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BI-MONTHLY INTERNATIONAL MAGAZINE FOR GLASS MANUFACTURING

YEAR 39 • ISSUE NO. 3/2026

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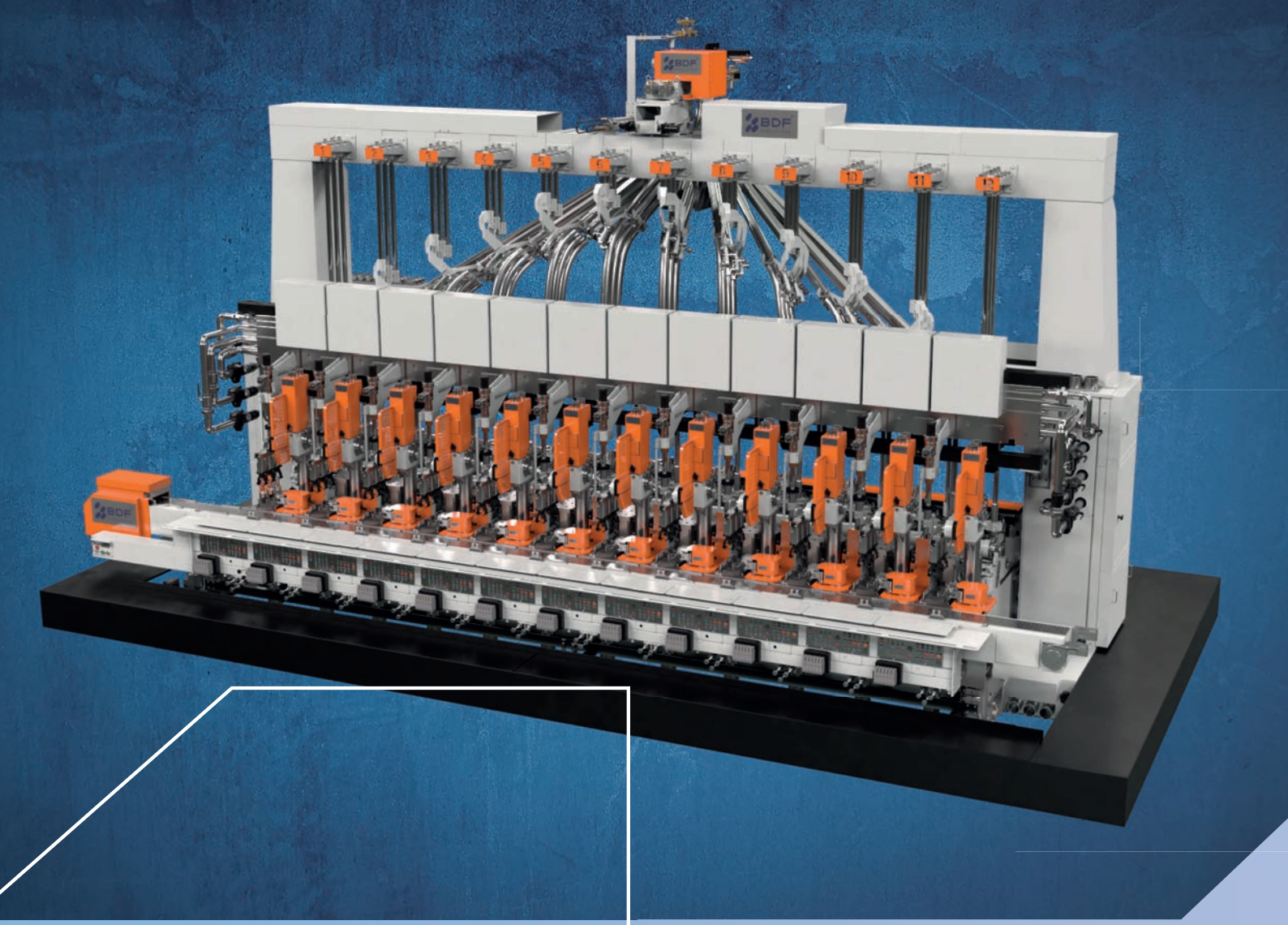

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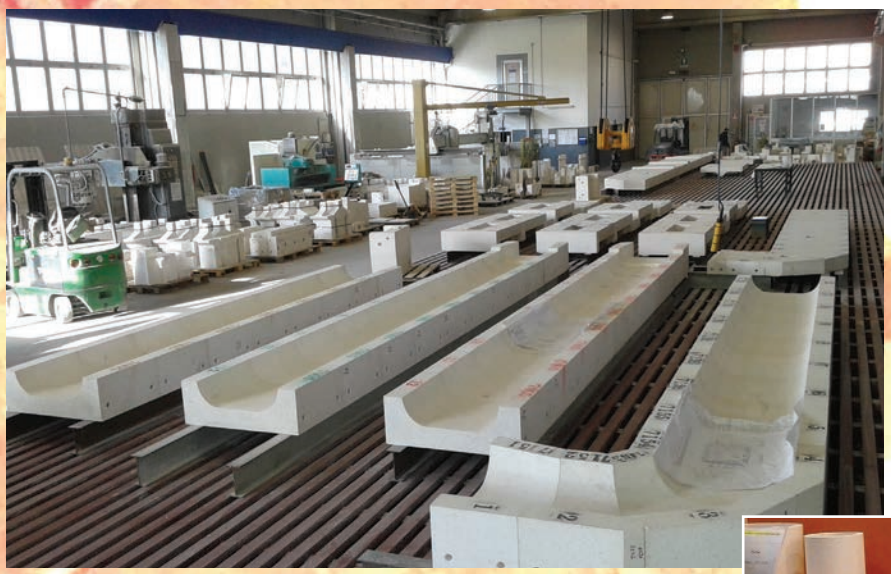

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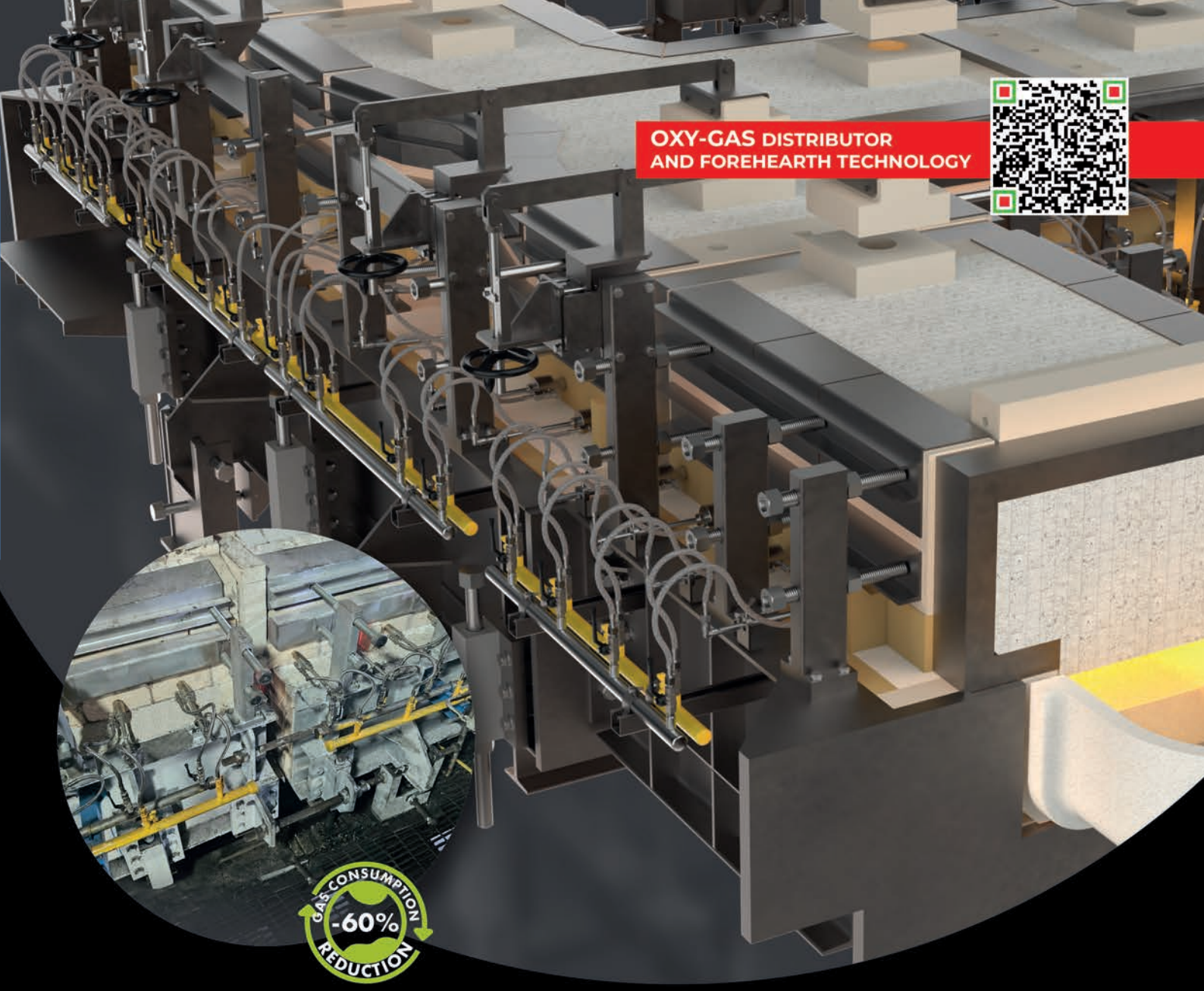

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2026 TRADE FAIRS CALENDAR

The magazine will be distributed at the following Events

2026 1

PHARMAPACK EUROPE | 21-22 JANUARY | PARIS - FRANCE

GLASSMAN ITALY | 4-5 FEBRUARY | BOLOGNA - ITALY

AMBIENTE | 6-10 FEBRUARY | FRANKFURT - GERMANY

Editorial files: 19-12-2025

Deadline Adv files: 07-01-2026

2026 2

COSMOPACK | 26-28 MARCH | BOLOGNA - ITALY

CHINA GLASS | 7-10 APRIL | SHANGHAI - CHINA

Editorial files: 20-02-2026

Deadline Adv files: 25-02-2026

2026 3

ICG - ANNUAL MEETING | 13-17 APRIL | LYON - FRANCE

INTERPACK | 7-13 MAY | DÜSSELDORF - GERMANY

FEATURED CONTENT: FORMING

Editorial files: 20-03-2026

Deadline Adv files: 25-03-2026

2026 4

GLASSMAN LATIN AMERICA | 20-21 MAY | MEXICO CITY - MEXICO

CPHI AMERICAS | 2-4 JUNE | PHILADELPHIA (PA) - USA

Editorial files: 20-04-2025

Deadline Adv files: 23-04-2026

2026

Glass Industry Directory 2026

Editorial files: 11-06-2026

Deadline Adv files: 18-06-2026

2026 5

GLASSTEC | 20-23 OCTOBER | DÜSSELDORF - GERMANY

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Editorial files: 28-09-2026

Deadline Adv files: 02-10-2026

2026 6

ATIV GLASS DAYS | 19-20 NOVEMBER | PARMA - ITALY

ALL4PACK- EMBALLAGE | 24-26 NOVEMBER | PARIS - FRANCE

UZ GLASS | 1-3 DECEMBER | TASHKENT - UZBEKISTAN

FEATURED CONTENT: ANNEALING & COATING

Editorial files: 16-10-2026

Deadline Adv files: 28-10-2026

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LUBEN GLASS

Reliable mould measurement systems

Maintaining mould precision is essential for producing high-quality glass containers. Control gauges and automated inspection technologies play a crucial role in monitoring mould condition and preventing defects. Through its gauges and measurement systems, **LUBEN GLASS** supports accurate mould verification across bottle production processes and accessories. We often pause to look at a glass bottle, intrigued by its shape, the designs and lettering on its surface, and its brilliance. Those working within the industry understand that the quality of the finished item depends not only on the glass itself, but also on the quality of the moulds -and related accessories- used to produce the container.

Precision in Bottle Production

Moulds are among the primary factors influencing bottle quality. Their condition directly affects production performance, making careful maintenance and control essential to ensuring containers are free of defects Maintaining moulds requires the regular use of control gauges to verify dimensions and ensure the correct coupling between the various components. Without these instruments, monitoring mould conditions becomes extremely difficult, limiting the ability to take preventive measures that help preserve consistent container quality. For years, Luben Glass has developed control systems and gauges designed to verify the suitability of moulds and their accessories. Through the use of advanced technologies, the company also supplies machinery -including the LMS V1 and the GALAXY family- capable of automatically checking the dimensions of various elements. The LMS V1 is used for mould inspection, while the GALAXY line focuses on the measurement of plungers and neck rings.

A Comprehensive Range of Gauging Solutions

For roughing and finishing moulds, the range of manual gauges supplied by Luben Glass includes flush pin gauges, plug gauges, dovetail flush pins, snap gauges and other tools designed to support accurate measurement and control. Manufactured from high-quality steel, these gauges are also available in special sizes upon customer request.

WWW.LUBENGLASS.EU

CINER GLASS

Management changes

Ciner Glass has announced the re-appointment of Gökhan Şen as CEO of Ciner Glass Ltd and Managing Director of Ciner Glass Belgium NV. Gökhan Şen was promoted to the position of Chief Executive of Ciner Glass after several years working as the Lead Co-ordinator for the company's European projects, helping to oversee the planning application process, setting out and progressing project timelines, while also developing key relationships with customers and partners. He is in charge of the company's investment to build a state-of-the-art glass manufacturing plant in Belgium alongside a number of other investment initiatives in the region.

WWW.CINERGLASS.COM

FURNACE SOLUTIONS CONFERENCE

Programme announced for 20th Edition

The Society of Glass Technology has unveiled a packed conference programme for the milestone 20th Furnace Solutions Conference. Taking place in St Helens, UK, on 3-4 June 2026, the event will explore the theme 'Decarbonisation: What's the Reality?' Global experts from across the glass supply chain will present to an international audience of glassmakers, end users and suppliers, addressing the latest challenges and opportunities shaping a more sustainable future for the industry.

- With delegate registration now open, the provisional technical programme includes: Oxygen and electricity experience as decarbonisation tools (AGC)
- Using AI to improve glass batch detection: A case study (Ametek Land)
- How green can we go? The reality of refractory manufacture in the net zero era (DSF Refractories & Minerals)
- Simulating glass decarbonisation: Potential vs Reality (Fives Glass)
- Enabling furnace decarbonisation: Alternative fuel trial developments (Glass Futures)
- Next-generation electric forehearth technology for low-carbon glass forming (Glass Service S.r.l.)
- Oxy-gas combustion system: An efficient and sustainable solution for glass industry decarbonisation (Glass Service S.r.l.)
- Spent foundry sands as a secondary raw material for glassmaking (Glass Technology Services)

- Glass composition / Process / Bottle Design / Post-treatment; and the projects dedicated to each of these pillars (L'Oréal)
- Hybrid furnace for flat glass decarbonation: Volta mid-sized pilot (Saint Gobain)
- Profitable & low carbon glass manufacturing (Schneider Electric)
- Soldier block corrosion profile simulation, a tool to understand the impact of low carbon melting process evolution (SEFPRO)
- Why the future grid needs glass furnaces to be flexible in this power super-cycle (Sheffield Hallam University)
- Contributing state-of-the-art technology for decarbonisation (SORG)
- LIFE SUGAR project: pilot test results (Stara Glass)

Complementing the technical programme, delegates will also benefit from a range of networking opportunities, including a grand civic reception and dinner at St Helens Town Hall as well as a tour of the Glass Futures R&D Innovation Centre.

With limited spaces available for this special anniversary event, those interested in participating are encouraged to secure their place by registering as soon as possible. Sponsorship and tabletop exhibition opportunities are also available on request. Recent Furnace Solutions conferences have attracted senior personnel from leading global glassmakers including AGC, Ardagh, Beatson Clark, Encirc, Euroglas, Guardian, Knauf, Nippon Electric Glass, NSG Pilkington, O-I, Saint-Gobain, Saverglass, Sisecam, Stoelzle, Verallia, Vidrala, Vitro and many more.

WWW.SGT.ORG

VAL SAINT LAMBERT

Celebration of 200 years of glassmaking history

In 2026, **Val Saint-Lambert** will celebrate 200 years of glassmaking history and know-how. The crystal works was founded in 1826 and has left its mark on the region's industrial, artistic and social history, as well as beyond its borders. The Bicentenary pays homage to this unique legacy through an ambitious programme combining heritage, modern creation and artistic innovation.

The Bicentenary has been devised as a fundamental project and is aimed at all audiences: the region's inhabitants, visitors from Belgium and abroad, families, culture aficionados, professionals and partners. It is also an invitation to re discover Val Saint-Lambert as a vibrant, inspiring and forward-looking place. Throughout the bicentennial celebrations, visitors will be able to watch glass-blowing demonstrations in the workshops. The master glassmaker's ancestral techniques reveal the magic of molten crystal, shaped before visitors' eyes. Beyond the celebrations, this Bicentenary is a decisive moment for the future of Val Saint-Lambert and its crystal-making activity. The project, with the backing of the Uhoda group, aims to bring this iconic heritage site back into the spotlight, attract new audiences and contribute to the long-term sustainability of the Belgian company.

