA GROUP offers unique solutions for glass furnaces, including grooved tubes, high alumina alternatives and cutting-edge structural designs.

LOOKING BACK

Having developed its global footprint considerably since its founding, Sigma has also boosted turnover over recent years. Notably, the company has increased its index in produced and sold refractory tons - also placing itself in a leadership position as regards the production of special pieces. Whereas at its earliest stages the company had Italy as its main reference market, and so exported very little, the exact opposite is now true, considering that it exports over 80 percent. Production was initially based only at the Sigma unit in Locate Varesino, though today it has two production units - one in Italy and the other at Plovdiv in Bulgaria. The group currently has 100 employees. It started in Italy in 1990 with just one warehouse before gradually developing to another, adjacent to the first, and thereafter acquiring a further warehouse to eventually arrive at occupation of the entire street as well as the surrounding industrial area. Construction of the





first unit in Bulgaria started in August 2013 and production began in March 2014. The group recently completed construction of a fourth building at Plovdiv. In Bulgaria it can now boast seven sintering furnaces and there are nine at its Italy headquarters. Therefore the tally totals 16 furnaces - all making Sigma the international leader of special pieces - particularly those of considerable tonnage, with an average

monthly production of circa 650 tons of shaped blocks.

Today the group is a global leader of bonded refractories for the glass industry. It provides the full range of materials for glass furnaces from Fireclay to Sillimanite, Mullite, High alumina, Zircon-mullite, Zircon, Magnesia based materials, Silica and Fused cast.

SIGMA TODAY

The group is specialised in the production of shaped pieces of considerable tonnage, with an average monthly production of circa 600 tons of shaped blocks and 650/700 tonnes of pressed refractories.

Over the years it has engineered unique products as well as improved products that are already widely-used, such as:

- a specially grooved tube from 5" to 14" including the metering shape, which affords better gob homogeneity in weight and temperature;
- a bonded high alumina for channel blocks up to K60", which represents the best alternative to fused cast - alumina for soda-lime glass contact applications for operating temperatures of up to 1300°C;
- sillimanite/mullite working end and forehearth superstructures up to K72";

- Bottom paving in Fireclay, Sillimanite & Zircon-mullite with blocks up to 1000x500x300 mm;
- A high grade mullite and new structural design for the regenerator chambers which affords both higher resistance to chemical attack and increased structural stability at high temperatures.

MEETING TOMORROW'S CHALLENGES

With Sigma's special refractory still in great demand, the group is preparing to face the challenge of the glass furnace of the future. That may be combustion with a mix of hydrogen and oxygen or completely electric. Either way, SIGMA will be there. ■



SIGMA GROUP
REFRATORIES *with passion*

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Robust industry offerings diversify with Caldeyrys – HWI ties

Global refractories leaders HWI and Caldeyrys joined in 2023 following HWI's century-long history of glass innovation. Today, they address sustainability in glass manufacturing, pioneering such solutions as the HWI chromia alumina reuse programme, while introducing energy efficient glass production – all taking collaboration to the next level as they jointly enhance service excellence.

Bryn Snow
Director of Glass and Nonferrous
Application Technology

HWI, a Member of Caldeyrys

Paul Stipanovich
Application Technology
Specialist, Glass and Nonferrous

HWI, a Member of Caldeyrys

A WINNING COMBINATION FOR GLOBAL GLASS SOLUTIONS

Refractories continue to be an essential enabler of glass manufacturing advancements. HWI, a Member of Caldeyrys,

began its rich history of glass partnership and innovation back in 1864 when Charles Taylor and Sons opened a small firebrick business in Ohio to serve glass manufacturers. Over the last century of its history HWI's research and development teams, serving the glass market, have pioneered a host of innovative solutions that continue to impact how glass is manufactured today.

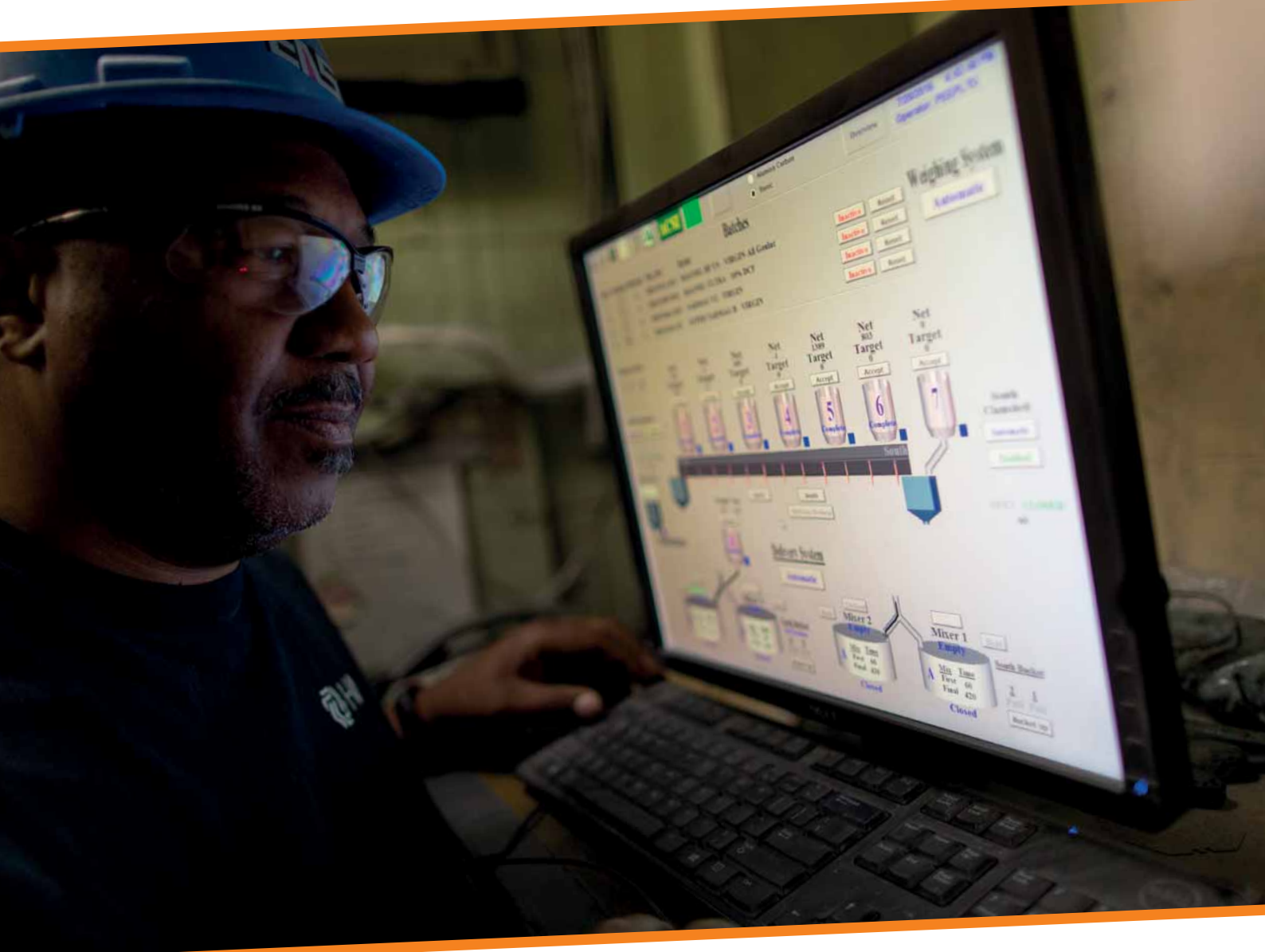
HWI now provides the largest refractory manufacturing capacity to the glass industry in North America. In 2023, HWI became a Member of Caldeyrys and the brand for the Americas

region of the global refractories leader Caldeyrys after both companies were united under single ownership. As Caldeyrys Group, the organizations together create a world-class refractories solutions provider with even greater opportunities to serve the glass industry on a global scale.