WWW.VAL-SAINT-LAMBERT.COM

SGD PHARMA

Advancement of North American pharmaceutical glass offering

SGD Pharma announced a strategic Franco-American OEM collaboration with Prince Sterilization Services, to validate Ready-to-Use (RTU) Type I glass primary packaging solutions serving the North American market. The first tangible outcome of this collaboration is the My Sterinity Nasal platform, a new flexible cleaned vial range within SGD Pharma's My Sterinity RTU platform using the company's U-Save Type I vials which are designed to support the expanding segment of high-value nasal drug delivery. The launch was showcased at DCAT Week 2026, taking place from March 23-26 in New York. My Sterinity Nasal is the first platform to launch from the collaboration between SGD Pharma and Prince, combining SGD Pharma's leadership in Type I glass manufacture and Prince's expertise in sterilisation services. Initially available in 3.5, 7.5 and 10 millilitre formats in both clear and amber glass, My Sterinity Nasal vials offer key benefits for high-value nasal therapies:

- Controlled particulate and endotoxin levels for enhanced purity
- Biologically inert Type I sterile glass, with no need for preservatives (reducing inflammation risk)
- Validated Sterility assurance
- Compatibility with standard nasal preservative free pump systems
- Packaged in double-bagged trays for RTU presentation.

The global nasal market is valued at EUR 9 billion with more than 2 billion units, historically dominated by plastic (around 88 percent).

However, glass offers greater chemical inertness, barrier protection and long-term bio-compatibility, which is critical for preserving product integrity, minimising adsorption and ensuring sterility in chronic-use therapies. Once focused on acute, rescue treatments, the nasal market is now expanding more advanced and long-term treatments such as Alzheimer's, Parkinson's, multiple sclerosis and depression, that required a primary packaging combining sterility, consistency and precision dosing, making Type I glass the material of choice to safeguard long-term therapeutic stability.

WWW.SGD-PHARMA.COM

ARC

Takeover plan approved by commercial court

Following the hearing on March 10, at which the Commercial Court of Lille reserved its judgement, Timothée Durand's offer to acquire **Arc**, whose French subsidiary, Arc France, was placed under court-ordered administration on January 7, has been accepted.

The outcome was not in doubt: the heir of the Durand family, who shaped the history of the glassworks founded in Arques in 1825, received unanimous approval at the hearing. The sale must be approved by the Regional Directorate for the Economy, Employment, Labor and Solidarity (DREETS) for implementation in early April.

Timothée Durand's offer, backed by Matthieu Leclercq, formerly of Decathlon, is valued at EUR 50 million. This includes the closure of a soda-lime furnace, the H, and 704 job cuts, through either outright layoffs or voluntary departures, while maintaining the workforce at 2,764 employees out of the approximately 3,500 currently employed at the historic headquarters in Arques. In early April the company could send out termination notices to the affected employees.

"This is the solution we were hoping for," stated Nicholas Hodler, CEO since 2018, as he left the courthouse on March 10. "It's clearly the best, even if it involves a redundancy plan."

"It's difficult, but it's responsible," asserted Timothée Durand, adding that, "When a company is losing money, you have to make difficult decisions." He described this plan as "full of hope."

WWW.ARC-INTL.COM

VIDRALA

Castilla-La Mancha site: Investment exceeding EUR 180 million

A leading company in the manufacture of glass packaging for the food and beverage industry, **Vidrala** is planning an investment scheme for its Caudete plant, Albacete, Castilla-La Mancha, Spain - exceeding EUR 180 million in total. This project aims to strengthen sustainability and energy efficiency at the site. The President of Castilla-La Mancha, Emiliano García-Page, visited the facilities to see first-hand the scope of the planned works, which are designed to bolster the centre's industrial competitiveness and ensure its long-term commitment to the area.

The Vidrala plant in Caudete is a major industrial hub for the region. Equipped with two furnaces and eight production lines, it has an annual capacity of approximately 315,000 tonnes of glass containers for the food and drink sectors. Furthermore, it directly employs around 300 professionals, making it one of the primary industrial employers in the surrounding area. The investment plan outlined by Vidrala, an international group with a presence in Southern Europe, the UK and Ireland, Brazil and Chile, includes measures to modernise the production centre by incorporating advanced technology into the glass manufacturing processes.

From June, the factory will begin refurbishing the first of its two furnaces in the region, which will expand its annual capacity by 10 percent. Meanwhile, the second phase - subject to the plant's competitiveness and market conditions - includes the upgrading of the second melting furnace, the expansion of electrical infrastructure, and the development of new renewable energy generation solutions on-site. Additionally, large-scale moulding machinery would be introduced, allowing production to adapt to lighter and more sustainable packaging.

A strategic partner for the agri-food sector

Vidrala's activity in Caudete is closely linked to the development of the agri-food sector, particularly wine, which is one of the pillars of the Castilla-La Mancha economy. Through its industrial platform in Caudete, the Group supplies glass packaging to numerous food and drink producers, helping to drive the sector's competitiveness and consolidate industrial value chains linked to the territory. The new investment programme reinforces this relationship, ensuring a more efficient, sustainable industrial platform prepared to meet future market needs.

WWW.VIDRALA.COM

TME ENGINEERING & SAVERGLASS

Continuation of long-standing collaboration

TME Engineering was pleased recently to continue strengthening its long-standing collaboration with **Saverglass**. As part of a group-level deployment strategy, TME Engineering has been selected to further deploy Blankontrol®, its blank forming process control solution, across Saverglass operations. This step confirms the integration of Blankontrol® as a key element of Saverglass' forming control approach. With this latest deployment phase, Blankontrol® is now implemented on eight machines within the Saverglass group, highlighting the confidence placed in the solution as a long-term, standardised forming process control platform. forming conditions upstream, contributing to controlled and robust production environments.

WWW.TME-ENGINEERING.COM - WWW.SAVERGLASS.COM

MAGNECO/METREL

New crown installed on regenerator furnace in Italy

Magneco/Metrel recently completed installation of a new full crown on a regenerator furnace for an Italian float glass manufacturer. The new 10 tonne crown was cast in place using Metpump AP, Magneco's unique monolithic colloidal silica refractory product.

The installation also included repairs to the upper structure. Metpump material was available and on-site within seven days from order placement. The crown casting process was completed in four hours and the material was hard in 24 hours - a significantly shorter install time than conventional refractory materials. Because Metpump AP is monolithic, seams are minimised, increasing thermal efficiency and reducing energy costs/emissions.

Additionally, Metpump AP is lime free offering better erosion protection, alkali resistance and lower maintenance/hot repairs. Magneco/Metrel is the only supplier to the glass industry that is capable of installing monolithic crowns and has over 25 years of proven performance. The service life of Metpump products is equal to or greater than standard conventional block.

WWW.MAGNECO-METREL.COM

FEVE

Recognition of glass as a strategic sector welcomed

Following publication of the European Commission's proposal for an Industrial Accelerator Act (IAA), the European Container Glass Federation (**FEVE**) has welcomed the recognition of glass manufacturing as a strategic industrial sector and the streamlining of permitting procedures for energy-intensive industry decarbonisation projects. Indeed, the proposed objective for manufacturing to account for at least 20 percent of EU GDP by 2035 sends an important signal of renewed industrial ambition. However, urgent action on multiple fronts is needed to get there and safeguard the competitiveness of the industry, while enabling decarbonisation at scale in a moment marked by increasing energy and carbon costs and intense competition, leading to unprecedented production decline and furnaces closures across Europe.

"Europe's glass packaging industry is fully committed to decarbonisation and is investing to make it happen" said Carlo Pirrone, Secretary General of FEVE. "While today's proposal is a step in the right direction, we need bolder action to lower energy prices, boost grids development and simplify rules to maintain our competitive edge." The European container glass industry stands as a resilient and strategically important contributor to the EU economy and to local supply chains. Glass packaging also underpins Europe's global trade strength, supporting exports of high-value goods -from food and beverages to pharmaceuticals and cosmetics- worth over EUR 140 billion, or 6.1 percent of total EU exports. With the right framework conditions, the sector can deliver fully circular, non-toxic packaging solutions while advancing toward decarbonised manufacturing, preserving industrial capacity, jobs and strategic autonomy in Europe.

WWW.FEVE.ORG

HORN

Record time reconstruction of Stoelzle Flaconnage furnace

Following a major fire back in July 2025, **Stoelzle Flaconnage**, part of the **Stoelzle Glass Group**, contracted **HORN Glass Industries** on August 29, 2025, with the time-critical cold repair and reconstruction of Furnace 1 at the Knottingley site in the United Kingdom. HORN assumed overall responsibility for the engineering, coordination, and execution of the project. The 170 tonnes-per-day end fired furnace with five forehearths was engineered, manufactured, delivered and erected within a very short time-frame. The scope of work was completed in less than four months. This was possible only through a consistently accelerated project execution, in which design, manufacturing and installation were carried out in parallel and closely coordinated.

This approach was complemented by precisely planned logistics. On-site installation, mechanical assembly, and commissioning were completed efficiently while complying with all applicable safety, quality and regulatory requirements. To enhance energy efficiency and reduce CO_2 emissions, the HORN e-Fusion electric boosting system was integrated, complemented by the HORN HRD-BEAM for contactless glass level measurement. HORN's scope of supply included complete engineering and execution of refractory materials, steel construction, and equipment for the melting furnace, distributor, forehearths, and batch charger, as well as dismantling works, full cooling water supply, controlled heat up, filling and commissioning. By 20 December 2025, the furnace was fully operational again, ensuring a rapid restart of production with minimal downtime. This project highlights HORN's technical expertise, efficiency and strong team performance.

WWW.HORNGLASS.COM - WWW.STOELZLE.COM

VETROPACK

The difference made by glass recycling

Glass recycling makes quite a significant difference. Every 10 percent increase in recycled glass used in production saves: 2.5 percent energy and 5 percent CO2 emissions. That's just part of the impact. Glass is made from natural raw materials and can be recycled endlessly without losing quality, making it one of the key materials for a circular economy. Across Europe, recycling glass already saves millions of tonnes of primary raw materials every year. Because it melts at lower temperatures than raw materials such as quartz sand, it also reduces the energy needed in production. This progress is visible across the industry: glass containers are 30 percent lighter than 20 years ago and production today generates 70 percent fewer CO2 emissions than 50 years ago.

Glass recycling is already well established in Europe, with 80.1 percent of glass packaging collected and 92 percent of it actually recycled. The majority of packaging glass used in Europe is not only recycled in Europe, but in the country of use. This keeps transport short and has an additional positive effect on emissions. But **Vetropack** aims even higher and the company is working to further increase the proportion of recycled glass in production. As part of its SBTi (Science Based Target initiative) target, Vetropack has committed to reducing emissions from its production (Scope 1 emissions) by 50.4 percent by 2032, with increased use of recycled glass playing a key role in achieving this goal. The more recycled glass is used, the greater the environmental benefit.

WWW.VETROPACK.COM

ORORA

One year of operation for Oxyfuel Glass Furnace

Orora is marking the first 12 months of operation of its high efficiency G3 oxyfuel glass furnace located at Orora's South Australian glass manufacturing site at Gawler. The AUD 130 million rebuild and upgrade of the Gawler G3 furnace, including a AUD 12.5 million Australian Government grant under the Modern Manufacturing initiative, has reduced natural gas consumption by 32 percent, eliminating more than 13,000 tonnes per annum of carbon dioxide CO2 emissions, while nitrogen oxides emissions have fallen by more than 70 percent compared with the previous recuperative furnace. The results highlight the role of oxyfuel technology in decarbonising energy intensive industrial processes while maintaining productivity at scale. The G3 furnace replaces a traditional air fuel design with oxyfuel melting, supported by on site oxygen generation. By removing nitrogen from the combustion process, the furnace operates at higher thermal efficiency, directly reducing fuel use and associated emissions. The upgraded design has also nearly doubled electric boosting capacity compared with the previous furnace, enabling increased use of electrical energy and further reducing reliance on natural gas in glass production. Despite the additional electricity required to generate oxygen, the furnace has delivered a net reduction in emissions, contributing materially to Orora's Scope 1 and Scope 2 emissions performance.

When combined with increased use of recycled glass, total CO2 savings now exceed 27,000 tonnes per annum. Performance of the furnace has been further enhanced by Orora's onsite glass beneficiation plant, which has enabled a substantial increase in recycled glass (or cullet), usage. The beneficiation plant can process up to 150,000 tonnes of glass each year, which is equivalent to approximately 330 million wine bottles or 750 million beer bottles. Helping to increase cullet utilisation by more than 30 percent, with peak production periods sometimes achieving up to 90 percent recycled content. The oxyfuel furnace is a cornerstone of Orora's long term sustainability strategy, supporting its global targets to reduce emissions intensity per tonne of glass by 60 percent by FY35 and increase post consumer recycled content in coloured glass to 68 percent by FY35. The Gawler furnace now produces more than 475 tonnes of glass per day, making it Australia's largest glass furnace and demonstrating that emissions reduction and industrial scale can progress together.

WWW.ORORAGROUP.COM

O-I

More efficiency, fewer emissions and less energy use

O-I is edging closer to the final steps of equipping one of the furnaces at its Veauche, France, plant with hybrid-flex technology, the first in O-I's footprint. The Veauche plant serves the premium market and already uses a very high level of recycled glass during production. This leading-edge furnace innovation, along with a new heat-recovery system, will turn this historic location into a modern high-tech glassmaking facility.

WWW.O-I.COM

GLASS SERVICE ITALY

India success story

When a glass production plant suffers from chronic energy losses and spiralling operating costs, the answer is not routine maintenance. It's a radical technological transformation. That is exactly what **Glass Service Italy** delivered in India. Starting from a traditional air/gas heating system - outdated, energy-intensive and difficult to control - the Glass Service Italy team designed and executed the complete conversion of a Tandem Forehearth to oxy-gas technology, working on an existing, operational structure. The team reports that nothing was left to chance. Every section of the fore-hearth channel was recalculated using advanced 3D simulations, which determined the optimal positioning of the burners at a constant pitch of 250 millimetres. This density level ensures precise temperature control along the entire path of the molten glass, a degree of accuracy that conventional systems simply cannot match. The demolition and reconstruction phase was managed with millimetre-level precision: only the structurally necessary components were replaced, minimising plant downtime and keeping intervention costs under control. Once commissioned and running under stable conditions, the data confirmed and exceeded the design projections:

- -60percent in Natural Gas consumption compared to the previous system
- Absolute thermal stability throughout the fore-hearth
- Measurable and visible improvement in glass quality These are not theoretical projections.

These are real figures - measured on a live production plant. That said, a project of this complexity is never achieved through technology alone. The success of such an intervention is the result of the synergy between Glass Service Italy's specialist engineers and the local Indian workforce - a collaboration that turned a demanding engineering challenge into a benchmark of industrial excellence. Because, as the Glass Service Italy team proudly insists, behind every energy-saving figure, there is always a team.

WWW.GLASSSERVICE.IT

STOELZLE

Hot repair of furnace planned at Czestochowa site

Starting from March 9, **Stoelzle** undertook a planned hot repair of one of its two flint glass furnaces at its Częstochowa, Poland, production site. The glass-to-glass repair required 17 days, with a total project timeline of 19 days including hot sealing. All customer orders and deliveries remained fully supported throughout the process. "Our customers need cost efficiency, cash discipline and flexibility more than ever," said Dr August Grupp, CEO of Stoelzle. "By continuously upgrading our production sites, we enhance efficiency and reliability, enabling competitive cost structures, stable specifications, and agile supply. These investments are ultimately about strengthening our customers' ability to compete."

Stoelzle Czecstochowa's Furnace 1 combines high capacity with modern technology and is designed for reliable, efficient production. It supports both flint and coloured glass, ensuring flexibility for premium spirits and food packaging requirements. A central improvement linked to the repair is the completion of a new system for dosing external cullet. With commissioning this upgrade enables Stoelzle to significantly increase its recycled glass input - supporting lower energy consumption, reduced CO2 emissions and progress against the company's sustainability targets. The Częstochowa plant is one of Stoelzle's most advanced and efficient sites in Europe, combining highly automated production with a strong focus on cost competitiveness, value creation and continuous innovation. An integrated decoration facility and in-house development capabilities enable end-to-end solutions tailored to customer needs. The site also acts as a reference model for the company's U.S. plant in Monaca. To ensure seamless supply during the temporary furnace shutdown, Stoelzle has implemented extensive preparation measures: safety stock build-up, optimised production schedules, coordinated planning across other Stoelzle plants and ongoing alignment with key customers.

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Managing contact in glass production – with INTERGLASS insights

Conceptual visual representing lubrication as a condition enabling controlled interaction between surfaces in hollow glass forming environments.

In hollow glass manufacturing, stability emerges from controlled surface interaction rather than visible intervention. Examining lubrication as a condition for continuity, we reflect here on friction, process discipline and operational confidence. That trio sums up the winning approach of INTERGLASS, being all shaped by acute observations of how sustained contact management can support reliable production.

GLASS IS SHAPED IN FULL VIEW. CONTACT OPERATES IN SILENCE

In hollow glass production, surfaces meet thousands of times before a single container reaches the end of the line. Cycles repeat. Temperatures fluctuate. Components remain in continuous interaction. What may appear as mechanical repetition is, in fact, a dynamic relationship between materials, motion and time. Friction in this environment rarely manifests as a visible event. It accumulates. It becomes apparent through adjustments, shortened intervals and subtle variations in behaviour that gradually influence operational confidence. The absence of disruption often reflects controlled conditions rather than the absence of

Research and development activities supporting lubrication performance and process stability in glass manufacturing processes.

ABOUT INTERGLASS

Founded in 1992, Interglass was established to expand the range of glass-forming lubrication alternatives available to glassmakers in Mexico. Over three decades, the company has grown into a trusted partner for leading glass manufacturers in more than 40 countries. Interglass focuses on developing innovative lubrication technologies designed to improve process stability and support the evolving needs of the glass industry. Guided by the idea of creating a world that flows better, the company continues to invest in new solutions that contribute to a more efficient and sustainable future for glass production.

force. Understanding hollow glass manufacturing as a continuous contact environment changes how performance is interpreted. Surface interaction becomes structural to production stability. What happens between cycles can become as relevant as the cycles themselves. From this perspective, lubrication is not merely a functional input. It becomes a condition that enables continuity. Predictable behaviour, extended intervals and reduced variability often reflect how consistently contact is managed over time. In high-throughput environments, stability is rarely accidental.