HELPING GLASS MANUFACTURERS SOLVE ENERGY AND PRODUCTION CHALLENGES

Sustainability continues to be a significant focus for the glass industry, which has been





seeking solutions for energy reduction in melting glass and employing even more recycling solutions throughout product lifecycles for decades. Helping customers meet their energy transition needs has been a priority for Calders Group, including HWI - and the glass industry is no exception.

Almost 30 years ago, as concerns about the environmental impact of chromia alumina refractories grew, HWI created a pioneering reuse programme for these products to provide alternatives to hazardous waste landfilling for glassmakers.

Today, all suppliers of refractories to the glass industry are doing likewise.

Innovation continues to focus on new products that support energy savings efforts. HWI's highly-insulated bottom construction, the use of High Emissivity Coatings, and the development of the JADE® and HORIZON product lines are just a few examples of solutions brought to the market to reduce the energy needed to manufacture glass.

To help advance energy alternatives for furnaces, HWI has invested in GlassTrend's

GT37 project, which is studying refractory corrosion in hydrogen-fired furnaces. It is also working with furnace designers on other hybrid and electric melting designs.

Moreover, furnace designers are exploring new robotic installation solutions as the industry continues to lose highly skilled bricklayers. In response, HWI has improved its production technology for pressing large-profile bricks. The larger block construction enables faster installation when leveraging machinery to lift refractory into place - reducing the number of skilled bricklayers needed on a job site.



PRODUCT AND SERVICE ADVANCEMENTS

Refractory product formulations and performance qualities are also addressing the changing needs of glass manufacturers. HWI launched JADE 75 and JADE 75 DC brands recently to further its product portfolio offering in chrome alumina. The new products fill the need for applications where additional corrosion resistance is required, but thermal shock is of great concern, along with costs. JADE 75 and JADE 75 DC brands address these concerns and prevent the need to move to the most premium quality of a 95 percent chromia-containing refractory.

Calderys' HWI brand has also launched a portfolio of refractory expendables for the container glass industry to provide an economic solution while leveraging its large Distribution Center network in the Americas - meeting

the immediate service demands of this product line.

Globally, Calderys has an immense global footprint - both in sales and in installation services, which is set to enable a higher service level to the global glass industry. Calderys has been providing monolithic solutions to the industry for many years. Now, with the full portfolio of products from HWI, the company is poised for an even stronger position in the market.

Refractories play a vital role in ensuring that glass manufacturers innovate, maximize furnace performance and improve energy efficiencies for a sustainable future for the industry. Calderys and HWI teams are actively coordinating product portfolios, sales and installation services - driving even more opportunities to expand Calderys Group offerings and energy transition support for the global glass industry. ■



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NET ZERO

Net zero

Planned electric melting to see SCHOTT pioneering climate-friendly glass



Innovation in Bavaria. Schott is planning a new melting furnace in Mitterteich that will produce pharmaceutical glass with low CO2 emissions using electricity by 2026. Up to 80 percent less emissions are possible. Photo courtesy of Schott

Thanks to its focus upon hydrogen and green electricity for glass melting, SCHOTT has achieved a significant milestone in emissions reduction. Current plans for an innovative electric melting tank by 2026 align with ambitious climate-neutral and Scope 3 goals - all endorsed by the technology group's Science Based Targets initiative.

Taking stock of its past year, Schott has covered much ground in the gradual reduction of emissions after having set the goal of sustainably transforming its energy-intensive specialty glass production. In addition to promising research results in using hydrogen instead of natural gas during the melting process, accelerated technological change has begun with the construction of the company's climate-friendly electric melting tank. Schott also made progress in terms of energy efficiency and the use of green electricity. Besides the plan for climate-neutral production in Scope 1 and Scope 2 by 2030, ambitious reduction targets have now been set for the value chain (Scope 3) for the first time. The globally-recognized Science Based Targets initiative (SBTi) recently confirmed the emissions reduction target submitted by Schott based on scientific findings for all three scopes.

STEPPING AWAY FROM NATURAL GAS

The glass industry is one of the most energy-intensive industries in

the world. Temperatures of up to 1,700 degrees Celsius are reached in huge melting tanks to melt the glass raw materials. To date, the main source of energy has been natural gas - associated with high emissions of greenhouse gases that are harmful to the climate. Schott has therefore already made reducing its emissions in its own production a focus of its sustainable com-

pany transformation since 2020. Absolute emissions have been reduced by 60 percent since 2019 by switching to green electricity and continuously increasing energy efficiency. Despite growth and high energy consumption, the Group kept CO2 emissions constant in fiscal year 2022/23. Jens Schulte, the Schott Management Board member in charge of the 'Zero Carbon' strategy programme, says: the Schott Management Board member in charge of the 'Zero Carbon' strategy programme: "We have already achieved the first important milestones, such as switching to 100 percent green electricity, in the last two years. Now we must solve complex technical challenges with our melting tanks. In order to reduce emissions even further and achieve our climate targets we must break new technological ground. Our focus is on developing innovative technologies to melt glass more sustainably."

TECHNOLOGICAL CHANGE

Schott is currently conducting pioneering research into melting glass with sustainable energy



Intensive testing: Schott is working on several research projects to melt glass with electricity. Photo courtesy of Schott/ Oliver Rüter

NET ZERO

sources instead of natural gas. Here, the Group is focusing on two options: electrifying the melting tanks with green electricity, or using green hydrogen. Laboratory tests with 100 percent hydrogen were successfully carried out in the spring of 2023. More tests on melting tanks on an industrial scale are to follow next year. Indeed Schott recently launched several research projects aimed at determining the proficiency of electricity in regards to the highly complex material and process requirements of melting specialty glass. “Our results were very promising,” says Head of Melting Research Michael Hahn. “In the pilot plant, we were able to increase the share of electrical energy to up to 60 percent for difficult-to-melt aluminosilicate glasses, for example, while maintaining at least the same glass quality. We have thus shown that a ‘super-hybrid tank’ with a higher percentage of electrical heating than fossil heating is possible in principle.” Tests are now to be conducted directly on the newly-developed tanks, and under real production conditions, in order

to learn more about the processes in the tank.

PILOT PROJECT: CLIMATE-FRIENDLY ELECTRIC MELTING TANK

Schott is currently taking the next step towards decarbonizing its production. The company plans to build an electric melting tank in Mitterteich, Bavaria, by the beginning of 2026. The tank will be the first of its kind, using electricity to melt glass for the pharmaceutical industry in a much more climate-friendly way. Following the company’s technology roadmap, the development will mark an important step in its ultimate plan to gradually implement sustainable technologies across the board in its plants. The pilot tank powered by green electricity is expected to reduce greenhouse gas emissions by around 80 percent compared to the melting tanks currently in use. Natural gas will still need to be used in some areas. The innovative project is intended to set new standards for the entire industry, and is therefore being funded by the German Federal

Ministry for Economic Affairs and Climate Protection and the European Union to the tune of EUR 14.8 M. Schott will invest a total of around EUR 40 M in this innovation.

ENERGY EFFICIENCY: REDUCTION BY 22,000 MWH

Energy efficiency has increased continuously and systematically. A total of 22,000 MWh/year and 8,800 tons of CO₂e/year were saved, which equates to the electricity consumption of more than 7,300 two-person households in Germany. The company is also developing solutions such as expanding the compressed air supply, recovering heat from melting tanks, and improving roller cooling. Additional local projects will provide further energy savings, such as using waste heat at the Schott Pharma site in Müllheim, Germany, to heat private homes, the installation of solar panels at the plant in Lanškroun, Czech Republic, and the construction of a new building in Landshut, Bavaria, which is powered by 100 percent green electricity.

GREEN ELECTRICITY: EXPANSION OF THE PORTFOLIO

The Group was also able to expand its portfolio in the area of green electricity. Since 2021, Schott has switched to 100 percent green electricity with the help of Energy Attribute Certificates (EACs) and Power Purchase Agreements (PPAs). The company relies on high-quality, independently audited green electricity labels. To date,

The new heating methods influence the manufacturing processes. Digital models help experts to simulate changes in the melting tanks. Photo courtesy of Schott/ Oliver Ruether





Experiments with hydrogen have reached 100 percent in laboratory tests in 2023. Further tests are to follow, though infrastructure and poor energy source availability remain a major challenge.

the Group has concluded seven direct contracts with energy producers (PPAs). With these, the company is supporting the energy transition in Germany. Here Schott plans to cover around 24 percent of its electricity consumption in Germany through PPAs in 2024. The goal is to further expand and internationalize these contracts with suppliers of renewable energy systems. The first contract has already been signed in Asia. The Schott plant in the Indian state of Gujarat has been receiving electricity from a wind-solar park since the spring of 2023.

SCOPE 3: GROUP AMBITION FOR VALUE CHAIN EMISSIONS REDUCTION

Until now, the technology group’s climate strategy has focused upon emissions from its

own production (Scope 1+2). Now, for the first time, Schott has determined the dimension of emissions along its value chain (Scope 3) and has thus set further reduction targets in this regard. In 2019, these Scope 3 emissions amounted to around 1.3 million tons of CO₂e. By 2030, the absolute emissions in Scope 3.3 (energy and fuel-related activities) and Scope 3.15 (investments) are to be reduced

by 27.5 percent. The Group is also working closely with its suppliers. 74.23 percent of the suppliers with the highest emissions are to also set themselves science-based climate targets by 2027.

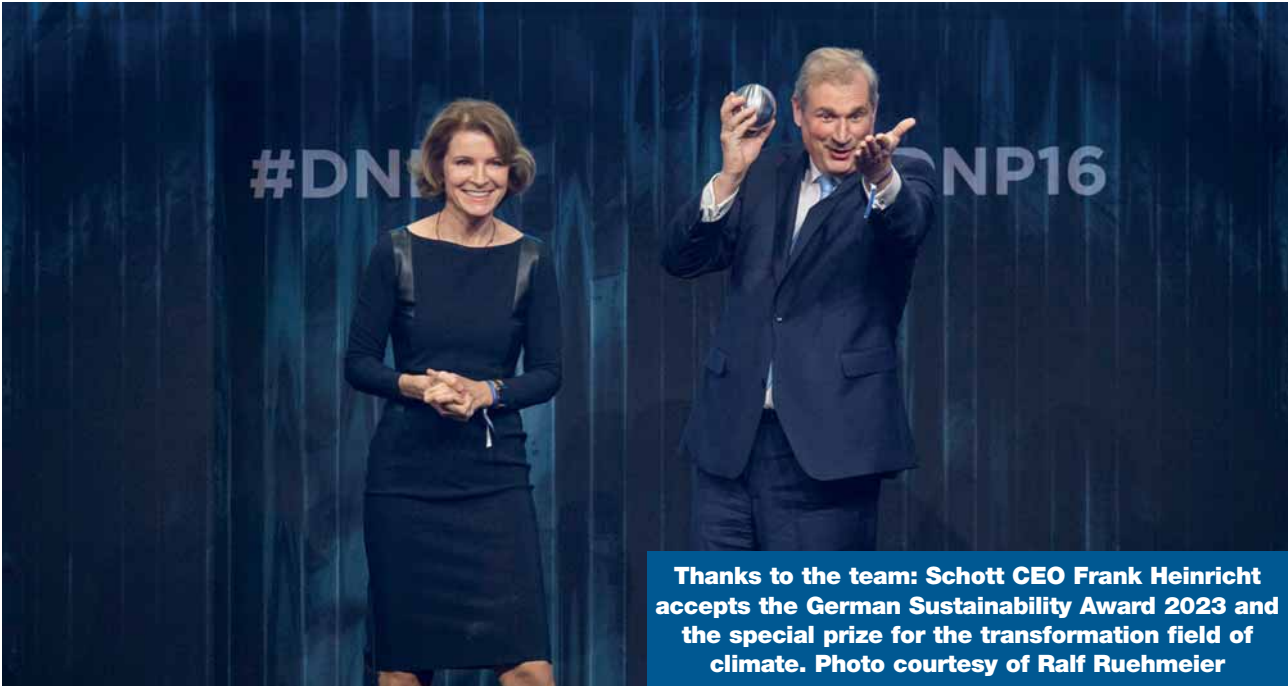
AN INTERNATIONAL CLIMATE INITIATIVE

Schott has consistently expressed its priority to align its climate targets with the current state of climate science. For this

Schott is working on numerous projects to increase energy efficiency, e.g. this heat pump at the Mainz location. Photo courtesy of Schott



NET ZERO



Thanks to the team: Schott CEO Frank Heinrich accepts the German Sustainability Award 2023 and the special prize for the transformation field of climate. Photo courtesy of Ralf Ruehmeier

reason, the Group has joined the global Science Based Targets initiative (SBTi), whose members are pioneers in the decarbonization of the economy. The initiative is regarded as the Gold Standard for scientific climate targets. Through its commitment, the technology Group seeks to assist with limiting global warming to 1.5 degrees Celsius - thereby fulfilling the requirements of the Paris Agreement. Schott has set specific targets for all three Scopes, which have been reviewed and confirmed by the SBTi.

GERMAN SUSTAINABILITY AWARD

With such ambitious goals, the climate protection strategy still has many more steps to take, and numerous challenges to overcome - which is true not only for Schott, but for all players that are committed to sustainable development. Here the fact that Schott has already received initial public recognition for its measures is an encouraging sign for the journey ahead. After winning the "Energy Efficiency Award" in the fall of 2022, Schott was hon-

oured twice with the prestigious German Sustainability Award in November 2023 - one for the glass and ceramics industry sector, and the other in special recognition of climate transformation. Says Schulte: "This renewed success confirms our strategy and motivates us to take the next steps with commitment. Thanks to the IPO of our pharmaceutical subsidiary, we are in a good financial position to make further investments. Nevertheless, like many other manufacturing companies in Germany, we are dependent on certain framework conditions. These include the availability of green energy at competitive prices and a corresponding nationwide infrastructure."

STRATEGIC FOCUS UPON FOUR FIELDS OF ACTION

As part of its 'Zero Carbon Program,' Schott has established four fields of action to reduce CO₂ emissions. In addition to technological change and the use of 100 percent green electricity, this includes the continuous improvement of energy efficiency. As a final step, the Group also uses offsetting to compensate for

remaining emissions. Despite all efforts taken, a manufacturing company like Schott will not be able to avoid all emissions. Consequently the Group will offset any remaining emissions harmful to the climate for the foreseeable future by participating in climate protection projects. In doing so, Schott relies on certificates with strict international standards, such as the Verified Carbon Standard or the Gold Standard. To calculate climate-relevant emissions, the emissions of all greenhouse gases are considered across the Group. Here, in order to ensure comparability of the impact on the climate, Schott expresses its greenhouse gas emissions in CO₂ equivalents (CO₂ e). ■

SCHOTT
glass made of ideas

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Ceramic and glass RADIATIVE COATINGS that offer stability and scalability

Global warming heightens heat-related health risks. Unlike air conditioners, which release greenhouse gas emissions, RADIATIVE COATINGS offer passive cooling with no emissions by reflecting solar radiation and emitting thermal radiation into space. Inspired by nature, innovations in ceramic and glass coatings show promise, reducing both energy consumption and emissions.

Laurel Sheppard

More people are at risk from heat-related diseases and death than ever before as global temperatures continue to rise. Though air conditioners may appear to be a solution, use of this technology leads to the emission of hydrofluorocarbons and greenhouse gasses, which drive climate change. While energy-efficient air conditioners help reduce emissions from these devices, other cooling methods that do not cause any emissions are needed.

Radiative coatings can provide passive cooling without the use of



SUSTAINABILITY

mechanical refrigeration equipment. Such coatings are designed to reflect solar radiation and emit thermal radiation to the cold outer space – thereby achieving electricity-free spontaneous cooling.