VISION ITSELF DEPENDS ON LUBRICATION

Biological systems recognise this instinctively. Interaction without fluid becomes friction. Friction without control becomes damage. Industrial environments follow a comparable logic. Controlled interaction allows processes to evolve without interruption and materials to be shaped without compromise. Within this context, INTERGLASS operates from the observation that hollow glass lines are defined less by moments of peak performance than by the continuity that connects them. Attention is placed on how surfaces interact across cycles, how application discipline influences behaviour and how small variations accumulate over extended operation. Supporting continuity therefore becomes part of operational performance—not through isolated interventions but through sustained conditions that allow production to progress with confidence. Lubrication, in this sense, acts quietly, enabling interaction while remaining largely unseen. Glass quality is ultimately visible in the finished product. Process stability is not. Yet it is precisely this silent stability that allows production to advance without interruption. In hollow glass environments, performance is often expressed through continuity and through everything that does not require correction along the way. ■

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Interlub Group facilities supporting technical development for glass forming lubrication technologies.

ResponsibleGlass gains momentum through STARA GLASS founding membership

The future of the glass industry depends on responsible, shared decisions that extend beyond the boundaries of individual companies. In this spirit, Stara Glass has chosen to become one of the founding members of ResponsibleGlass, an international initiative established to promote increasingly sustainable, transparent, and accountable glass production.

BUILDING A COLLABORATIVE SUSTAINABILITY FRAMEWORK

ResponsibleGlass is a not-for-profit organisation established in 2025 with the objective of maximising the contribution of glass to a sustainable society. Glass is an extraordinary material, essential to the energy transition and to sectors including construction, automotive, food and beverage and pharmaceuticals. At the same time, its production can generate significant impacts, including greenhouse gas emissions, water consumption, raw material extraction and risks to health and safety. ResponsibleGlass was created to address these challenges systemically through collaboration between industry and civil society stakeholders, alongside the development of practical tools for improvement.

DEFINING INTERNATIONAL STANDARDS FOR GLASSMAKING

At the core of the initiative is the development of an International

Responsible Glass
Sustainability standards

Francis Sullivan: Chair of Responsible Glass

Glass industry sustainability efforts advance as STARA GLASS becomes a founding member of ResponsibleGlass - the not-for-profit initiative launched in 2025 to create an international standard for responsible glassmaking, addressing emissions, resources, safety and transparency through collaboration between industry participants and civil society stakeholders worldwide today.

Standard for Glassmaking, applicable to industrial-scale glassmaking sites worldwide. The standard aims to mitigate negative impacts while enhancing positive ones in key areas such as occupational health and safety, human rights, greenhouse gas emissions, water stewardship, biodiversity and circularity. Its development follows rigorous procedures inspired by ISEAL principles, based on public consultation, feasibility testing, and consensus between business members and civil society representatives. The objective is not simply to define technical requirements, but to establish a robust and widely recognised framework capable of generating value for responsible businesses while providing the market with a reliable reference for best practices. As ResponsibleGlass chair Francis Sullivan explains: "Driving social and environmental change in the glass industry requires an approach which values industry knowledge, social and environmental expertise, openness, trust and a forum where decisions are not only transparent but also equitable. This multi-stakeholder approach, tried and tested in the steel and forestry sectors, will be pivotal for driving this change. Our membership will be the driving force and the foundation for this initiative, and that is why we're so proud to have far sighted and pioneering organisations such as Stara Glass as a Founding Member who are already working with us today to make this change happen."

TECHNOLOGY, RESPONSIBILITY AND INDUSTRY TRANSFORMATION

Within this context, the decision by Stara Glass to participate from the outset as a founding member aligns closely with the company's industrial identity. The company works daily alongside glass manufacturers, developing technological and engineering solutions designed to improve furnace efficiency, optimise energy consumption, and reduce emissions. For Stara Glass, sustainability is not an abstract concept but a measurable technical parameter guiding design choices, research activities and international collaborations. Joining ResponsibleGlass as a founding member represents a further step: not only contributing innovative solutions aimed at reducing environmental impact, but also participating directly in shaping the standards that will guide the evolution of the entire sector. It means placing technical expertise, operational experience, and long-term vision at the service of a broader industrial community. Through this commitment, Stara Glass reinforces its position as a technically driven company aware of its role in the transformation of the glass industry - one that places its know-how in support of a shared objective: making glass an increasingly sustainable material, not only by reducing consumption and emissions but also by helping define ambitious and widely recognised sustainability standards. Because the future of glass -and of the planet- must be built together. ■

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Digital transformation accelerates efficiency at RONDOT GROUP plants

Across modern glass manufacturing, RONDOT GROUP integrates automation, data and advanced engineering to improve safety, efficiency and sustainability. From robotic swabbing to precision cooling and coating innovations, its connected technologies enable glassmakers to optimise processes, reduce risk, enhance quality and meet evolving demands – whether they be environmental or operational.

PROTECTING WORKERS, EQUIPMENT AND RELIABILITY

As artificial intelligence reshapes glass container manufacturing, embedding digitalisation and automation across the hot end has become essential. With 9 interconnected brands, (Rondot, Graphoidal, Quantum, LWN, Novaxion, Pennine, Ramsey, Sheppee and Sonicam), Rondot Group integrates technology, expertise and processes to support plant upgrades, equipment repurposing and the replacement of legacy systems Automation, precision handling and connected systems are reducing operator exposure while strengthening process control. Safety is engineered throughout the hot end, from spraying

and swabbing to conveying and ware handling. Continuous monitoring via 24/7 connected servers, combined with robotic swabbing, enables early fault detection and more stable operations. At BA Glass in Spain, the Novaxion Blank & BlowSide robot demonstrates this approach in practice. Automating the blank & mould side, it optimises lubricant use, improves the Pack-to-Melt ratio and enhances safety by removing operators from high-risk zones. With manual intervention minimised, operators can focus on process optimisation and defect reduction without the disruption of section jams linked to delayed swabbing.

OPTIMISED EFFICIENCY FROM FORMING TO FINISHING

Close collaboration with customers underpins the development of increasingly efficient solutions. Through the digitisation of processes, data and insights, performance improvements become measurable and repeatable. Advanced measurement equipment ensures continuous monitoring and control, while live data management enables precise adjustments, reduced variability and consistent product quality. Future gains are expected from the integration of LWN and Novaxion technologies. By capturing real-time data directly at the mould through swabbing systems, operating conditions can be more accurately assessed. This information can then inform LWN cooling systems, enabling precise regulation of airflow. Moving beyond fixed settings to data-driven cooling strategies allows significantly greater control over forming conditions. Efficiency gains extend further through Sheppee's hot ware handling solutions. Ongoing development has produced integrated offerings capable of addressing a wide range of container-handling requirements, supporting overall production line performance.

REDUCING ENVIRONMENTAL IMPACT AND SUPPORTING ESG GOALS

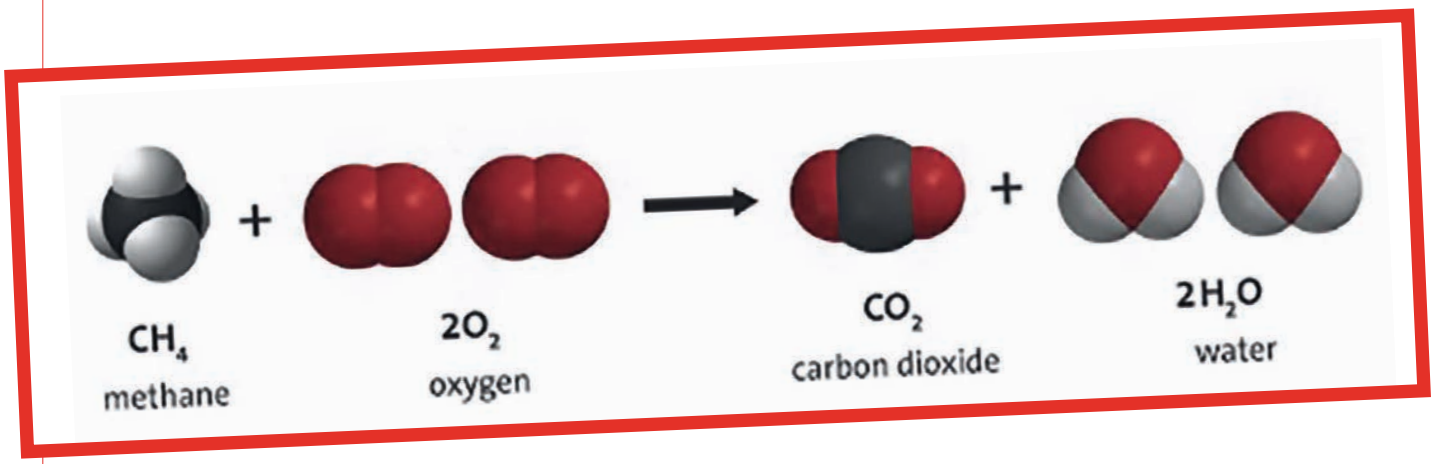
Environmental performance remains a central focus. ISO 14001 certification at one Group entity marks an important step in establishing environmental management standards, while ISO 9001 certifications across multiple sites reinforce efficient, high-quality processes that help minimise waste. Eco-design principles are embedded early in product development, ensuring sustainability is considered from the outset. Pennine has seen four Skeleton products approved under the UK Green Channel programme, accelerating patent processes for environmentally beneficial innovations. Graphoidal has advanced its shear spray technology by refining spray patterns from wide dispersion to controlled precision. This enables effective cooling even when spray bars are positioned further from shear blades than ideal, reducing unintended cooling of surrounding components and lowering the risk of gob contamination - supporting more sustainable production. This precision extends to the cold end with Graphoidal's Advanced Dosing Unit. Designed for One-Step coating application, it removes the need for separate hot-end coating processes. Fully automated dosing, adjustable ratios and the ability to switch between application modes provide flexibility across production requirements. Enhanced mixing, precise control and remote monitoring capabilities deliver a comprehensive solution for performance tracking and optimisation. ■

Cutting-edge GLASS SERVICE ITALY combustion system lowers industrial emissions

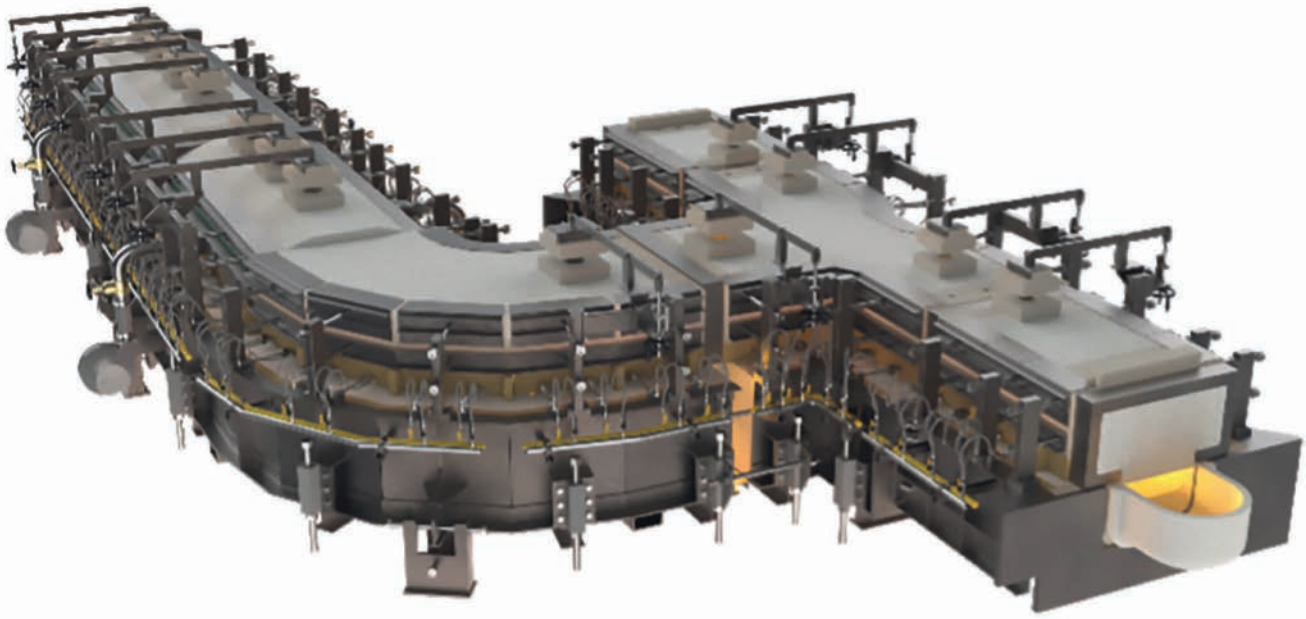
Glass Service srl has officially showcased the final stage of its oxy-gas combustion process, a technology that not only optimises but redefines efficiency parameters for glass forehearths. This development comes at a time when the global glass industry faces an unprecedented challenge: the need for real, structural decarbonisation to reduce carbon footprint and achieve net-zero emissions by 2050, in line with the Paris Climate Agreement.

ADDRESSING DECARBONISATION CHALLENGES

Decarbonisation remains a complex process, particularly in key sectors such as glass. Despite significant progress through improvements in furnace design, increased use of cullet (recycled glass) and enhanced energy efficiency via raw material preheating, best available technologies and incremental improvements must continue to reduce emissions whilst maintaining operational performance, economic advantages and environmental sustainability. Glass Service srl is contributing to this transition with forward-thinking solutions aimed at supporting a circular and carbon-neutral economy, turning a global challenge into an opportunity.



Significantly reducing gas consumption, CO2 and NOx emission, GLASS SERVICE srl has introduced an oxy-gas combustion system for forehearths. With technology that improves thermal efficiency, maintains glass quality and delivers cost savings, it is also rigorous in supporting current decarbonisation goals through more sustainable operations across the global glass industry.



ELIMINATING INEFFICIENCIES IN COMBUSTION

The oxy-gas system provides a direct response to this need, marking a shift from traditional air-gas combustion methods to an innovative process. Conventional systems inherently waste energy by heating nitrogen present in the air, representing both an economic and environmental cost. By replacing air with oxygen, the system eliminates nitrogen from the combustion process, ensuring that no energy is wasted heating nitrogen, which accounts for 78 percent of air.

Results from chemical analysis, testing, and recent installations confirm measurable improvements:

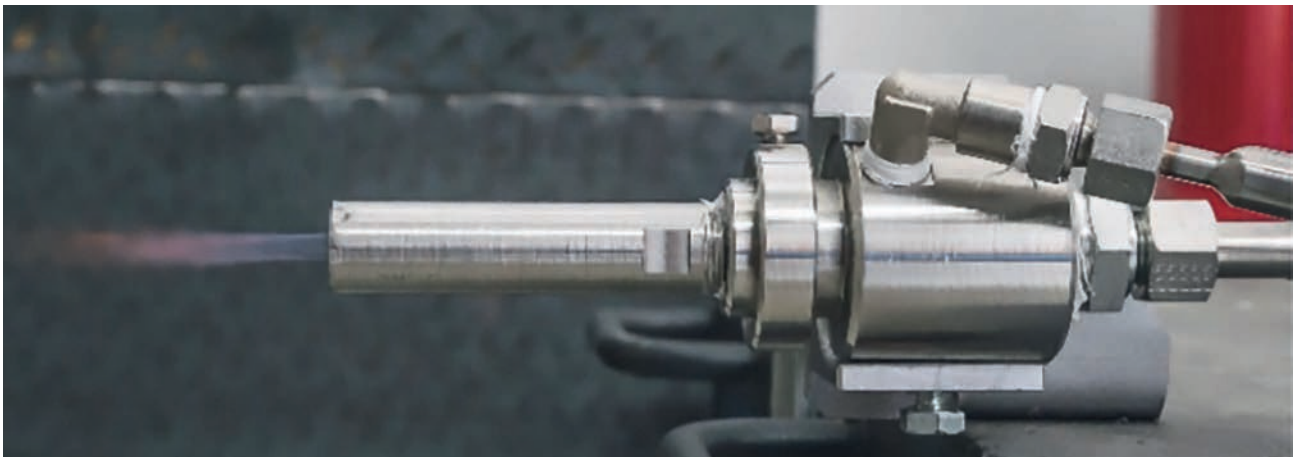
- Up to 60 percent reduction in gas consumption
- Up to 60 percent reduction in CO_2 emissions
- Up to 80 percent reduction in NOx emissions

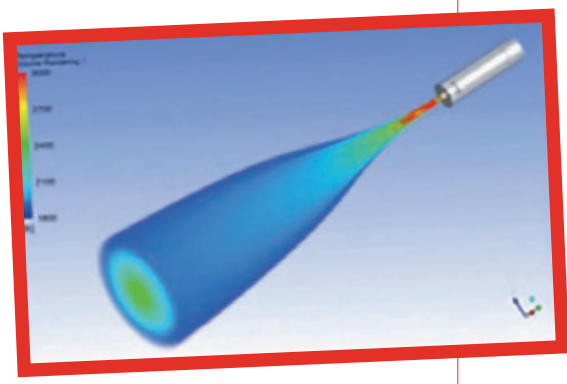
At the same time, the process maintains high performance levels, improving furnace efficiency and glass quality.

PERFORMANCE AND ECONOMIC IMPACT

Central to this are new oxy-gas burners, characterised by low power levels (1.5-5 kW) and ease of assembly. Installed along the forehearth, they ensure thermal homogeneity of the glass.