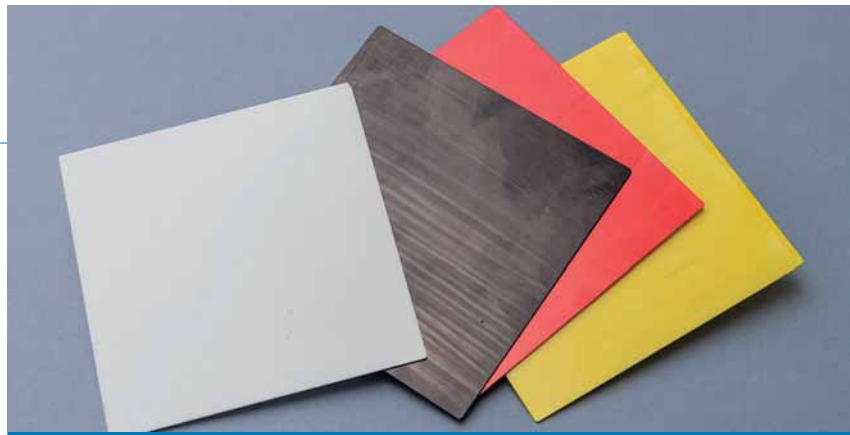
Researchers have made numerous advancements in radiative coatings in recent years, thanks largely to innovations in micro/nanofabrication. This article overviews two recent papers, both published in Volume 382, Issue 6671 of ‘Science,’ that harnessed such manufacturing techniques to develop new radiative coatings.

BEETLE-INSPIRED CERAMIC COATING ACHIEVES NEAR-PERFECT SOLAR REFLECTIVITY

Researchers at several Hong Kong universities designed a new ceramic radiative coating that exhibits a near-perfect solar reflectivity of 99.6 percent. The coating’s impressive properties are due to its nanostructure, which was inspired by the *Cyphochilus* beetle. Native to Southeast Asia, it is considered the whitest insect on earth. The beetle’s colouring is due to the arrangement of tiny tear-shaped scales that cover its entire exoskeleton. Only 6 µm thick, these form a highly connected and dense network of chitin, i.e., a long-chain polymer that gives strength to the exoskeletons of crustaceans, insects, and the cell walls of fungi. Chitin scatters light extremely efficiently, resulting in the ultrawhite appearance.

Previous studies have drawn inspiration from the *Cyphochilus* beetle to create sustainable and biocompatible ultrawhite coatings. But the new study took this inspiration a step further by creating a coating that is both aesthetic and functional.

The Hong Kong researchers fabricated the ceramic coating through a process that can be easily scaled for mass production. First, they cast a solution of polyethersulfone (PES), N-methyl-2-pyrrolidone (NMP), and alpha-alumina onto



Samples of the beetle-inspired ceramic radiative coating in different colours. Image courtesy of City University of Hong Kong

a flat substrate and immersed it in ethanol, which caused the NMP to dissolve. They then sintered the material to remove the PES and bond the alumina particles in a porous pattern that resembles the *Cyphochilus* beetle scales.

In addition to a record-high solar reflectivity of 99.6 percent, the final alumina coating exhibited an infrared thermal emission of 96.5 percent and withstood temperatures of more than 1,000°C (1,832°F). When applied to a house roof, the coating reduced the amount of electricity used for space cooling by 20 percent.

Other characteristics of the ceramic radiative coating include:

- **Ultralow thickness.** The coating requires a thickness of only 150 µm to achieve a reflectance of more than 95 percent. Conventional high-performance roof cooling coatings typically require a thickness above 1 mm.
- **High mechanical strength.** The coating demonstrates a high mechanical strength of more than 100 MPa (building envelopes require a minimum of 35 MPa).
- **Low reflectivity.** The coating has low reflectivity within the atmospheric window transmittance range at any thickness, making it suitable for coating concrete and similar substrates.
- **Subambient cooling.** The coating achieves subambient cooling above 4°C even around midday (between 11 a.m. and 2 p.m.), resulting in lower temperatures compared to white commercial tiles.

- **Either water-loving or water-repelling.** The coating can be converted from superhydrophilic (attracted to water) to hydrophobic (repels water) by impregnation with organosilicon compounds. This change to the coating causes only a small drop in solar reflectance.
- **Resistant to environmental stimuli.** The coating resists pollutants when treated with fluorosilane, maintaining a solar reflectance of more than 97 percent. The coating also exhibits resistance to ultraviolet radiation and fire.
- **Recyclable.** The coating is recyclable and can be turned into a new material with well-preserved optical properties.
- **Colour options.** The coating can be coloured using a dual-layer design while mostly retaining its reflective properties. For example, yellow, red, and green coatings exhibited reflectivity in the near infrared region of 95 percent, 96 percent, and 87 percent, respectively.

Said Chi Yan Tso, associate professor of energy and environment at the City University of Hong Kong: “This study confirms the great potential of cooling ceramic in reducing people’s reliance on traditional active cooling strategies and provides a sustainable solution for avoiding electricity grid overload, greenhouse gas emissions, and urban heat islands.”

Published in ‘Science,’ the paper is entitled ‘Hierarchically structured passive radiative cooling ceramic with high solar reflectivity.’

AUTHOR BIO

Laurel M. Sheppard is an award-winning writer and editor who has worked on numerous trade and association publications, including *The American Ceramic Society Bulletin*, *Advanced Materials & Processes*, *Materials Engineering*, *Society of Women Engineers* and *Photonics Spectra*. She also currently writes energy content for *Questline* and articles for the *Ohio Genealogical Society*.

TEMPERATURE DROP ENABLED BY MICROPOROUS GLASS COATING

Researchers at the University of Maryland and the University of Wisconsin-Madison used a solution-based process to fabricate a microporous glass coating that achieves a cooling effect even under high-humidity conditions.

The solution consisted of phosphate glass particles (2–15 μm) and alpha-alumina nanoparticles (0.3–1.0 μm) suspended in ethanol. The glass particles acted as a nonconventional binder to form a robust porous supportive framework, while the alumina particles strongly scattered light and prevented densification of the porous structure during manufacturing.

After sintering at about 600°C, the glass particles formed an interconnected mesoporous structure, with the alumina particles surrounded by the glass. Scanning electron microscopy analysis showed a porosity of about 50 percent and an average pore size of 6.7 μm .

Testing identified the optimal mass fraction of alumina particles to be 40–60 wt. percent. Coating thickness needed to be more than 500 μm to achieve solar reflectance greater than 95 percent.

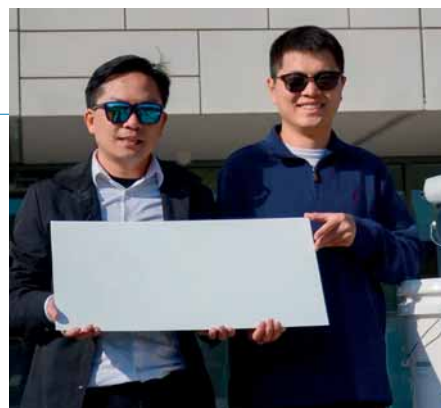
The researchers note that the solution's viscosity could be modi-

fied for different coating techniques, such as spray or brush coating, thus allowing the coating to be applied with good adhesion on various substrates, including brick, tile, metal, and glass.

However, solar reflectance depended on the coating method. Compared with brush-on glass coatings, spray-on glass coatings had a rougher, more porous structure, resulting in slightly lower solar reflectance. Increasing the alumina mass fraction to about 60 wt. percent in spray-on coatings achieved solar reflectance of more than 96 percent at a thickness of about 500 μm .

Other advantages of the glass radiative coating include:

- Combines high solar reflectance (>96 percent) and high infrared emissivity (95 percent) in the atmospheric transparency window.
- Enables temperature drop of about 3.5° and 4°C during mid-day and nighttime, respectively, even under high-humidity conditions (up to 80 percent).
- When applied to roofing, it can reduce annual carbon dioxide emissions by about 10 percent, resulting in an average annual cost savings of about USD 350 for old buildings and about USD 290 for new buildings.
- Maintains high solar reflectance even when exposed to harsh con-



Distinguished University Professor Liangbing Hu (left) and assistant research scientist Xinpeng Zhao at the University of Maryland display a panel of steel coated with their new radiative cooling glass. Image courtesy of A. James Clark School of Engineering, University of Maryland

ditions, including water, ultraviolet radiation, soiling, and high-temperature flame shock.

- Compatible with several different combinations of glasses featuring different softening points (300°C to 1,000°C) and dielectric particles (titanium dioxide, zinc oxide, boron nitride).
- Can incorporate inorganic dyes to produce pink, green, and yellow colours while retaining solar reflectance properties ranging from 90 percent to 95 percent.

Said first author Xinpeng Zhao, assistant research scientist at the University of Maryland: “It’s a game-changing technology that simplifies how we keep buildings cool and energy-efficient.”

The researchers established a startup company called CeraCool to scale up and commercialize the glass coating technology. ■



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ACKNOWLEDGEMENTS

This article was originally published on The American Ceramic Society's Ceramic Tech Today blog on Dec. 12, 2023. Republished with permission.

INDUSTRY SPOTLIGHT

A glance at the glass market in ITALY from 2022 to the present

Despite challenges, the glass industry in ITALY achieved 1.5 percent growth over 2022, serving diverse Made in Italy sectors. A EUR 400M investment now targets a 12 percent capacity increase by 2024. With 8,000 employees, a €2.5 billion turnover and supported by an EUR 8 billion decarbonization investment, it currently addresses both energy cost volatility and sustainability.

For the glass industry, 2022 proved to be a complex year that was marked by rising energy costs, inflation, lingering effects of the pandemic and a more than tenfold increase in glass scrap prices. Despite these challenging factors, the year concluded with a 1.5 percent growth compared to 2021. In Italy, the glass industry stands out as a unique case in Europe - encompassing all production sectors while serving numerous Made in Italy supply chains. These include flat glass for construction, automotive



applications, furnishings and the pharmaceutical sector.

CHALLENGES

Despite the recorded increase, the industry fell short of meeting demand. Imports of bottles and vases surged by 11.3 percent while exports experienced a 4.4 percent decline. Consequently, investments totaling approximately EUR 400M were earmarked for the construction of five melting furnaces scheduled to be operational by 2024. The aim has been to secure a 12 percent increase in production capacity - as outlined in a report by Assovetro, the national association of glass producers.

Said Assovetro container section president Roberto Cardini: “Despite persistent challenges, the industry has continued to grow. 2023 is expected to be a year of stabilization, allowing us to tackle future such challenges as decarbonization through the exploration of new energy vectors.”

The sector comprises around 60 plants and 32 large-scale production companies - along with approximately 300 transformation companies and 30,000 direct employees. Italy represents a key market for this industry, totaling around 8,000 employees and generating an annual turnover of approximately EUR 2.5 billion.

ENERGY COSTS AND THE IMPORTANCE OF SUSTAINABILITY

The sector has grappled with the volatility of energy prices and the surge in scrap prices (rising from around EUR 25 per ton to approximately EUR 200). Consequently, the cost of using scrap exceeds that of virgin raw materials.



Additionally, it's crucial to note that the industry consumes about 1 billion cubic metres of gas annually.

HIGHLIGHTING POTENTIAL

During the ‘The Future through Glass’ conference organized in Rome by Assovetro, in collaboration with Cnel, a study conducted by Open Impact was presented. It established that “every euro invested in this sector in Italy would generate EUR 2.5 in positive value in environmental, social and economic terms.” Considerable investments in the sector were also discussed, with approximately EUR 8 billion earmarked for decarbonization activities, energy efficiency, electrifica-

tion, Carbon Capture and Storage, biomethane, hydrogen and recycling. Indeed the glass market has the potential to serve as a model for the future transition to green practices - demonstrating that investing in sustainability is a winning long-term strategy from all perspectives.

“Glass is pivotal in supporting the transition,” said Assovetro President Marco Ravasi. “And it can do so with overwhelmingly positive social, environmental and economic returns. This shows that transitioning the economy toward green and circular practices can be a catalyst for development - especially if approached without prejudice, but rather by choosing the most effective options to achieve our goals.”

Confronting held ware challenges head-on at XPAR VISION

In every container glass factory, managing held ware and resorting often proves to be a daunting challenge - leading to both increased costs and disruptions in production. That situation is further exacerbated by the manual unloading, re-inspecting and palletizing that accompanies the traditional method of resorting - leading to inefficiencies and deferred shipment. Here, recognizing the need for a transformative solution, XPAR Vision has introduced its Long Term Image Storage (LTIS) system.

THE CHALLENGES OF HELD WARE

Triggered by suspicions concerning poor quality or critical

defects, held ware results in costly resorting processes, which not only consume valuable resources but also puts customer deliveries at risk whilst increasing operational costs. Here the indirect costs associated with held ware are often overlooked, such as warehouse space occupation, captive packaging material and the potential need for expensive dumping and scrapping when held ware reaches unmanageable levels.

LONG TERM IMAGE STORAGE (LTIS)

The LTIS system offered by XPAR Vision signifies a genuine game-changer for glass factories. It involves the storage of an 'unlim-

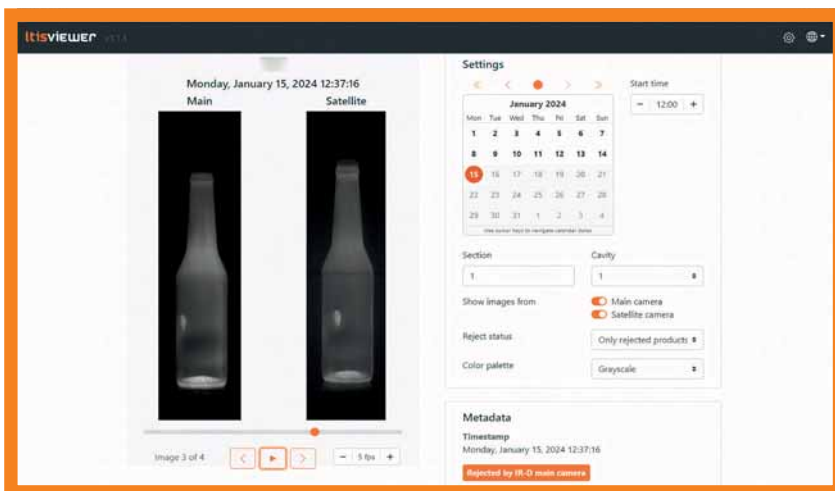
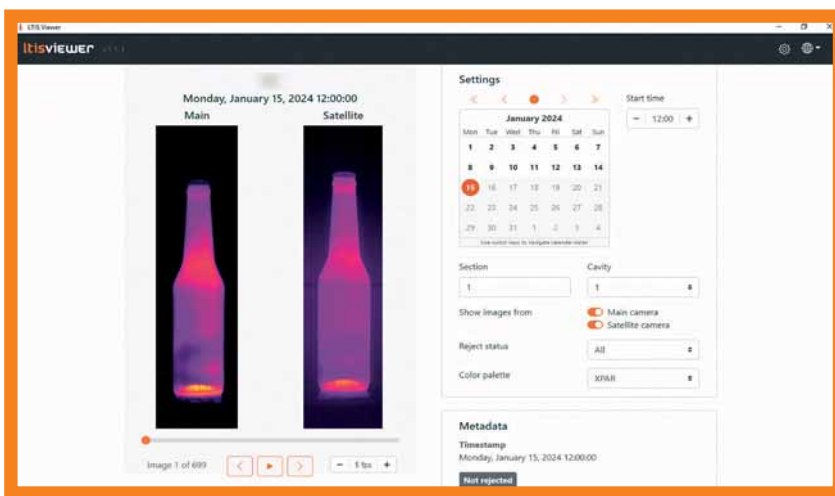
ited' number of images of all individual containers - whether accepted or rejected. These become easily accessible through an XPAR Viewer, affording efficient retrieval and analysis while being presented in either grayscale or colour.