The burners have been designed and developed using CFD modelling to simulate thermal parameters and include





a cleaning technology that removes carbon deposits from the nozzle, ensuring long-term reliability.

The financial impact is also significant. Analysis of a single forehearth indicates average annual savings of approximately EUR 55.000, supporting a rapid return on investment and reducing costs associated with ETS. These combined benefits position the oxy-gas combustion system as a response to increasingly demanding industry conditions. ■

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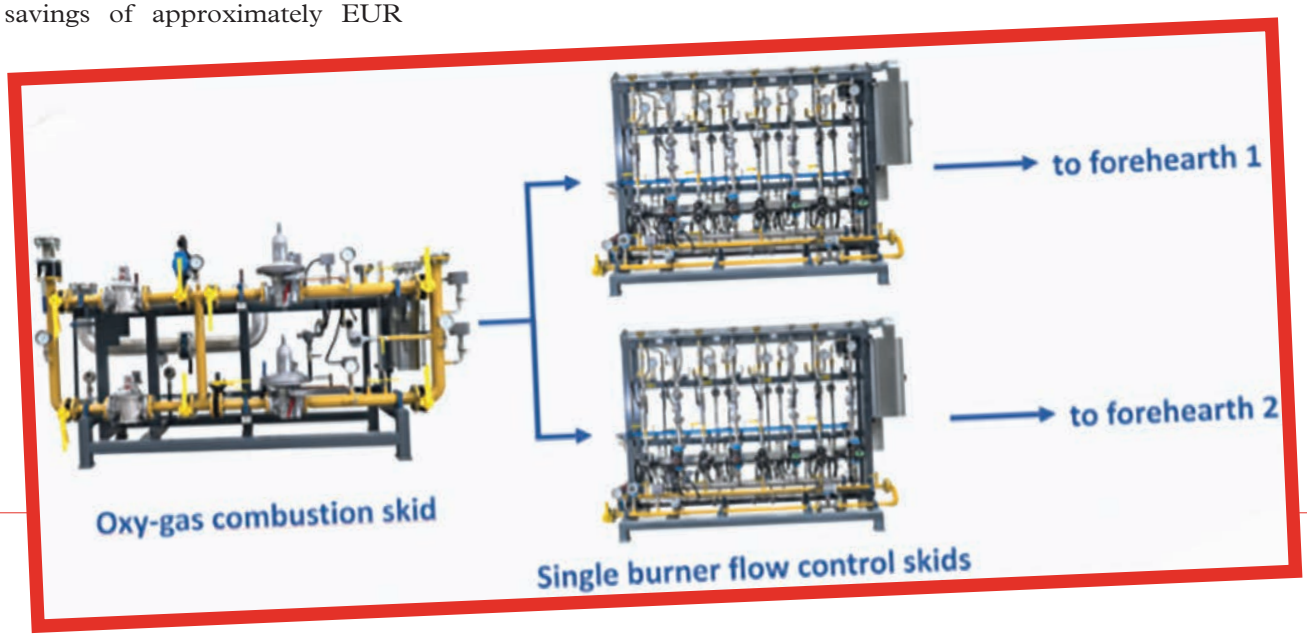

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Data-driven efficiency improves through VERTECH' solutions for glass

Every year, Vertech' releases a new version of its Manufacturing Execution System, SIL, ensuring a secure and up-to-date platform that evolves alongside glassmakers' operational and technological requirements. As digitalisation reshapes industrial practices, SIL reflects a long-term vision: converting plant data into actionable performance drivers.

FULL CONTROL OVER THE PRODUCTION PROCESS

For more than three decades, SIL has supported container glass manufacturers worldwide, evolving into a comprehensive MES tailored to the specific constraints of the glass industry.

The system enables real-time monitoring through precise Key Performance Indicators (KPIs), covering the entire production chain - from batch preparation to palletising, including mould shops and quality laboratories. This end-to-end visibility ensures full traceability of products and processes, helping manufacturers improve efficiency, reduce waste, and maintain product quality. By structuring and centralising data, SIL transforms raw information into meaningful insights, enabling a shift from reactive management to proactive decision-making. SIL provides a 360° view of the plant through six modules: SILProd oversees production lines and facilitates communication between hot and cold ends; SIL4.0 enables plant-wide data acquisition and customisable KPI dashboards; SILXQual manages quality control across materials, products, and pallets; SILXManager sup-

Digitalisation is reshaping glass manufacturing as VERTECH' advances its SIL platform to transform plant data into actionable insights. With real-time monitoring, predictive analytics and seamless integration, the system enhances efficiency, quality and collaboration, positioning manufacturers to meet evolving operational and technological challenges.

ports data extraction and reporting; SILXMold ensures mould traceability and compliance; and SILXMaint optimises maintenance strategies to sustain production efficiency.

SEAMLESS COMMUNICATION ACROSS EQUIPMENT

A key strength of SIL lies in its ability to communicate with virtually any equipment within a plant. Through robust and flexible communication protocols, the system integrates seamlessly regardless of machine suppliers. In increasingly complex production environments, SIL acts as a digital backbone, ensuring consistent data flow across all stages. This interoperability enhances coordination, eliminates information silos and improves overall operational efficiency.

WEB-BASED TECHNOLOGIES

Aligned with the evolution of industrial software and Industry 4.0, Vertech' has transitioned toward web-based applications. Solutions such as SILXQual and SILXMold illustrate this shift, maintaining full functionality while improving ergonomics and accessibility. Designed for multi-device use, including tablets, these tools allow operators to interact directly with the system on the shop floor, improving responsiveness and simplifying daily operations.

SECURITY AS A CORE REQUIREMENT

With increasing connectivity in industrial environments, cybersecurity has become a central concern. Vertech' integrates security into every stage of SIL's development, encouraging customers to maintain updated infrastructures and adopt best practices such as virtualisation. The annual release cycle ensures alignment with evolving security standards while incorporating technological advancements, balancing innovation with operational protection.

ENHANCING COLLABORATION ACROSS THE PLANT

Recent developments in SIL emphasise improved human inter-

action within the plant. An integrated messaging feature enables direct communication between departments, facilitating faster information exchange and better coordination. By reducing communication gaps, the system supports smoother operations and quicker responses to production issues.

DATA-DRIVEN INSIGHTS THROUGH ADVANCED DASHBOARDS

Dashboards form the core of the SIL user experience, consolidating large volumes of production data into clear, intuitive visualisations. Users can tailor dashboards to their roles, selecting relevant KPIs, while multi-plant views allow industrial groups to compare performance across sites and harmonise processes globally. These tools enhance visibility and support faster, informed decision-making.

FROM KPIS TO PREDICTIVE ANALYTICS

SIL is evolving beyond monitoring toward predictive capabilities. Continuous development introduces new features that support process optimisation and deeper data analysis. With SIL4.0, advanced analytical approaches are integrated in collaboration with data scientists and specialised laboratories, aiming to identify correlations and anticipate production behavior. This reflects a broader industry shift toward predictive and prescriptive models where data actively drives performance.

SUPPORTING GLASSMAKERS EVERY STEP OF THE WAY

Vertech' complements its technology with comprehensive support services, including maintenance contracts, software updates, upgrades and training. This close collaboration ensures that customers can fully leverage SIL while adapting it to their specific operational needs.

A DECADE OF OPPORTUNITY

As the container glass industry faces increasing demands for efficiency, flexibility and sustainability, digital solutions such as SIL are becoming essential. By continuously innovating, Vertech' positions SIL as a true performance driver - bridging the gap between data and operational excellence and helping manufacturers prepare for future challenges. ■

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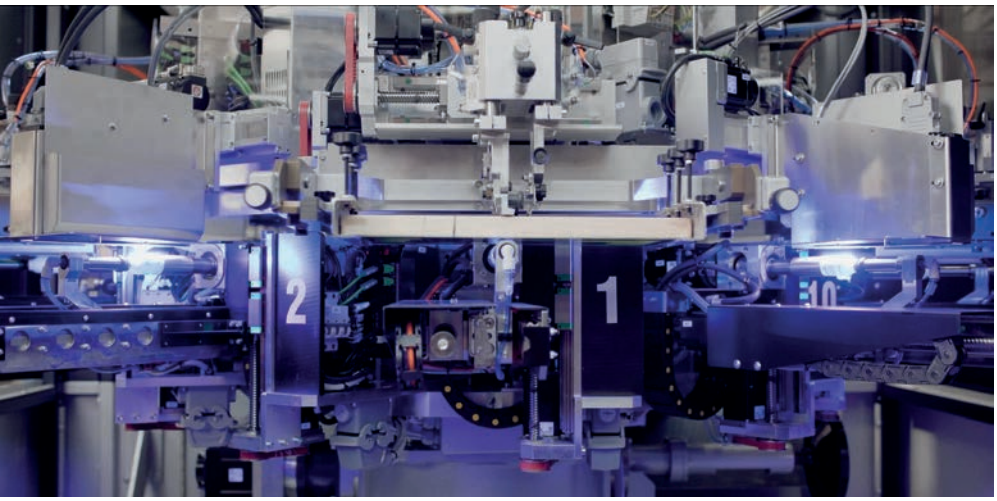
Modern container printing capabilities expanded through OMSO's SB021.25

Designed to meet evolving production requirements, the SB021.25 introduces enhanced flexibility, quality control and operational efficiency to glass decoration lines. Developed by OMSO, the system combines servo-driven screen printing, integrated vision inspection and energy-efficient UV LED curing to support high-quality container decoration.

OMSO has been focusing on the development of technologies for direct decoration and printing on primary packaging for over seven decades now. Today its systems serve a wide range of sectors including cosmetics, pharmaceuticals, food and beverages. Headquartered in Italy and with installations in over 85 countries worldwide, the company has built an international reputation for dependable machinery and high-quality decoration processes applied to glass, plastic and aluminium containers. To support customers across major global markets, the company also maintains a direct presence in the United States through OMSO North America, located in Erlanger,



Kentucky. The facility serves as a hub for commercial operations, technical support and application assistance throughout the North American market.

PLATFORM EVOLUTION

Against this backdrop, the SB021.25 screen printing machine represents the latest development within the OMSO screen printing platform. The system has been engineered to respond to the increasing need for flexibility, quality and precise process control in contemporary glass decoration lines. A key design element is the adoption of a single loading and unloading station. This configuration improves the management of the production line, reduces the overall footprint and enhances operator ergonomics. At the same time, it streamlines container flow while making format changes and machine set-up operations easier to perform.

PROCESS PRECISION AND QUALITY CONTROL

The machine can be equipped with up to three screen printing units, enabling multicolour decoration to be applied directly onto glass containers. Fully servo-driven movements ensure a high level of repeatability and printing stability, even when operating at elevated production speeds. To further broaden decorative options, the system can also incorporate a hot stamping module, suited to applications that require metallic finishes or premium visual effects. Particular attention has also been given to in-line quality inspection. The machine may be fitted with a latest-generation linear camera vision system designed to continuously verify print quality and detect potential defects during production. Through automated inspection, non-conforming containers can be identified immediately, supporting consistent quality standards while helping to limit production waste.

DIGITAL OPERATION AND ENERGY EFFICIENCY

In addition to production performance, the SB021.25 has been developed with a strong emphasis on operational control and ease of use. The machine's operating architecture enables accurate and safe management of all motion sequences, while presenting operators with clear and contextualised information via an interface developed by OMSO. The proprietary software, built on a Windows-based platform, has been specifically designed for decoration equipment and features an intuitive touchscreen interface organised according to operating context. Key parameters become visible when required, allowing operators to manage the machine more easily, particularly during set-up. Advanced diagnostic and monitoring functions are also integrated into the system, including event logging and activity history that support troubleshooting and preventive maintenance. These capabilities are complemented by secure remote assistance via a protected connection and, when required, live camera monitoring, enabling rapid technical intervention even without technicians on site. Energy performance has also been carefully considered. The adoption of UV LED lamps for ink polymerisation, combined with high-efficiency motors, substantially lowers energy consumption compared with traditional mercury vapour lamps, while also improving process stability and shortening start-up times. The innovations introduced with the SB021.25 will be presented by OMSO at the next edition of Glasstec 2026, the leading international trade fair for the glass industry, which will take place in Düsseldorf from 20 to 23 October 2026. ■

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Governance and ESG initiatives accelerate progress at ANTONINI

Antonini srl has achieved three major international certifications, reinforcing its commitment to quality, safety and environmental responsibility. The company has obtained ISO 45001, ISO 22000 and ISO 14001, confirming that its management systems comply with internationally recognised standards in occupational health and safety, food safety and environmental management.

INTEGRATED CERTIFICATION MILESTONE

The certifications mark an important milestone for the company and reflect a structured, proactive approach to operational management. By implementing integrated management systems aligned with ISO standards, Antonini srl maintains high levels of process control, regulatory compliance and continuous improvement across its operations. For clients and partners, the certifications provide an additional guarantee of reliability, product safety and responsible environmental practices. They also underline the company's commitment to maintaining rigorous operational standards while fostering a safe and responsible working environment.

Three new ISO certifications and broader ESG initiatives highlight how ANTONINI is strengthening governance environmental accountability and operational reliability. The company's latest steps -from carbon footprint measurement to cybersecurity alignment- signal a structured approach to sustainability compliance and long-term value creation for clients partners and stakeholders worldwide.

EXPANDING THE ESG FRAMEWORK

Alongside its certification programme, Antonini srl has continued strengthening its broader ESG (Environmental, Social & Governance) framework through several initiatives designed to improve transparency, accountability and sustainable performance. On the environmental side, the company has launched a comprehensive supply chain analysis to assess environmental, social and governance risks and opportunities across its value chain. In addition, Antonini srl has begun calculating the Product Carbon Footprint, enabling the quantification of greenhouse gas emissions at product level and supporting the identification of targeted strategies to reduce environmental impact.

GOVERNANCE, EQUALITY AND DIGITAL RESILIENCE

From a governance perspective, the company has implemented an organisational model aligned with Legislative Decree 231/2001, reinforcing its internal control system and strengthening its commitment to ethical conduct, compliance and responsible corporate governance. Antonini srl has also obtained Gender Equality Certification, confirming its commitment to promoting equal opportunities, inclusivity and fair workplace practices throughout the organisation. In response to the evolving regulatory landscape and the growing importance of digital resilience, the company has aligned its internal procedures with the requirements of the NIS2 Directive. Enhanced cybersecurity policies and risk-management measures have been introduced to ensure protection of critical systems, operational continuity and data security. Through these initiatives, Antonini srl continues to position itself as a reliable and forward-looking partner within its sector, combining operational excellence with strong environmental, social and governance standards while creating long-term value for clients, partners and stakeholders worldwide. ■

ANTONINI
FLORENCE ITALY

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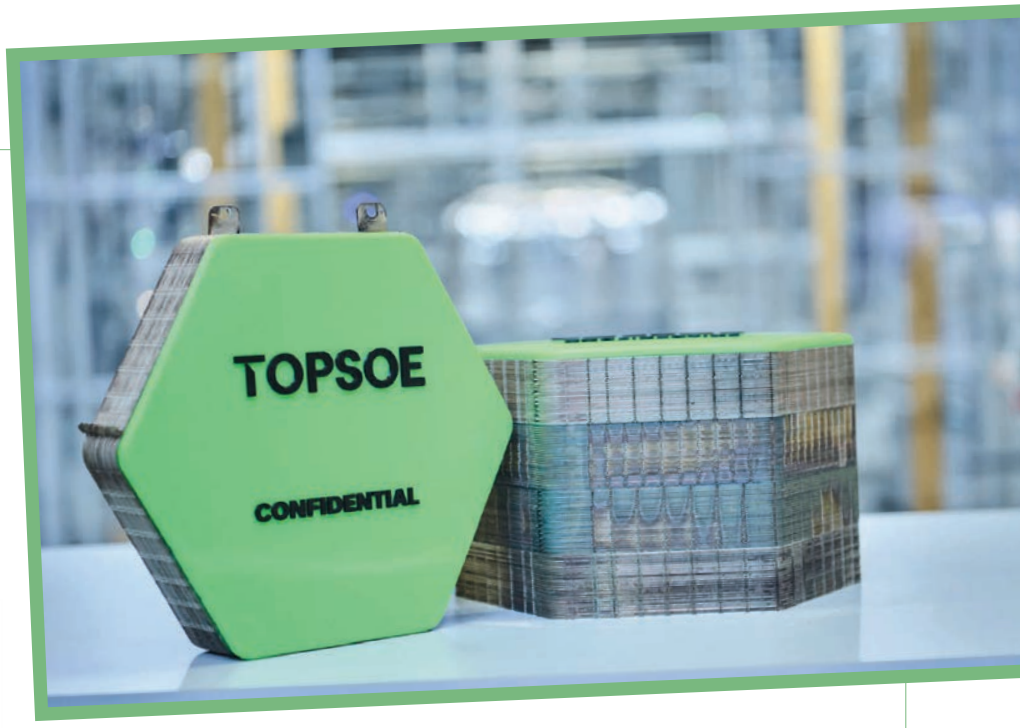
Decarbonisation acceleration with TOPSOE Power-to-X technology

As glass manufacturers pursue deep emissions reductions, TOPSOE is expanding its role through solid oxide electrolysis cell technology that enables efficient production of low-carbon hydrogen from renewable electricity - building upon decades of catalytic emissions-control collaboration and supporting fuel-switching pathways for hard-to-electrify high-temperature glass furnaces worldwide.



For more than 80 years, Topsoe has been built on science, innovation and applied chemistry. Today, the company is expanding its contribution to glass decarbonisation through its solid oxide electrolysis cell (SOEC) technology - a key component of its Power-to-X portfolio that enables the production of low-carbon hydrogen from renewable electricity.