DIGITAL RESORTING

One key LTIS feature is its ability to review images at any time, thereby enabling verification of both the occurrence and timing of defects as well as identifying the specific cavity or section responsible for the defect. Such digital resorting capability significantly reduces the need for physical resorting - effectively streamlining the process and minimizing costs.



With its Long Term Image Storage (LTIS) system, XPAR Vision addresses current glass container factory challenges by revolutionizing held ware management. It digitally reduces both costs and production disruptions by enabling efficient image storage, retrieval and analysis - all leading to enhanced internal and external traceability as well as minimised resorting.



INTERNAL TRACEABILITY BENEFITS

For internal traceability, LTIS provides key information to reduce the quantity of held ware as well as associated resorting costs. Indeed customers report a significant reduction in both held ware and

resorting expenses, with the added benefit of identifying areas for improvement in XPAR IRD system settings based upon feedback.

EXTERNAL TRACEABILITY BENEFITS

Externally, LTIS facilitates opti-

imum identification of contaminated pallets through images and timestamps - a capability that allows glass container producers to manage and limit potential damages, including customer complaints, financial claims, recalls and reputational harm.

CUSTOMER SUCCESS STORY

A recent testimonial from one of XPAR Vision's glass bottle producing customers highlights the significant benefits of LTIS: "With XPAR Long Term Image Storage, I was able to go back and review images and verify that we had actually been making defects on the entire section - pointing towards a different root cause. This allowed for a full correction of the issue and ensured that we went back far enough with the quarantine to prevent any critical defects from reaching the customer." ■

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Revolutionary **FORGLASS** solutions extend its lusty market offer

As was evident at the recent science and technology 'Glass Industry 2023' conference, the industry's interest in **Forglass Mixing Electrodes®** is considerable. There Marian Klisch, the company's director of Research & Development, presented the mathematical modelling studies that led to both the development and successful launch of the Forglass Mixing Electrodes®. A revolutionary approach to accelerating the melting process that combines the functionality of electrodes and bubblers, the synergy of the two processes offers incredible opportunities for constructing hybrid furnaces that these days have the full attention of virtually all glass producers. The company is also well-known and respected as a supplier of turn-key batch plants, including some highly innovative, specialised and patented machinery. Currently its top three sellers are the following:

SMARTSCRAPER®

An 'intelligent' scraping conveyor equipped with a cutting-edge Overload Protection System (OPS), the SmartScraper® uses electronic sensors to continually monitor the working conditions of the conveyor - all while diagnosing problems and instantly reacting to changes in operation. The machine's built-in intelligence allows it to slow down or stop before its elements are damaged, including the protection system itself. Additionally, a comprehensive array of sensors (e.g. temperature, working speed or efficiency), SmartScraper® allows detailed analysis of its performance to prevent future malfunctions.

VIBE®

A high-performance vibrating dosing feeder that's innovative on a global scale, it allows extremely precise batching of the transported material (weigh-



Forglass Mixing Electrode

It was at Glasstec 2022 that FORGLASS exhibited -and then patented- its Forglass Mixing Electrodes®, together with the flexible Forglass Hybrid Furnace. The two innovations are congenially connected, since the design concept of the Hybrid Furnace relies on the use of Forglass Mixing Electrodes® during the melting process as a flexible source of electric energy.

ing precision > 99.95 percent). The use of inertia drives allows the machine to achieve three times higher efficiency, compared to classical batch dosing solutions. And because this device is often placed in the most critical stages of the technology line (e.g., feeding of charge to the glass furnace) its high reliability means virtually eliminating costly and time-consuming stoppages.

SELECTABLE GRAIN CRUSHER™

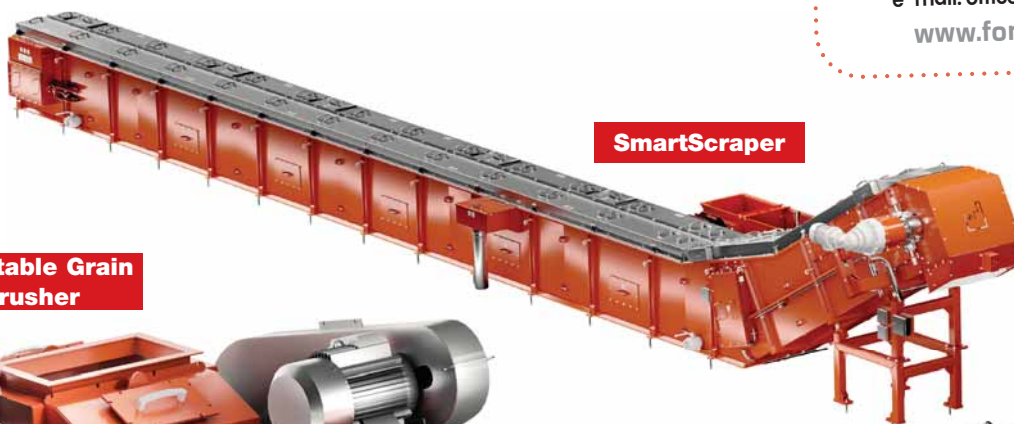
A special crusher that makes it possible to adjust the size of the grain. The desired fraction can be easily set and maintained throughout the machine's life cycle. This technology, enclosed in a small device, can be integrated into virtually any technology line. ■



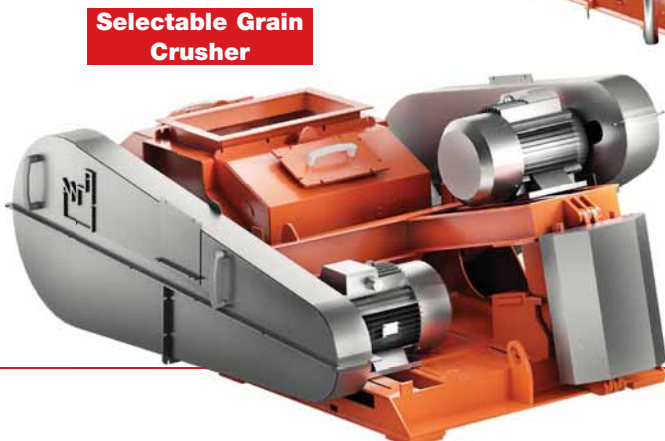
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SmartScraper



**Selectable Grain
Crusher**



VIBE

LinkedIn reach-out: LUBEN GLASS goes online in style

Making its unique mark upon the hollow glass market since 1984, Luben Glass continues to hone its strategy of reaching out to ever more customers the world over. Here's what motivated its recent dive into LinkedIn, which signaled the company's new path towards achieving precisely that goal - and all as an accompaniment to the ongoing development and research programme that it's been successfully carrying out over the years. Having now opened its doors to the web as well, today Luben Glass has a specialized team of expert social media communicators.