This step builds on more than two decades of collaboration with glass manufacturers, during which Topsoe has delivered -and continues to provide- catalytic filtration technologies that reduce industrial emissions. These solutions support advanced De-NOx processes, ammonia control, CO and VOC removal, and the destruction of dioxins (PCDD/F).

Headquartered in Kongens Lyngby, Denmark, and operating globally across Europe, Asia and the Americas, Topsoe aligns its technologies, catalysts and services around a single ambition: enabling the energy transition for energy-intensive industries.

This scientific heritage underpins the company's approach to some of the world's most complex industrial decarbonisation challenges. Glass manufacturing represents one of these challenges, as it belongs to the category of hard-to-electrify industries that account for approximately 30 percent of global greenhouse-gas emissions, where continuous high-temperature processes make full electrification difficult to achieve.

In glass production, fuel switching away from fossil energy sources offers the largest single opportunity for CO_2 reduction. However, this transition must be achieved without compromising furnace performance, product quality or plant economics.

EFFICIENCY

Topsoe's solid oxide electrolysis cell (SOEC) technology is positioned as a key enabler in this transition. Operating at temperatures of around 700-750°C, SOEC performs high-temperature steam electrolysis with higher electrical efficiency than conventional alkaline or PEM electrolysis technologies.

Efficiency increases further when additional heat or steam from industrial processes is integrated, improving overall energy utilisation and reducing the electricity required for hydrogen production.

This characteristic makes SOEC particularly attractive for industries such as glass manufacturing, where large volumes of high-grade waste heat are already present. By integrating steam from existing processes, electrolysis efficiency can increase significantly while reducing overall electricity demand.

ECONOMICS

Higher efficiency directly improves project economics. With steam integration, SOEC can deliver up to 20 percent more hydrogen per megawatt of electricity input, enabling higher hydrogen output for a given electricity input.

Over long operating periods, this translates into higher hydrogen yields and improved project economics compared with conventional electrolysis technologies. In markets facing volatile electricity prices and tightening emissions constraints, these characteristics can strengthen the economic case for hydrogen-based fuel switching in glass furnaces, particularly where low-carbon electricity and supportive policy frameworks are available.

INTEGRATION

Decarbonising glass production requires more than hydrogen supply alone. Hydrogen combustion introduces new technical requirements, including burner redesign, refractory and insulation adjustments, potential oxygen integration, and dedicated hydrogen storage and handling systems.

Topsoe therefore collaborates with technology partners across the glass value chain to enable the integration of hydrogen into industrial

furnace operations. This includes collaboration with OEMs and glass manufacturers on hydrogen-compatible burner concepts, oxygen system integration and plant-level hydrogen supply configurations.

In parallel, Topsoe supports feasibility studies, business case development and public funding applications to help overcome the high capital costs and long investment cycles associated with industrial decarbonisation.

Hydrogen utilisation in glass furnaces has already been demonstrated in collaborative initiatives led by Stazione Sperimentale del Vetro and its industrial partners, where hydrogen-based combustion has been tested in glass manufacturing processes. Results from these demonstrations confirm the technical feasibility of integrating hydrogen into glass furnace operations and provide valuable insights for future large-scale deployment.

TOWARDS A NET-ZERO GLASS INDUSTRY

Looking ahead to 2050, studies indicate that full decarbonisation of the glass sector will require a portfolio of solutions. While hydrogen is expected to contribute a meaningful share of the future fuel mix, the majority of emissions reductions will likely come from electrification, increased cullet use, alternative raw materials and, where necessary, carbon capture technologies.

Within this multifaceted pathway, SOEC-based Power-to-X solutions can serve as a critical bridge between renewable electricity and the operational realities of industrial glassmaking, enabling the production of low-carbon hydrogen and synthetic fuels that support deep emissions reductions in high-temperature industrial processes.

By combining decades of catalytic expertise with next-generation electrolysis technologies, Topsoe continues to expand its role in supporting glass manufacturers as they move from incremental efficiency improvements towards credible Net-Zero glass production pathways. ■

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Inside the glass transition, with ASSOVETRO

ASSOVETRO outlines the ecological transition of the Italian glass industry - detailing emissions, energy use and decarbonisation strategies. Through Green Fuels, carbon capture and supportive policy frameworks, the association identifies both the investments and the infrastructure that's required to align the sector with climate targets while safeguarding competitiveness.

CONNECTIVITY DRIVING THE ECOLOGICAL TRANSITION IN MANUFACTURING

The ecological transition of the Italian glass industry represents one of the most complex and strategic industrial transformations currently underway in Europe. According to Assovetro, the national glass sector remains a cornerstone of both the Italian and European manufacturing landscape, combining high production capacity, strong international positioning and a deeply rooted commitment to innovation, energy efficiency and circular economy principles.

In 2022, the Italian glass industry generated EUR 27 billion in turnover, employed 28,800 highly specialised workers and achieved an estimated social impact of EUR

9.6 billion. Environmental performance already plays a central role, with an average recycling rate of approximately 80 percent and a collection rate exceeding 90 percent. Through glass recycling alone, the sector saves an estimated 414 million cubic metres of gas annually, underlining its strategic contribution to resource efficiency and emissions reduction.

EMISSIONS, ENERGY USE AND THE CURRENT BASELINE

A detailed analysis of sector emissions shows that total greenhouse gas emissions reached 3.74 million tonnes of CO_2 equivalent in 2022. The majority of these emissions fall under Scope 1, deriving from fossil fuel combustion in glass-melting furnaces and from intrinsic chemical reactions during vitrification, particularly the decomposition of soda and limestone. Scope 2 emissions account for roughly one quarter of the total and are linked to electricity consumption across production facilities.

Energy consumption patterns reflect the structural characteristics of the sector. Natural gas remains the dominant energy input, accounting for approximately 81 percent of total energy use, primarily to fuel fusion processes. Electricity, representing the remaining 19 percent, is mainly employed in downstream processing, automation and to support furnace efficiency. Consumption is geographically concentrated in northern regions, where industrial glass districts are historically located.

DECARBONISATION PATHWAYS AND STRATEGIC OPTIONS

Under a Business-as-Usual scenario, sector emissions would decline only marginally by 2050, stabilising at approximately 3.67 million tonnes of CO_2 equivalent due to increased production volumes. This trajectory is incompatible with the Paris Agreement and net-zero objectives, making targeted intervention unavoidable.

Assovetro identifies two primary decarbonisation strategies for the sector: the Green Fuels strategy and the Carbon Captureand Storage (CCS) strategy, supported by a dedicated pathway for glass transformers. Both approaches rely on a flexible combination of seven key levers: energy efficiency improvements, increased electrification, green fuels such as hydrogen and biomethane, higher use of recycled glass (cullet), precalcined raw materials, CCS and renewable energy sourcing. No single lever is sufficient on its own; only an integrated mix can deliver the required emissions reductions.

The Green Fuels strategy focuses on replacing fossil fuels with biomethane and hydrogen, reserving CCS for residual emissions that cannot be eliminated otherwise. By contrast, the CCS strategy continues to rely on natural gas while deploying large-scale carbon capture from 2035 onward to abate both process and combustion emissions. Both strategies foresee a substantial increase in electricity demand, particularly for hydrogen production via electrolysis, placing significant pressure on national energy infrastructure.

COSTS, INVESTMENTS AND ENABLING CONDITIONS

The economic dimension of the transition is substantial. Total investments required by 2050 are estimated at EUR 4.23 billion for the Green Fuels strategy and EUR 5.39 billion for the CCS strategy, with CCS requiring approximately 26 percent higher capital expenditure due to the construction of large carbon capture facilities. Operational costs diverge even more sharply: while CCS entails higher upfront investment, Green Fuels leads to significantly higher long-term operating expenses driven by the recurring cost of green hydrogen procurement.

Assovetro highlights that the success of the transition depends heavily on factors external to glass manufacturers. These include the availability and affordability of decarbonised energy carriers, the development of electricity, hydrogen and CO_2 transport infrastructures and a stable regulatory framework, particularly regarding the EU Emissions Trading System. Without coordinated public investment, regulatory reform and targeted financial support, the sector risks losing competitiveness while being unable to maintain current production levels.

To address these challenges, Assovetro proposes a comprehensive policy framework combining investment incentives, operational cost support, accelerated infrastructure development, EU ETS reform and stronger trade defence mechanisms. Only through such an integrated approach, the association argues, can the Italian glass industry achieve climate neutrality whilst preserving its industrial base and strategic autonomy within Europe's manufacturing ecosystem. ■

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Dairy expansion supported by VETROPACK packaging for ARTESANA

Award-winning Romanian dairy producer ARTESANA is expanding across Europe with support from VETROPACK, whose glass bottles and jars are reinforcing the brand's focus upon natural ingredients and sustainability. Launched in 2023, the partnership combines artisanal dairy production with reliable glass packaging and future lightweight innovations.

Vetropack's glass packaging is helping Romanian dairy producer Artesana bring its award-winning milk products to a growing international market. The Swiss glass manufacturer has supplied bottles and jars for the company's expanding range, supporting a brand built on natural ingredients, minimal processing and artisanal values. The pure, unadulterated taste of milk from Artesana relies on glass packaging supplied by Vetropack, as the Romanian dairy producer continues to set new standards for

Visionary founders: the husband-and-wife team of Alina and Daniel Donici successfully launched Artesana and turned it into a strong brand within just a few years.

Recognised for excellence: customers and industry watchers alike are convinced by Artesana's dairy products – thanks in part to glass packaging from Vetropack.

natural dairy products. Since 2023, the Swiss glass manufacturer has delivered bottles and jars from its site in Chișinău, in the Republic of Moldova, for Artesana's whole milk, cream cheese, yoghurt and kefir.

AN AWARD-WINNING ROMANIAN DAIRY BRAND

Artesana, a young company based in Tecuci, Romania, has collected international awards for its sustainably produced dairy products made from cow's and goat's milk sourced from regional farms. The partnership with Vetropack plays a key role in presenting these products in packaging that reflects the brand's commitment to quality and sustainability. The origins of the business trace back to a defining moment. During a trip to Catalonia in Spain, Daniel Donici tasted a handmade cheese whose flavour left a lasting impression. Inspired by that experience, he decided he wanted to produce something similar. Soon his wife Alina shared the same ambition. That was in 2007. With no previous experience in dairy production, the couple embarked on what they describe as a true adventure. Their vision was clear from the beginning: to create milk and dairy products distinguished by exceptional flavour and genuine health benefits. Today, Artesana has become a highly regarded brand among consumers and industry observers alike. Since its founding in October 2012, products including milk, cheese, sana -a Romanian variant of buttermilk- yoghurt and kefir have consistently received recognition from international media and industry forums. Most recently, the company was named 'Artisan Dairy Innovator of the Year' for 2025 by Global Brands Magazine.

PRESERVING THE NATURAL CHARACTER OF MILK

What sets Artesana apart is its commitment to preserving the natural character of milk. While plant-based alternatives such as oat and soy milk are becoming more common in Romania, the company follows a different path. "The vision is -and remains- to preserve the whole milk flavour: no additives, and the absolute minimum of industrial processing," explains General Manager Sergiu Mulțescu. "As far as possible, we take nothing away - nor do we add anything." Milk is sourced exclusively from small and medium-sized farms in the surrounding region. As a genuine natural product, its taste varies slightly with the seasons, while fat content ranges between 3.5 and 4.2 percent because animals receive different feed in summer and winter. Around 40,000 litres of milk are processed each day. The milk is gently pasteurised at lower temperatures using optimised processes designed to preserve vitamins, proteins and natural fatty acids. It is also not homogenised, allowing a natural layer of fat -cream- to form on top. The result is high-quality whole milk from both cows and goats, containing no additives and forming the basis for Artesana's dairy range.

GLASS: THE IDEAL AMBASSADOR FOR ARTISANAL PRODUCTION

For the team at Artesana -who describe themselves as "milk artisans"- glass is the only suitable packaging material. "We don't see this

Artesana's range also includes high-quality sana from goat's milk, shown here in a small 350-ml bottle from Vetropack.

as just a question of aesthetics," says Mulţescu. "Above all, it's about product quality. Glass is the only packaging material that does not react with the contents, so it preserves the delicate ingredients and characteristics of our products." Transparency also plays an important role. Customers can immediately see the product inside - including the cream that naturally rises to the top of the bottle. As a material that is 100 percent recyclable, glass also aligns with the company's sustainability goals. The distinctive design of the bottles further reinforces the brand identity. Available in 1-litre and 350-ml formats, they feature a concave shape and wider opening, creating an attractive profile while ensuring that the cream does not block the flow of milk. "The round, clear shape reflects the past and represents values that are important to us - simplicity, honesty and diligence," Mulţescu explains. Vetropack's containers also include two inscriptions on the base: the brand name 'Artesana' and the phrase 'artizanii laptelui' - Romanian for 'milk artisans'.

PACKAGING PARTNERSHIP SUPPORTING INTERNATIONAL GROWTH

As Artesana's business expanded, the company transitioned to Vetropack as its glass packaging supplier in 2023. The collaboration initially began with a 330-ml glass jar and has since grown to include five different containers - two bottles and three jars. Production volume is expected to reach around eight to nine million glass containers in 2025.

As General Manager, Sergiu Mulțescu drives innovation and growth at Artesana, working alongside the founders and in collaboration with Vetropack.

The Artesana factory at Tecuci in eastern Romania was built to the latest technical and environmental standards.

The packaging range currently includes:

- 1-litre bottle for fresh cow's milk (including organic)
- 350-ml bottle for sana (cow's or goat's milk, including organic), kefir (cow's or goat's milk, including organic) and drinking yoghurt
- 300-g, 200-g and 160-g jars for natural yoghurt, cream cheese, sour cream, fruit yoghurt and other dairy products

"In turbulent and economically challenging times marked by trade barriers and inflation, Vetropack offers major advantages such as reliable deliveries, consistently high quality and flexibility when it comes to changes and innovations," Mulţescu says. He also recalls how quickly Vetropack was able to establish the manufacturing process for Artesana's existing container designs. The Chişinău facility offers geographical proximity, efficient logistics and flexible production suited to smaller batch sizes. Looking ahead, Artesana plans further expansion. The company aims to strengthen its yoghurt and kefir segments and introduce new products specifically designed for children. A third production line is planned to support international growth.

PACKAGING DEVELOPMENT WILL ALSO CONTINUE

"Lightweight glass is an option for the future, allowing us to become even more sustainable and resource-efficient," Mulţescu notes. "Modular packaging solutions are also of interest for our international markets." He emphasises that the relationship with Vetropack goes beyond supply. "We see our collaboration as an opportunity for co-creation - not only regarding glass containers, but also reusable solutions and educational initiatives focused on recycling and environmental responsibility." Artesana has already demonstrated its commitment to this approach. Through the 'Label Explorers' school programme, the company introduced more than 25,000 pupils and teachers across Romania to the basics of food labelling and ingredient transparency - while also helping them understand the difference between natural products and industrially manufactured alternatives. ■

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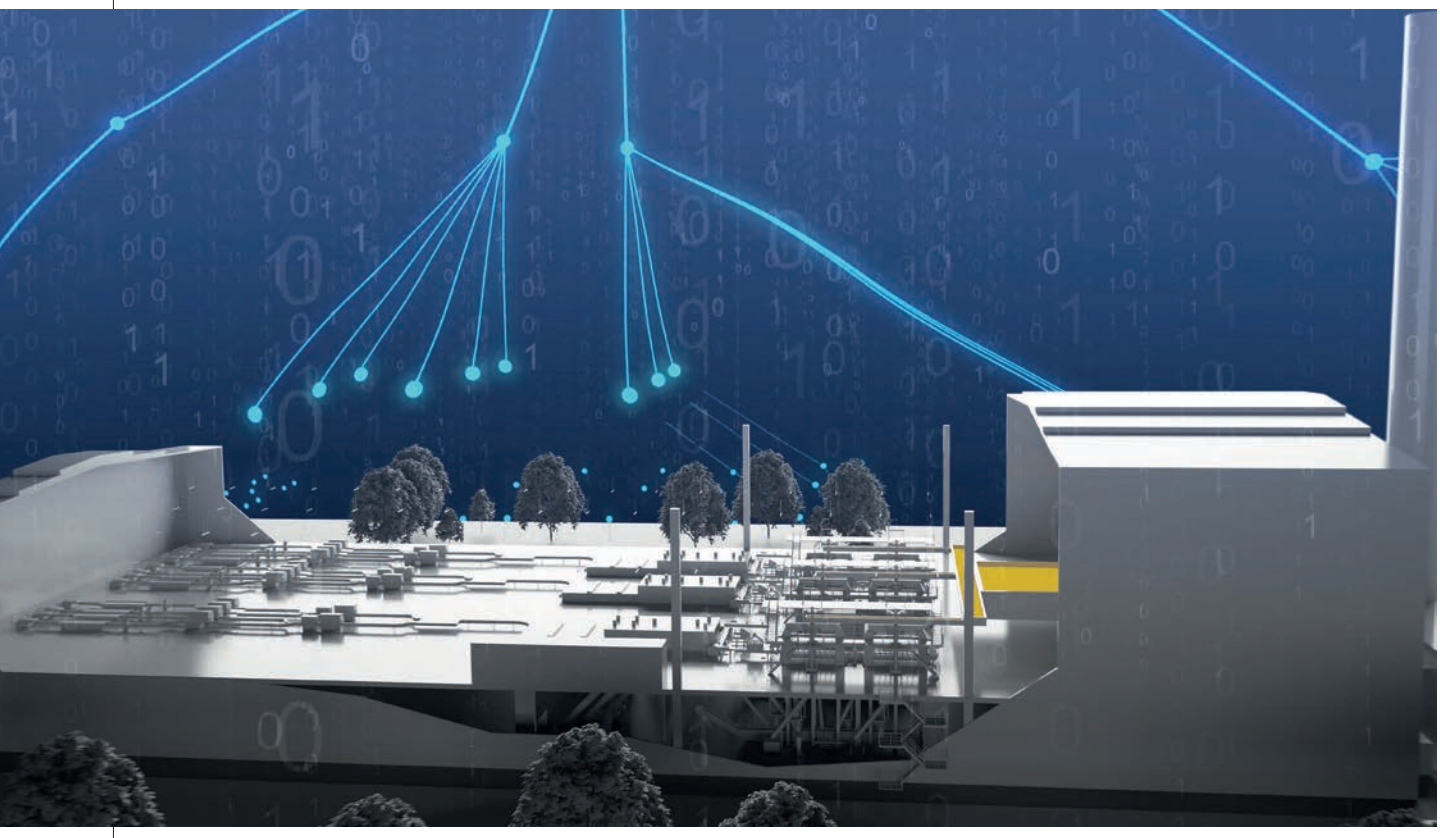
Forming

Data-driven forming technology strengthens performance across HEYE operations



SMART GLASS MANUFACTURING: UNLOCKING THE POTENTIAL OF DIGITAL TECHNOLOGY

The glass container industry is undergoing a fundamental shift. As sustainability targets rise and expectations for efficiency increase, glass production is being redefined. Rising energy costs and stricter environmental regulations are accelerating the move toward smarter, leaner and more data-driven operations. In this environment, digital technologies are no longer optional; they are becoming essential for overcoming operational challenges and ensuring long-term viability. Digitisation has been embedded in

Digital technologies are reshaping container glass production as manufacturers pursue efficiency, quality and sustainability. Through decades of innovation, HEYE has developed systems that connect forming processes with real-time data and analytics - enabling smarter production control, predictive maintenance and more transparent, energy-efficient glass manufacturing environments.

the strategy of HEYE for decades. As early as the 1990s, the company introduced PC-based image processing systems and servo-controlled IS-machine processes, well before 'Industry 4.0' entered the industry's vocabulary. Today this focus continues through technologies such as the bus-capable SpeedLine IS-machine, advanced Hot End Closed Loop control systems and digital solution like Heye SmartLink. The common objective across these developments is tighter control over forming processes, leading to improved uptime, higher yield and consistent product quality.

REAL-TIME CONTROL AT THE FORMING PROCESS

The direction of the industry is increasingly clear: critical parameters must be measured as close to the forming process as possible, and in real time. Only then can deviations be detected early enough to prevent defects and conserve valuable resources. Infrared and optical sensors, together with non-contact measurement technologies, have made closed-loop control systems possible. These systems automatically adjust forming parameters before defects arise. At the same time, remote connectivity and secure access to data have become essential tools for efficient technical support and for gaining plant-wide production insights. Digitalisation, however,

only delivers its full value when the right data reaches the right place at the right time. This is where Heye SmartLink plays a central role, acting as an interface between machine-level operations and higher-level analytics systems.

HEYE SMARTLINK: THE DATA GATEWAY FOR INTELLIGENT GLASS PRODUCTION

As digitalisation reshapes container glass manufacturing, access to real-time production data is becoming a decisive competitive factor. In response, Heye developed SmartLink, a compact software solution designed to connect production equipment with analytics platforms or manufacturing execution systems (MES). Heye SmartLink enables fast, secure and standardised transfer of process data from connected glass production equipment to customer's internal systems. Operating entirely within the customer's local network, the solution provides reliable access to structured machine data without compromising security or increasing network complexity. By converting machine data into a uniform format, Heye SmartLink establishes a reliable foundation for process transparency, condition monitoring and data-driven decision-making.

KEY FUNCTIONS OF HEYE SMARTLINK

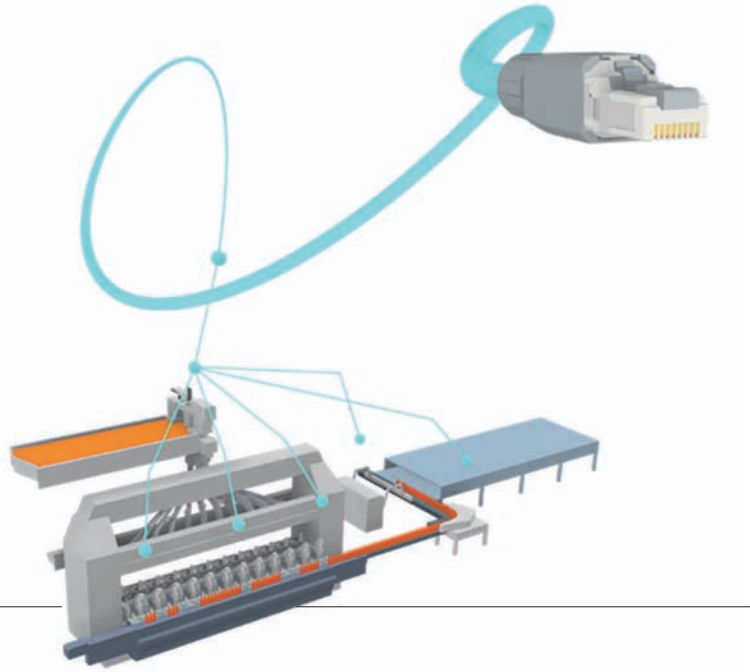
Heye SmartLink is designed to support seamless data handling and integration across glass production environments. The system receives real-time process data from connected equipment and converts raw machine information into a standardised JSON format. This data is then published through an MQTT broker, enabling efficient communication between systems while maintaining clear separation between machine networks and plant-level infrastructure. This architecture allows manufacturers to integrate production data without exposing critical machine systems, ensuring secure communication while maintaining high levels of operational transparency.

DATA EXPORT

Heye SmartLink can deliver a wide range of equipment-dependent data. This includes operating and configuration data, event parameters and section status, as well as gob characteristics such as weight, temperature and measurement values. Additional process information may include mould and plunger temperatures, plunger positions and press duration, forming pressure and production counter data. Reject counters and reject reasons can also be transmitted, providing valuable insight into production quality and operational performance.

ADVANTAGES AT A GLANCE

Heye SmartLink is designed for simple integration into existing infrastructure. The system requires only a single dedicated LAN Ethernet port and keeps all data within the customer's local network. Its standardised JSON format ensures compatibility with modern analytics tools, while the MQTT-based architecture reduces network load and supports efficient data transmission. Because the platform is modular and scalable, it can be adapted to a variety of plant environments and digitalisation strategies. By providing a unified interface for machine data, Heye SmartLink allows manufacturers to derive insights for monitoring, diagnostics, traceability and predictive maintenance. In doing so, it enables real-time access to standardised production data, supports predictive maintenance strategies, and facilitates both quality and energy analytics. The system also simplifies plant-wide integration, reduces infrastructure complexity and helps establish the foundation for greater automation and data-driven decision-making. Providing machine data seamlessly, securely and in real time for analytics and process tools, Heye SmartLink represents an enabling step toward the smart, energy-efficient glass plant of the future. ■



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Specialty alloys at FONDERIE VALDELSANE enhance production performance

HIGH-QUALITY GLASS MOULDS DRIVE EFFICIENCY GAINS

Fonderie Valdelsane Sales Manager Manuel Papi outlines how the company's cast iron and bronze alloys for glass moulds are enabling improved performance and higher efficiency in glass production. The company produces specialised cast irons and bronze alloys tailored specifically for this demanding application. Founded in in Tuscany, Italy, back in 1961, Fonderie Valdelsane has developed advanced technical expertise and technologies dedicated to the needs of the glass industry. Growing global demand has driven its international expansion, resulting in a wide network of glass industry partners.

High-performance mould solutions from FONDERIE VALDELSANE combine specialised alloys, advanced manufacturing and continuous innovation to improve efficiency in glass production. Ongoing developments in cast iron and bronze, alongside sustainability investments, enable the company to meet evolving industry demands whilst maintaining consistent quality and reliability.

FOCUSED EXPERTISE AND CONSISTENT QUALITY

A key strength lies in the company's singular focus on castings for glass moulds, allowing it to build deep expertise in this niche. Rigorous quality control processes, combined with carefully selected raw materials, ensure products meet the strictest international standards. These characteristics directly contribute to improved mould performance and production efficiency. Flexibility is another defining factor. The company responds to specific customer requirements by producing dedicated alloys and patterns in less than a calendar week. Continuous investment in research and development supports the adoption of advanced technologies, helping optimise production processes and maintain consistent product quality. In addition to manufacturing, Fonderie Valdelsane provides technical assistance, consultancy and after-sales support, reinforcing long-term customer relationships.

EXPANDING APPLICATIONS AND ALLOY DEVELOPMENT

The company's castings have long been recognised internationally for their quality. Since 2018, Fonderie Valdelsane has registered trademarks for its alloys to prevent imitations and safeguard glassmakers requiring high standards. Ongoing investment has focused on developing specialty alloys for specific applications and production sectors. The 2025 catalogue includes solutions designed for high-speed production, such as beer and soft drink containers, alongside products prioritising glass brilliance and surface quality. Specialised solutions are also available for high-end spirits packaging, where heavier

glass weights must be combined with effective thermal conductivity and mould cavity polishability. Recent technological advancements have enabled the development of materials suitable for more demanding applications, including moulds for borosilicate (Type I) and opal glass. Testing has shown that certain specialty cast irons can withstand not only thermal stress but also high chemical and mechanical stress, reducing the need for costly reinforcement in vulnerable mould areas.

BRONZE ALLOYS AND PERFORMANCE ADVANTAGES

Significant resources have also been invested in bronze casting, with dedicated furnaces and production lines separate from those used for cast iron. Growth in copper alloy production has exceeded expectations, supported by positive feedback from mould makers and glassworks. These materials offer advantages in machining operations such as turning, grinding and drilling, improving efficiency and processing speed. Ease of welding further enhances workshop operations and contributes to improved mould performance during bottle production. Glassmakers report strong results in terms of service life and heat dissipation, as well as the resolution of persistent issues such as pitting, cracks and detachment at joints between base and metallised materials. The company now supplies bronze alloys suited to a range of applications and processes, with particular growth seen in B210 bronze castings for neck rings in 2025.

SUSTAINABILITY AND ENERGY RESILIENCE

Energy security remains a critical priority for an energy-intensive manufacturer. In line with its environmental commitments, Fonderie Valdelsane installed an autonomous electricity generation system. Its photovoltaic installation, comprising more than 3,000 solar panels and producing 1.6 MWh, was inaugurated back in 2024 and supports CO_2 reduction efforts. Another ongoing objective is the effective use of scrap and recycled materials from glassworks, contributing to the circular economy while maintaining strict alloy tolerances. Progress in environmental and social responsibility is documented in the company's Annual Sustainability Report, published each year and shared with partners. ■

Next-generation IS machinery supported by evolving LATTIMER solutions

Across global container manufacturing, LATTIMER continues refining IS variable equipment for the servo era. New tong systems, neck ring mechanisms and redesigned take-out arms reflect a broader push toward higher accuracy, durability and productivity as glass plants pursue greater process consistency and operational efficiency worldwide.

Lattimer has become one of the most recognisable names in the glass container manufacturing industry, supplying IS variable equipment to more than 70 countries each year from manufacturing sites in the UK and the US.

BUILDING ON A LEGACY OF INNOVATION AND EXPANSION

The company's reputation has long been built on quality and innovation - attributes that remain as important today as they were in 1941 when Lattimer was founded. In recent years, this foundation has been reinforced through strategic acquisitions, including Hunprenco Limited in 2022 and Hartmann and Bender in 2023. As increasing numbers of servo-controlled machines are introduced across the industry, many of the 40,000 part numbers currently available in the Lattimer portfolio are no longer required. In their place, manufacturers are seeking faster, lighter and more versatile products capable of meeting demands for improved product quality, process consistency and higher productivity. Many Lattimer products have become industry standards. The challenge now is ensuring that the company's portfolio not only supports the new generation of IS machines but also continues to deliver clear value for customers investing in this equipment. Over the past year, Lattimer has introduced several new products that are gaining strong adoption while continuing the company's long-standing reputation for delivering customer value.

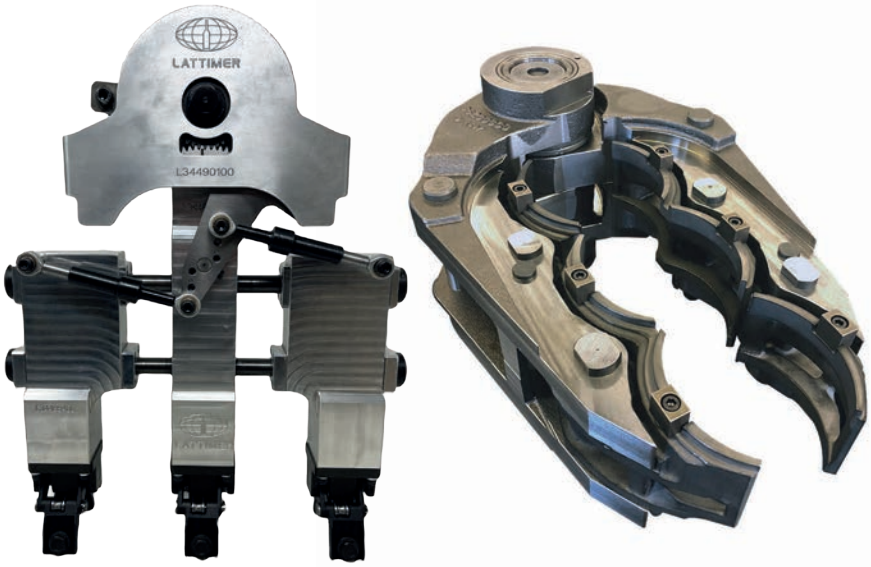
ENGINEERING SOLUTIONS FOR MODERN IS MACHINE REQUIREMENTS

One example is Lattimer's Neck Ring Mechanism, manu-

factured with a number of subtle but critical differences. A hardened and ground piston and rod provide closely toleranced, low-backlash, synchronised opening and closing of the flights. A heavy-duty spring ensures rapid return to the home position once compressed air is released, while roller bearings on the shaft allow smooth, resistance-free rotation during inversion of the neck ring arms. The simplified design also supports easier maintenance. The mechanism's robust construction enables trouble-free operation over many years and is available in a limited range of variants to suit different machine types. Customer growth and expansion into new markets have also driven demand for variable equipment for new machines. Within the past two years, Lattimer's range of products for the NIS machine has grown significantly. In particular, the NIS Varying Centre Distance Tong Head (VCD) has proven highly popular due to technical advancements designed to deliver longer service life and higher levels of accuracy, improving overall performance. Another development is the second-generation Parallel Tong, which introduces a simple but effective new design using many of the same components found in the Anti-Wink Tong Holder. One of the most common areas for critical container defects occurs around the neck during pickup. The parallel action of this new Tong Holder provides smoother and more precise movement, allowing pickup much closer to the mould. This can significantly reduce cycle time, as the Tong Holder is suitable for closed-mould pickup. The unit has also been designed as a compact assembly that can directly replace standard tongs.

EXPANDING PRODUCT DEVELOPMENT AND MANUFACTURING CAPABILITY

Lattimer's quick-change aluminium Blowhead, available in single, double, triple and quad gob configurations, combines strength and durability with interchangeable steel wear parts. This design extends service life while reducing lifetime operating costs. The company also manufactures a wide range of ductile iron mould holders -both blow and blank- each year, including industry standards and customer-specific designs. However, many standard holders have limitations in terms of speed and mould-closing pressures. Lattimer's design team



is therefore reviewing the current range of popular holders, incorporating design changes aimed at increasing strength and durability while maintaining accuracy and arm parallelism. Manufacturing processes for Neck Ring Arms have also undergone a comprehensive review aimed at reducing costs while guaranteeing product quality and accuracy. New casting designs have been introduced alongside revised manufacturing methods that reduce the number of operations required to produce finished parts. New variants allow wear areas of the arms to be replaced quickly -within minutes- rather than requiring time-consuming grinding and re-welding often carried out in plants. A product line redesigned specifically for servo machines is the Lattimer Take Out Arm range. These arms have been engineered as compact, robust and maintenance-friendly units available with both belt and silent chain drive. Because the repeated cycling of take-out arms can generate significant forces, the Lattimer design ensures that input and output shafts are fully supported and securely located to reduce the risk of failure. Many readers will already know that Lattimer supplies a full range of IS variable equipment, including both standard parts and those specific to particular machines, companies or containers. Mould holders, baffle arms, blowhead arms, tong heads and cartridges, inserts and lock rings are all available. Less widely known is the company's range of checking fixtures. Produced to order, these fixtures allow plants to verify the condition and accuracy of components -including tong heads, neck ring arms, inserts and mould holders- before installation on a machine. Lattimer continues to encourage customers to visit its production facilities. Recent improvements include updated equipment layouts within manufacturing departments, installation of new machines and a reorganisation of the assembly department, including the creation of a dedicated Neck Ring Mechanism assembly and testing area. These changes are intended to streamline manufacturing processes and increase productivity and efficiency. Operating in an increasingly competitive environment, Lattimer continues to pursue excellence across all areas of the business while reinforcing its commitment to supporting customers in achieving their own operational goals. ■

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Hot-end process stability strengthened with TME ENGINEERING systems

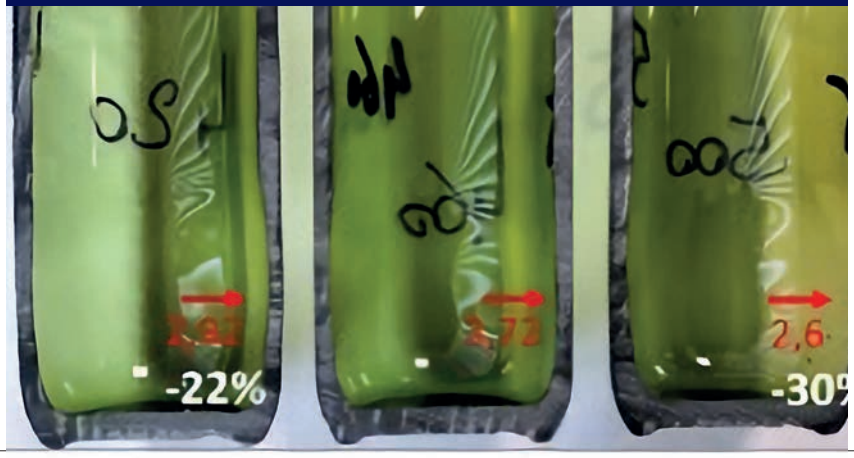
Lightweighting glass containers remains a central objective for the glass industry, driven by sustainability imperatives, reduced raw material and energy consumption, lower transportation costs and compliance with increasingly stringent environmental regulations. Achieving meaningful weight reductions while preserving mechanical integrity, burst resistance and overall product quality requires exceptional control over critical hot-end parameters. Effective lightweighting depends on four closely interrelated factors: precise control of gob weight consistency, optimal gob shape and delivery, optimised blank (parison) geometry design and -most critically- accurate thermal management during the forming process.