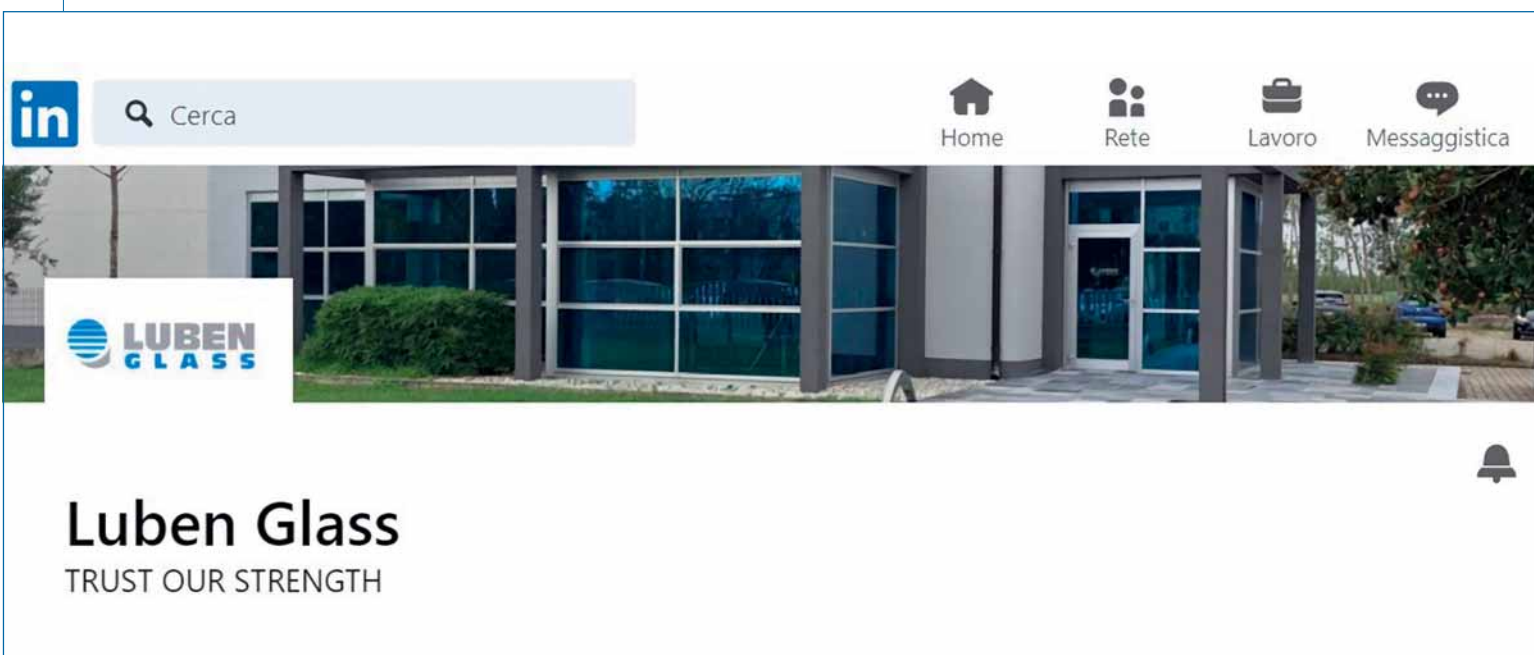
EXTENDING A PRE-EXISTING NETWORK

The company profile on LinkedIn comes as the first step in this direction, with messages inviting potential customers to an initial video call that's formally setup via email. Interested contacts can also keep in touch through WhatsApp or Botim - depending upon their preferred application. Online from October 2023, Luben Glass' new LinkedIn page has already surpassed 700 followers in just a few months - a high-five for cool layout and profile architecture, which are designed to keep customer views constantly updated while conveying news about new

products and delving into topics and solutions that are both out there on the market already.

PROFILE UPDATES

Posts go out weekly, serving as an important tool for briefing profile visitors on Luben Glass' business updates as well as technical insights for industry players. These include ideas for creating new solutions or even identifying some problem that had initially proved elusive - something that can indeed arise after having long remained undetected (and here anyone 'in the know' would be aware that precision remains the key to quality within the hollow glass industry).



← Tutta l'attività

Solo per te

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Good morning,
Our engineers amaze us again and again!!!
Take a look at this new mold holder that, with a ... vedi altro

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 Filippo Mombelli e altre 39 persone

13 commenti



Consiglia



Commenta



Diffondi il post



Invia



3.471 impressioni

[Visualizza](#)

LUBEN GLASS LINKEDIN POST
New solution: special mould holder without support which works as a simple, single-gob mould holder. Equipped with a special cam-system, it can retract the third part of the mould in such a way that it remains unconnected to any other system (plates, link, etc.). An innovative system, it can be placed into the IS machine without any need to make section changes.

A GLOBAL APPEAL

Though based in Italy, Luben Glass has worldwide customers with which it may not necessarily be doing business directly but to whom it can nonetheless offer both support and consultation as well as a problem-solving service. Over the years such glassworks have come to trust that Luben Glass is reliable and has never let them down.

EXHIBITING A WINNING PORTFOLIO

Perhaps this explains why in one of its most popular posts the company presents its machines, which are greatly coveted for their excellent maintenance and control of moulds as well as for achieving optimum quality - the same quality that customers can view first-hand by either visiting Luben Glass or sending it samples to try out. ■



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Crafting excellence: AUSTRALIA's glass industry redefines wine packaging

With the evolution of AUSTRALIA's wine industry over the past three decades the nation has become home to both a burgeoning global wine production and a flourishing culture of world-class vintners. That surge has proven to be a symbiotic boon for the country's container glass producers. In this issue, we take a look at the pivotal role of the container glass industry in shaping the wine segment.

Rajeev Jetley

A VINICULTURAL TAPESTRY

Australia, standing proudly as the fifth-largest wine producer globally, shares the stage with traditional wine giants such as France, Italy and Spain. With a vineyard expanse reaching 146,244 hectares in 2021, the top contributors were South Australia (52 percent), New South Wales (24 percent), and Victoria (15 percent). Over 2,100 wineries and approximately 6,000 grape growers



across 65 regions contribute over AUD 45 billion annually to Australia's thriving economy. The wine-grape crush in 2021 reached a staggering 2.03 million tonnes, showcasing the dominance of Shiraz (27 percent) and Chardonnay (19 percent) in the production spectrum.

VINTAGE TRIUMPHS

Australia's wine production for 2020-21 soared to nearly 1.5 billion litres, marking a substantial 34 percent increase from the previous year and a commendable 22 percent above the ten-year average. The narrative continues with red wine, claiming 58 percent of the production share, seeing a 40 percent rise since 2019-20. White wine production reached 628 million litres, experiencing a 27 percent surge from the previous year and a commendable ten percent above the ten-year average. Despite a four percent decline in total sales volume, domestic wine sales took center stage, commanding a 41 percent share, the highest since 2013-14.



A SYMPHONY OF VINEYARDS

Australia's diverse wine regions, including Hunter Valley in NSW, Barossa Valley in South Australia, and the Yarra Valley in Victoria, collectively yield over ten million hectolitres of wine annually. Iconic grape varieties such as Shiraz, Cabernet Sauvignon, Merlot, Chardonnay, Semillon and Sauvignon Blanc form the backbone of the industry. Small winemakers, crushing up to 500 tonnes, emerge as the unsung heroes, contributing eight percent to the Australian wine-grape crush, selling an estimated AUD 1.3 billion of wine, and accounting for 35 percent of domestic





sales value and ten percent of export sales value.

GLASS GUARDIANS: NAVIGATING WINE EXPORT CHALLENGES

In the intricate dance between the wine and glass industries, the last few years have presented challenges for the Australian wine sector. Reduced exports, particularly due to low imports from China, have led to a three-year decline. Wine Australia's latest export report (1 April 2022 to 31 March 2023) reveals a one percent dip in export volumes to 620 million litres, with the



value plummeting by seven percent to AUD 1.90 billion (AUD 1.29 billion).

MASTERS OF GLASS

The epicenter of container glass production for Australia's wine industry lies in the capable hands of two giants - Visy and Orora. Together, these industry behemoths orchestrate the production of over one million tonnes of container glass annually, embodying the essence of Australia's finest wines.

VISY: A NEW DAWN FOR GLASS INNOVATION

Visy, a relative newcomer, seized the spotlight by acquiring OI's container glass operations in 2020 for a staggering USD 733 million. Now standing as Australia's largest container glass producer, Visy's operations span across four production plants in Adelaide, Melbourne, Sydney and Brisbane. Specializing in beer and wine bottle production, Visy's Adelaide plant serves as the wine bottle production hub for South Australia, boasting

an installed capacity of 570 tonnes per day and over 170,000 tonnes annually.