THE CRITICAL ROLE OF THERMAL CONTROL

Thermal control is fundamental to achieving uniform glass distribution, defined as the even repartition of wall thickness throughout a container. Temperature gradients within the blank mould directly influence glass viscosity and flow, resulting in asymmetric thickness profiles. These variations create localised thin spots, which are more prone to breakage, alongside areas of unnecessary excess glass. Together, these effects significantly limit the extent to which lightweighting can be pursued without compromising quality. A practical demonstration of this phenomenon was observed during a trial conducted with a partner operation. By intentionally introducing a thermal imbalance between the left and right halves of the blank mould on an IS machine section, the resulting impact on glass distribution became immediately apparent.

In lightweight containers -where nominal wall thicknesses are already minimised- even small temperature deviations of just a few degrees Celsius can produce unacceptable thickness variations. This increases defect rates, rejection levels and the risk of failures in the field.

Cross-sectional views of trial bottles illustrating the consequences of thermal imbalance in the blank mould. From left to right: Reference bottle / Left-side imbalance / Right-side imbalance. Red arrows indicate measured wall thicknesses (in mm) and percentage deviations, with thinner zones reaching up to -30 percent on the affected side. Such variations make reliable lightweighting unachievable.



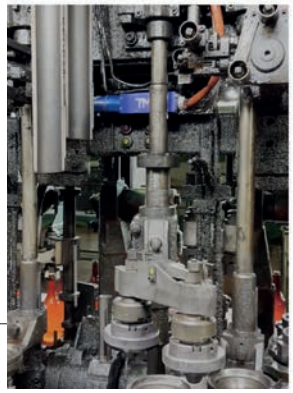
Advanced thermal control is transforming glass container lightweighting, with TME ENGINEERING's Blankontrol system enabling precise temperature monitoring at the forming stage. By improving glass distribution and process stability, manufacturers achieve significant weight reductions, enhanced quality and greater efficiency – all whilst supporting sustainability and reducing defects.

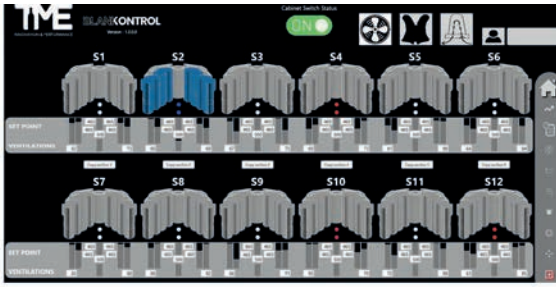
FROM MEASUREMENT TO MASTERY

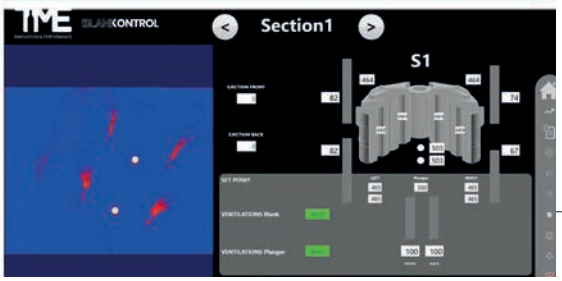
This is where TME Engineering's Blankontrol system establishes its relevance. The system provides real-time, non-contact temperature monitoring directly at the blank side for every cycle across each section of the IS machine. Its performance is defined by a measurement precision of approximately 2°C, allowing reliable detection of even subtle thermal deviations. Equally significant is the absence of any calibration requirement. The system is ready for immediate deployment and maintains accuracy over time without periodic adjustment, simplifying installation, operation and maintenance in demanding production environments. When integrated into a closed-loop control strategy -such as automated adjustments to cooling air or mould temperatures based on Blankontrol data- the system enables stable and repeatable thermal conditions from cycle to cycle and across the entire machine. This level of control over glass viscosity and flow in the blank mould leads to highly uniform wall thickness distribution, eliminates systematic thin spots and asymmetries, and provides greater confidence in achieving aggressive lightweighting targets, including weight reductions of 10-20 percent or more without compromising performance. Additional benefits include enhanced process stability, faster job changes and reduced start-up times.

INDUSTRY ADOPTION AND FORWARD MOMENTUM

Leading players within the container glass industry are already deploying advanced thermal control solutions to address the challenges of lightweighting. By integrating such tools upstream in the forming process, manufacturers are supporting broader sustainability and efficiency initiatives. The transition from reactive, post-forming inspection to proactive, data-driven thermal optimisation at the forming stage represents a significant shift in process philosophy. Blankontrol directly addresses this upstream requirement and glass container producers worldwide are increasingly adopting in-process thermal monitoring solutions to strengthen their lightweighting strategies. In this context, precise thermal management is no longer optional - it is essential. Blankontrol enables manufacturers to achieve consistent glass distribution, unlock higher levels of weight reduction, improve sustainability metrics and deliver reliable, high-performance containers with greater efficiency.







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Industrial glass forming evolves with FAMOR engineering technology

From high-temperature melting to advanced forming systems, modern glass production demands precision engineering and energy efficiency - across global glassworks, technologies developed by FAMOR Engineering support automated forming, turnkey production lines and electronically controlled machines, assisting manufacturers to improve quality, productivity and operational reliability.

ENGINEERING

Large glass tanks, often referred to as pot furnaces, are used to produce glass. The raw materials -sand, sodium carbonate, aluminium oxide, lime and dolomite, among the most important- are all thoroughly premixed before entering the melting process. The batch is heated to extremely high temperatures, typically between 1,300°C and 1,500°C, depending on the type of glass being produced. These temperatures, combined with the aggressive nature of molten glass, require high-quality refractory materials to line the tank or pot. Such materials protect the furnace structure and ensure consistent production condi-

tions during the demanding melting process. Energy consumption in glass production is correspondingly high due to these extreme temperatures. To optimise efficiency, complex air pre-heaters are commonly used. An increasingly attractive alternative is the adoption of oxy-fuel burners, which significantly reduce energy consumption while also lowering emissions of harmful substances. This heating technique is being implemented more frequently across the global glass industry.

FORMING

Once melting is complete, the forming stage begins. Historically, this process was entirely manual; glass blowing, for example, was practiced long before the birth of Christ. Today, however, glass feeding and forming are highly mechanised. Glass can now be delivered manually, via ball-collecting robots, or through automated feeding mechanisms. Based on these glass gob loading processes, a wide range of machines has been developed, each capable of being individually adapted to meet diverse production requirements. Across all systems, the focus remains on improving economic efficiency, creating more human-friendly working environments, and ensuring the highest levels of product quality. All systems are installed and tested by specialised personnel, ensuring that customers have a competent partner to rely on even after machine delivery. Glass forming systems today include pressing, centrifugal forming, blowing and press-blowing technologies. Recognised as one of the leading manufacturers of forming machines, Famor Engineering operates successfully on the global market. The company's success is rooted in its ability to solve the specific technical challenges faced by glassworks, providing high-quality technologies and customised machinery tailored to individual production needs.

EQUIPMENT RANGE

Through research, innovation and continuous technological development, the company has established itself as a recognised brand worldwide, offering turnkey systems and services designed to meet a wide variety of production requirements. Famor Engineering specialises in the design, production, installation and commissioning of plants, systems and machines for hollow glass forming. In this role, the company positions itself as a comprehensive technological partner capable of addressing production-related challenges with maximum effectiveness. Current forming machine production includes semi-automatic machines, automatic machines, flame polishing machines and integrated handling and transport systems. Complete forming production lines are available for tableware and kitchenware, stemware, lighting ware, high-voltage insulators, glass blocks and car headlight lenses. Famor Engineering also places strong emphasis on the speed and efficiency of its customer service. These working methods are widely appreciated within the company's market segment, reflected in the growing number of machines and systems sold each year and in the loyalty of customers who repeatedly turn to the company for new investments. Energy consumption remains a key focus, particularly with the development of increasingly electronically operated forming machines. Today, fully electronic technologies are being introduced to provide greater control and repeatability in glass production. ■

famorengineering
glass forming technology

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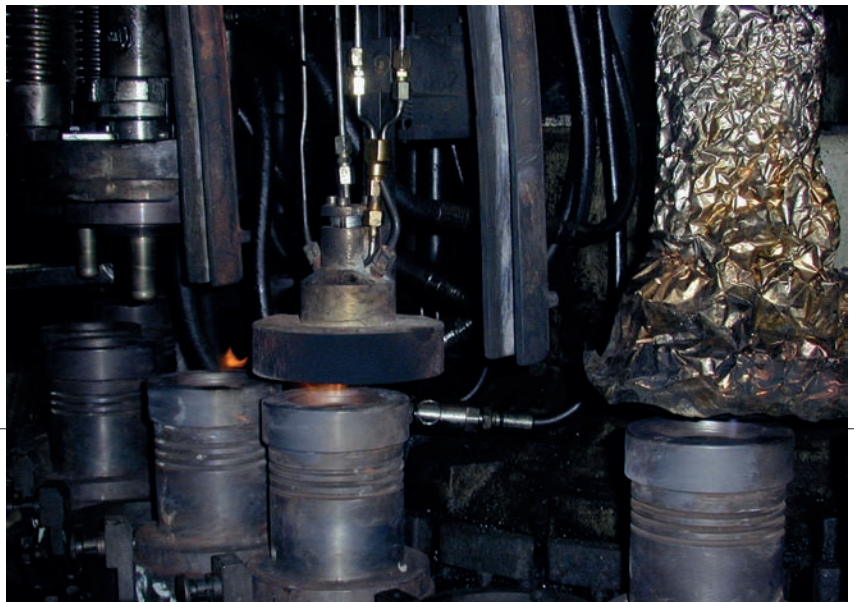


Production complexity significantly reduced with EMHART tong systems

Scan to watch the new technical video

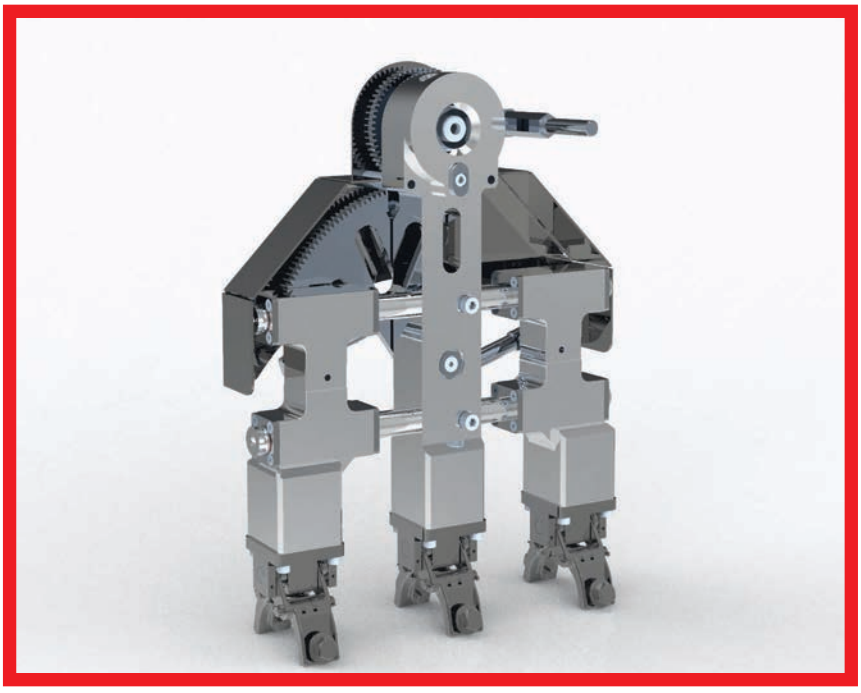
As global demand for glass containers accelerates, manufacturers face mounting pressure to increase capacity, improve efficiency, and maintain uncompromising quality. The industry is rapidly shifting toward high-performance Triple Gob (TG) and Quad Gob (QG) production, with forming machines now offering up to 12 TG/QG sections and tandem configurations reaching as many as 20 sections. These configurations deliver exceptional throughput, but they also push ware handling speeds to new limits. As a result, maintaining stable pack rates and ensuring flawless transfer -from push-out to lehr loading- has become increasingly complex. To meet these challenges, producers are seeking solutions that reduce operational complexity without compromising performance. Although dual-row concepts are in use, they come with limitations regarding the firing order as well as challenges during further processing.

SMARTER SPACING, STRONGER PERFORMANCE

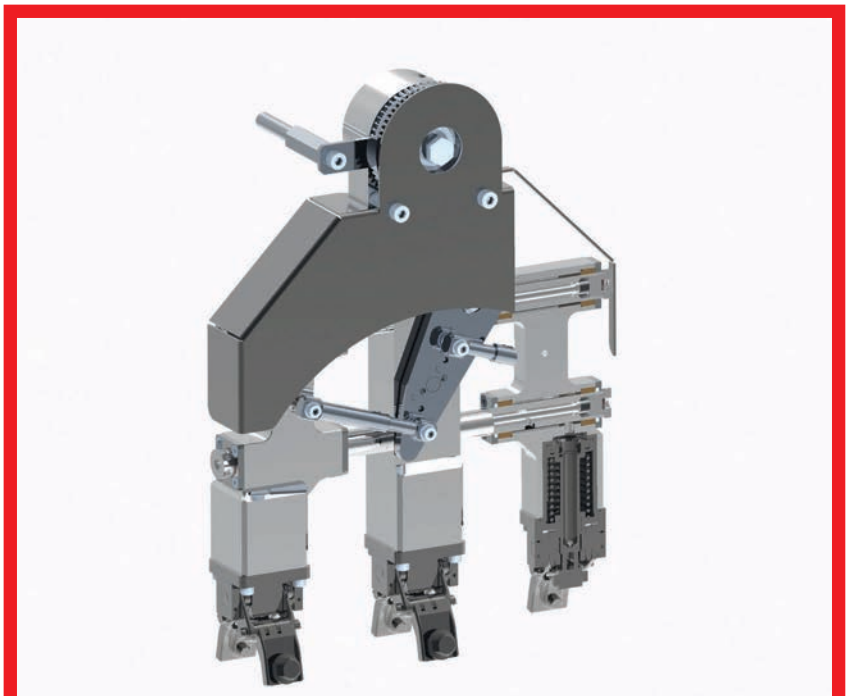
The Variable Center Distance (VCD) Tong Head offers a different approach. By reducing container spacing during the take-out sequence, it lowers belt advance and improves overall ware stability. The result is enhanced handling quality, increased efficiency, and more consistent pack rates across high-speed production environments. This capability is particularly valuable in modern high-output setups, where even small improvements in spacing and timing can significantly influence line performance.

ENGINEERING THAT ADAPTS IN REAL TIME

At the core of the VCD Tong Head is a precision-engineered mechanism based on a synchronized pinion and lever system. This system repositions movable sliders con-



Rising production speeds are reshaping ware handling requirements across the glass industry. Addressing precisely that need, the Variable Center Distance Tong Head enhances stability, reduces belt advance and improves pack rates. Widely adopted in high-output environments, this Bucher EMHART technology supports efficient, reliable operations while simplifying increasingly complex production demands.



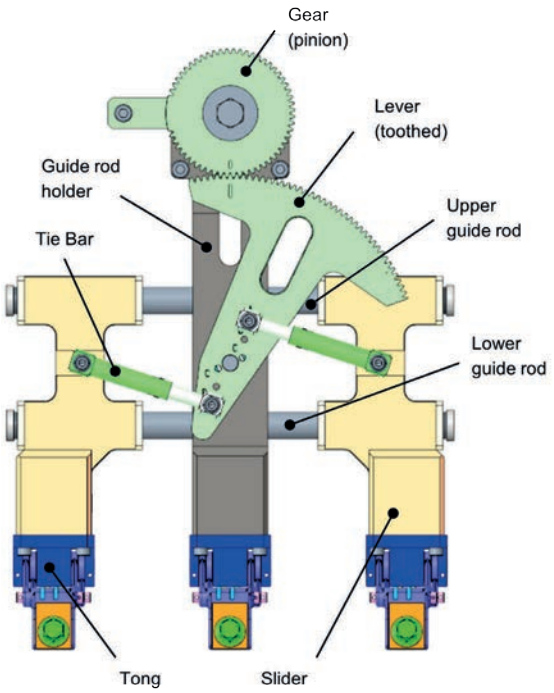
nected by a tie bar, enabling seamless adjustment from cavity center distance to optimized spacing on the dead plate. Operators can quickly adapt settings based on article diameter by repositioning or adjusting the length of the tie bar. A defined range of spacing configurations supports this flexibility, ensuring compatibility across multiple production requirements.

DESIGNED FOR DURABILITY AND EFFICIENCY

The latest generation of VCD Tong Heads builds on proven field performance with a design tailored for modern, high-speed production. Enhancements focus on robustness, reduced downtime, and extended maintenance intervals - delivering measurable value throughout daily operations. The features and benefits underscore the following operational advantages:

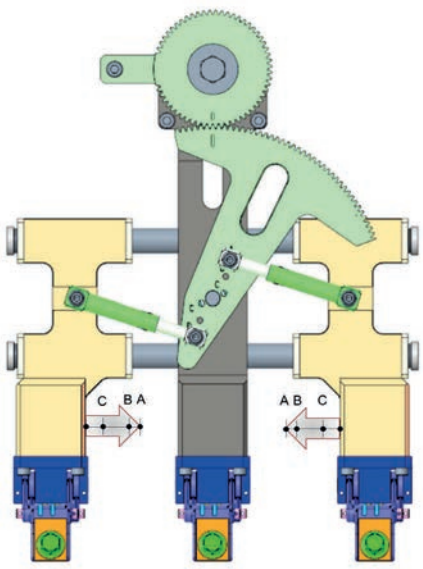
- Modular, adjustable bottle spacing aligned with FlexPusher finger configurations
- Slower, more controlled push-out motion
- Precise container release into pusher fingers
- Reduced conveyor belt speed due to tighter spacing
- Long-lasting slider bearing design for improved positioning
- Modular construction with identical wearing parts for easier maintenance

These features translate into tangible benefits, including improved ware handling, higher



AVAILABLE FOR	WARE SPACINGS ON DEAD PLATE
- NIS TG 5"	**3 - 3/4" /4 - 7/32" /4 - 11/16"**
- AIS TG 4 1/4"	2 - 1/3" /2 - 5/8" /2 - 11/12" / 3 - 1/2"
- AIS QG 3"	2" / 2 - 1/4" / 2 - 1/2"
- IS TG 85 mm	2" / 2 - 1/4" / 3"

VCD TONG HEAD	WARE SPACING FORMING MACHINE	MOUNTING POSITION ON LEVER	WARE SPACING DEAD PLATE	CONVEYOR BELT SPEED REDUCTION	ARTICLE DIAMETER RANGE
NIS TG	5″	A	3-3/4″ (95.3 mm)	25%	61-66 mm
		B	4-7/32″ (101.8 mm)	20%	66-71 mm
		C	4-11/16″ (119.1 mm)	6%	71-81 mm



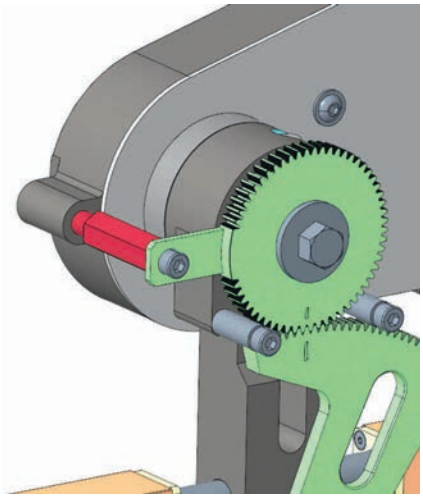
pack percentages, reduced losses and lower operating costs.

INTEGRATION WITHOUT COMPROMISE

The VCD Tong Head is fully compatible with standard take-out systems and integrates seamlessly with existing FlexPusher finger portfolios. It is supported by FlexIS forming control systems, accommodating all relevant belt advance configurations. For optimal performance, the system is recommended in combination with Servo Electric Take-Out (SETO) and Servo Electric Invert (SEI) mechanisms, ensuring smooth and reliable operation at high speeds.

A PROVEN SOLUTION FOR HIGH-SPEED PRODUCTION

As production volumes continue to rise, the adoption of VCD technology has expanded significantly. Its growing presence in high-speed applications reflects increasing industry recognition of its ability to enhance ware handling while simplifying operational challenges. Ongoing development efforts ensure that the system continues to evolve in line with market demands, supporting manufacturers in achieving higher efficiency and consistent quality in increasingly demanding production environments. ■



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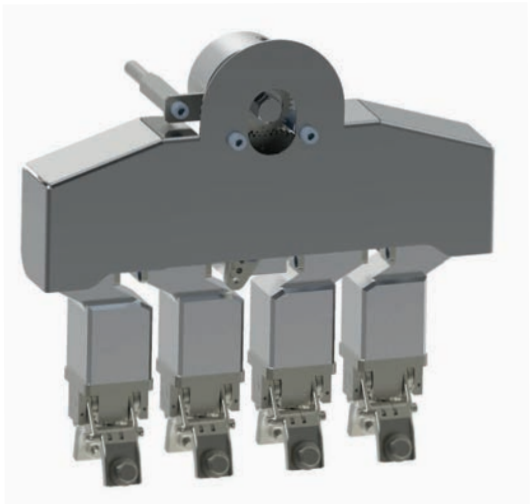
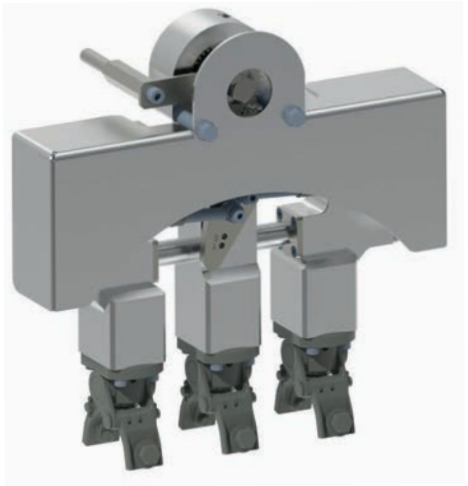
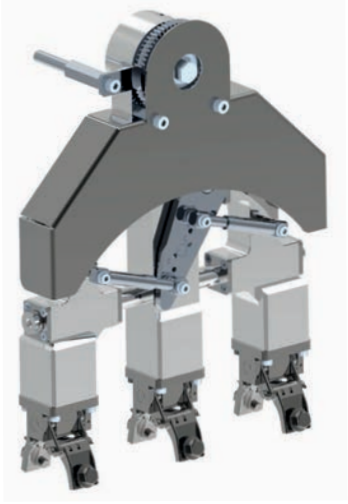


AIS QG 3”



IS TG 85mm



NIS TG 5”

LIGHTWEIGHTING points the way to a leaner, cleaner future

Whether working in collaboration with clients or through internal research and development, more companies are embracing lightweight designs as another part of their strategy to reduce carbon emissions.

As glassmakers continue their efforts toward decarbonisation through hybrid melting solutions, alternative fuels and the use of recycled cullet, glass packaging is seeking further reductions with lightweight products.

The benefits of these lighter designs are three-fold: reduced melting times to lower carbon in their creation, reduced shipping weight to cut down on fuel use and lower carbon during transport, while the lower weight also costs less for the delivery of products from their manufacturers.

Within the wines, beers and spirits markets, glass packaging has seen several new products enter the market recently, each offering a compelling combination of carbon reduction methods.

ARDAGH GLASS PACKAGING EUROPE: BORDEAUX, SCHLEGEL AND MORE

Launching in 2024 with two designs, Ardagh Glass Packaging-Europe introduced the Bordeaux and Schlegel lines. Both reduced the weight of their earlier lines from 410 grams to 360, and both can be made with up to 80 percent glass. This makes for a 12 percent reduction in carbon emissions.

Both Bordeaux and Schlegel 750 millilitre bottles are produced with a screw cap finish (BVS) and the Bordeaux range is also available with a cork mouth finish. Both bottle styles are available in flint, antique green and various standard green colours, with the addition of a royal blue option for the Schlegel range.

The new range is produced at AGP in Germersheim, Germany, adding new lightweight bottles to the standard European range, which already includes a lightweight 345 gram wine bottle produced in the UK.

AGP-Europe has more recently introduced an even lighter bottle designed for material reduction, structural performance and brand presentation. An ideal solution for still wines, the 300 gram, 750 millilitre bottle is made to perform on high-speed filling lines and withstand supply chain handling while delivering a significant reduction in bottle weight.

VERALLIA: BORDELAISE AIR 300G AND BURGUNDY AIR 300G

Launching in 2023, the Bordelaise Air 300G was designed to preserve the aesthetic contours that define the classic Bordelaise bottle while creating one of the lightest bottles on the market. The Bordelaise Air 300G has been produced in Europe from 2023. It is available in the colours antique green, dead leaf and flint, and is distributed in six European countries, along with the Air jars and My Air product line.

Now Verallia is taking on another iconic design with the launch of Burgundy Air 300G. Marketed as "a model of disruptive eco-design," this innovation stems from years of R&D expertise. Weighing just 300 grams compared to the European average of 450 grams (According to figures released by FEVE for the year 2023) with a 750 millilitre capacity, the Burgundy Air 300G reduces raw material use and CO2 emissions by 33 percent. Producing one million bottles saves 66 tonnes of CO2 (scopes 1 and 2), 279 MWh of energy, and 76 cubic metres of water. Depending on the glass colour, it can contain up to 86 percent recycled glass. The Bordelaise is available in colours antique green, green and flint.

The Verallia Air range is aligned with the Group's Net Zero 2040 roadmap

to reduce CO2 emissions (scopes 1 and 2) by 90 percent and offset the remaining 10 percent by 2040, compared with 2019 levels.

VIDRALA: CAVA LITE, AND A 260 GRAM BOTTLE

While 300 gram bottles are meant for still wines, sparkling wines require stronger and heavier bottles to prevent their breaking in shipping and storage. Yet even within this market, there is room for reductions. As an example, Vidrala collaborated with Jaume Serra, a Spanish wine maker owned by García Carrión Group. The result is Cava Lite, a 750 gram bottle that reduces emissions by 6.25 percent per bottle compared to the previous 800 gram model. Vidrala claims that for every million bottles produced, the carbon emissions will be reduced by more than 15 tonnes.

The launch of this bottle marks another step for Vidrala toward more lightweight options, and follows the

launches of BD Nova Lite in 2024 and BD Viva Lite in 2025. The Nova Lite weighs 360 grams, while the Viva Lite slims down further to 300 grams.

Perhaps the most intriguing of these upcoming options is a yet unnamed 260 gram bottle, first revealed at the Portuguese pavilion of Osaka Expo 2025. It's wider body is meant for a range of products, including spirits and oils as well as wines. Developed in collaboration with LiDA (Laboratory in Design and Arts at the Polytechnic of Leiria), it was designed with ultra-thin walls made with up to 80 percent recycled glass.

ŞIŞECAM: THE WORLD'S LIGHTEST WHISKY BOTTLE

Working in collaboration with spirit producer Diageo, Şişecam developed a bottle for a limited edition whisky, Johnnie Walker Blue Label Ultra. The finished product is formed using glass blowing techniques to create a teardrop shape before the sides are pressed in to form a vaguely square shape. It's a remarkable technical feat resulting in a greatly reduced weight of 180 grams, making it the world's lightest whisky bottle. But that may not be for long, because Diageo has made the decision to open source the design, an invitation for other spirit makers to embrace the ultra-light package.

Given its round bottom shape, the bottle is housed in a bamboo frame, which acts both to display the package as a work of art and to pour the rarified spirit contained within. The bamboo frame is housed in a special open walled box meant to protect the contents while capturing consumer interest. It makes a compelling point that lightweight doesn't have to mean the loss of bespoke designs for premium products.

VETROPACK: REZON

While most of the solutions offered for the wine market have utilized lighter designs and higher recycled cullet content, Vetropack's Rezon beer bottle aims to slash an even

higher amount of carbon by making their product reusable. Weighing around 30 percent lighter than traditional reusable packaging, these bottles are thermally strengthened to serve 20 percent more reuse cycles, leading to an extraordinary 75 percent in CO2 reduction.

Rezon bottles were first successfully tested on the market as part of a pilot project in Vorarlberg, Austria. Other users soon followed: a standard solution for the Austrian brewing industry was developed in collaboration with Brau Union, which has since made a significant contribution to achieving the Austrian reusable quota. Beverage brand Gösser was followed most recently by the Ried brewery, which is now switching its entire range to reusable bottles with the help of Vetropack's lightweight solution. The bottles are currently produced exclusively at Pöchlarn, Austria, which is being outfitted with an industrial-scale machine with significantly higher output in the second quarter of 2026.

LOOKING AHEAD

These are only a few examples of the continual research and collaboration leading to lighter glass packaging that doesn't compromise on product and consumer safety. As more lightweight options enter the market, they offer both tangible incentives and a gentle prod to competitors to join in on a trend that benefits them, their clients, and consumers.

Each new product offered in a lighter package is also a step closer to carbon neutrality when combined with new melting options and enhanced recycling practices, helping all of us, and the planet as well.

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OCMI OTG

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Fives
Glass Service
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Horn
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Horn
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Falorni Tech
Fives
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Famor Engineering
Graphoidal Developments
Heye International
Luben Glass
Olivotto Glass Technologies
Rondot Group
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SHUTTLE CARS

Tecnoferrari

STRETCH & SHRINK FILM WRAP MACHINES

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OMS
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SHRINK OVENS

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Tecnoferrari
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Vertech'
Vetromeccanica
Video Systems
Waltec Maschinen

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Olivotto Glass Technologies
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Fives
Luben Glass
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Olivotto Glass Technologies
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BDF Industries
Falorni Tech
EME
Glass Service
HFT
Horn
Olivotto Glass Technologies
Rondot Group
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Lahti Glass Technology
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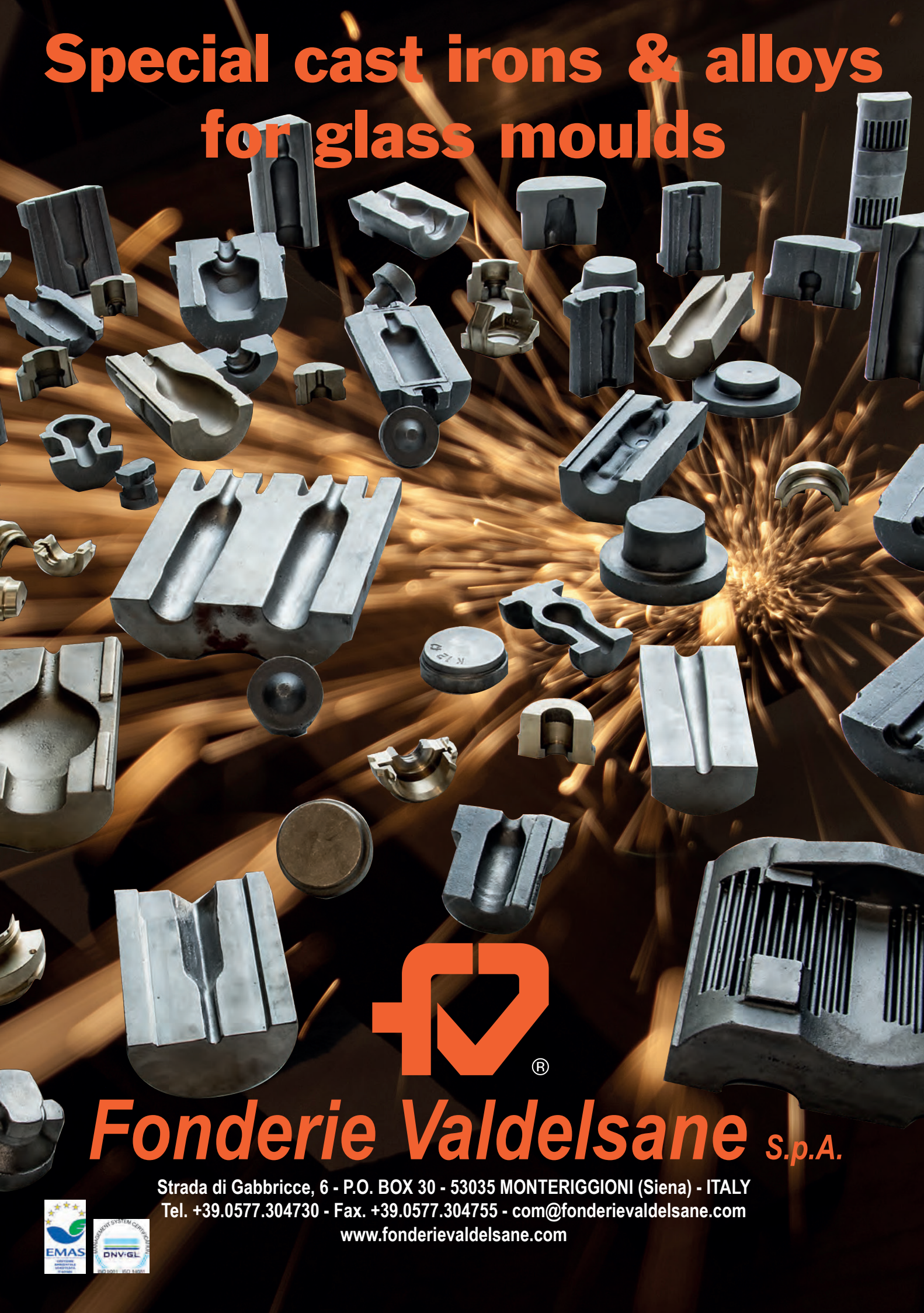

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