ORORA GROUP

Emerging from the shadows of global packaging giant Amcor in 2013, Orora Group stands as an international titan in packaging. Operating a container glass facility in Gawler, South Australia, equipped with three furnaces, Orora produces approximately 380,000 tonnes of glass containers annually. Beyond production, Orora stands out for its innovative decorative glass bottle sleeving application, addressing the evolving demands of the market.

GLOBAL ASPIRATIONS: SAVERGLASS ACQUISITION

Orora's recent acquisition of Saverglass, a French container glass producer, marks a strategic leap toward global prominence. Saverglass, renowned for high-end bottle design and manufacturing for premium spirits and wines, now proudly aligns itself with the Orora Group.

SHAPING ELEGANCE IN GLASS

In sum, as the curtain falls on this exploration into Australia's glass industry, intertwined with the rich tapestry of its wine culture, one cannot help but appreciate the artistry and innovation embedded in each bottle. Visy and Orora stand not just as producers but as architects of elegance, safeguarding the legacy of Australia's diverse and illustrious wines. In the ever-evolving symphony of glass and wine, these industry leaders continue to shape the very essence of Australia's vinicultural journey.



Glass sector in **RUSSIA** undergoes painful transformation

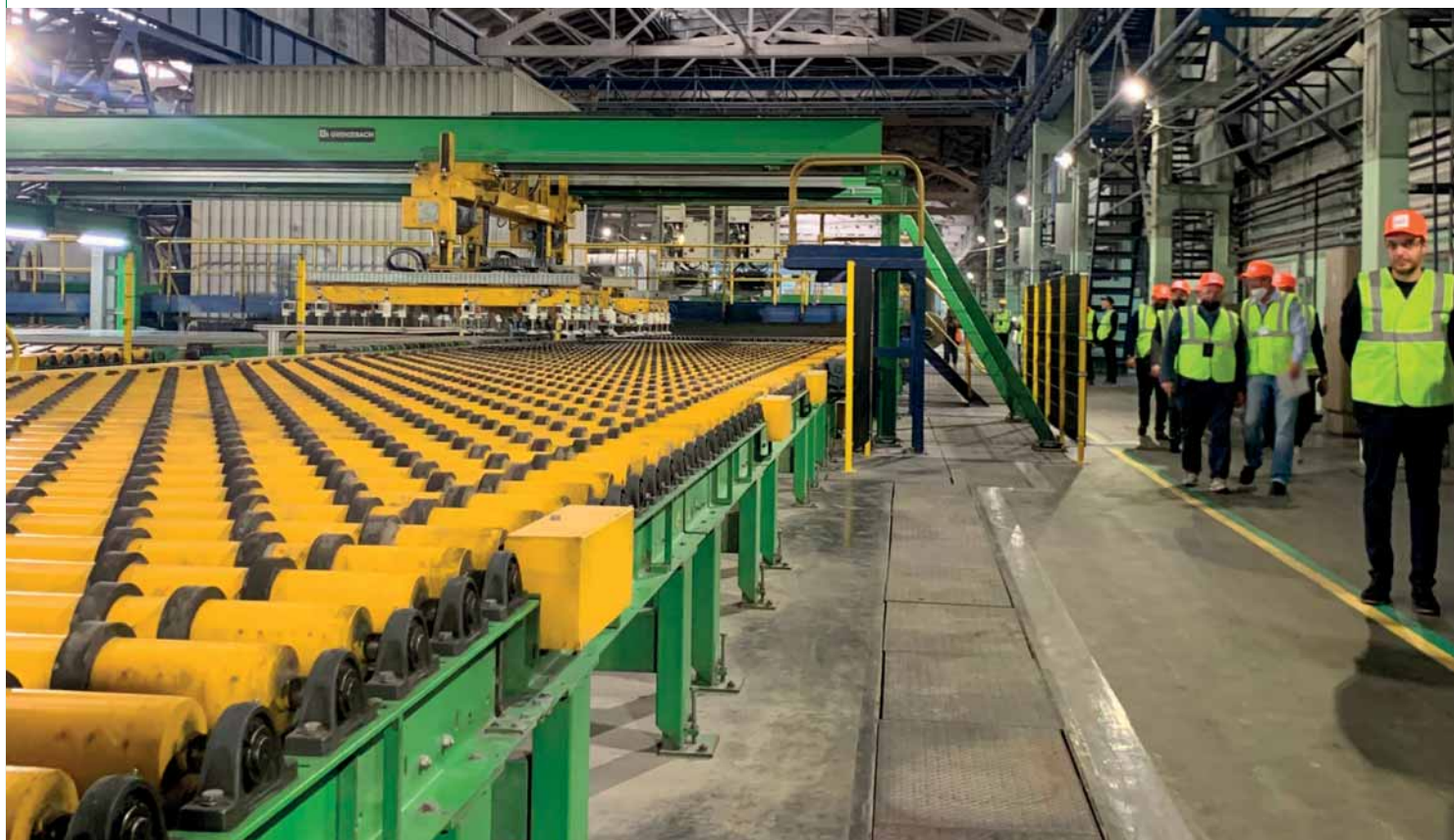
Eugene Gerden
Freelance Contributor

Before 24 February 2022 the Russian glass sector boasted remarkable achievements, experiencing annual growth rates of 7-8 percent and beyond. Two comprehensive 10-year development

programmes, spanning from 2000 to 2010 and from 2011 to 2020, contributed significantly to the sector's success. During this period, sheet glass output surged from 86 million square metres to an impressive 246 million square metres, while glass container production soared from 5.6 billion pieces to 14.6 billion pieces.

THE UNRAVELING

The eruption of the Russian-Ukrainian military conflict shattered hopes for sustained growth - ushering in a severe crisis. Confirming this downturn, Natalya Popkova, Deputy Director of the Department of Metallurgy and Materials at the Ministry of Industry and Trade, acknowledged an eight percent year-on-



In RUSSIA the glass industry recently found itself at the epicenter of transformation - grappling with the impacts of tightening sanctions and increased international isolation. Once a beacon of growth, it now finds itself facing unprecedented pressures that have stemmed from the conflict in Ukraine and the ensuing geopolitical fallout.

year decline in glass production in the previous year - with indications pointing to further declines in the current year.

EXPORT WOES AND GLOBAL IMPACT

The industry's predicament is exacerbated by a significant drop in exports, traditionally a major revenue source for Russian glass-makers. Global majors, operating within Russia, have largely suspended their operations. Despite rumours of potential resummptions, most global producers show little inclination to reinstate Russian

operations in the short term. The imposition of bans on Russian glass exports to Western markets has further compounded the challenges, with exports plummeting from up to 30 percent of annual output to nearly negligible levels.

STRATEGIES FOR RECOVERY

To counteract these industry woes, head of Steklosouz Viktor Osipov has called for stimulating domestic consumption and reviving science and mechanical engineering. He proposes a focus on



the production of double-glazed windows, an area where Russia lags behind global averages, with per capita consumption ranging from 3-5 square metres as compared to 23-25 square metres in the EU.

IMPORT DEPENDENCY AND GOVERNMENT RESPONSE

The industry's high dependence on imported equipment has hindered planned repairs, with Western sanctions making the supply of equipment challenging. The Russian government, cognizant of the industry's struggles, faces limitations in providing substantial support due to budget constraints. However, initiatives such as tax and customs exemptions, compensations, and subsidies for exports to new markets in Asia are being explored. Natalia Popkova indicates potential compensations to the industry reaching RUB 2 billion (USD 22 million) this year.

MOVING ON

In sum, Any conclusion to the current crisis could potentially signal a resilient path forward. This would necessarily involve a delicate balance of stimulating domestic demand, addressing industry challenges and exploring new export markets. The industry's ability to adapt and innovate will determine its success in overcoming such obstacles with a view to emerging stronger in the post-sanctions era. ■



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