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PENNEKAMP

glass WORLDWIDE

September/
October 2020

Exclusive interviews: Fuyao, Gerresheimer, Vitro & Wiegand Glas + technology & market reports. Latest news & Virtual Marketplace: glassworldwide.co.uk

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Welcome

Welcome to your latest issue of *Glass Worldwide,* covering the diverse interests of the flat, hollow and specialist glass manufacturing and processing sectors around the globe. This was originally scheduled to be our glasstec 2020 exhibition edition but the ongoing Covid-19 pandemic means that sadly, we are unable to catch up with our readers, advertisers and colleagues in person at this October's event, which has been rescheduled for 15-18 June 2021. Instead, like many others in our business and private lives, much of what we have taken for granted for so long – the ability to learn and communicate – must be conducted remotely, with the assistance of multi-media tools.

This year's Conference on Glass Problems, for example, goes ahead on 26-30 October but as a virtual series of conference sessions, short courses, symposium and associated exhibition. Sadly, many other glass industry events originally scheduled to take place in 2020 have either been postponed or cancelled altogether.

Throughout these challenging times, the *Glass Worldwide* team continues to strive for the identification and publication of editorial information that delivers maximum value for readers and advertisers. We are grateful for the industry's continued support to deliver this service, which also includes the latest Hot Topics industry news and a specialist Suppliers in the News section at www.glassworldwide.co.uk, together with an events calendar and digital archive. Readers will also discover a regularly updated on-line Virtual Marketplace, showcasing the latest technologies available from the international glass industry's suppliers.

As well as providing extensive industry news coverage, the latest issue of *Glass Worldwide* includes a series of exclusive interviews with senior industry personalities. Oliver Wiegand, for example, discusses the recent commissioning of a greenfield glass container production facility in Germany by Wiegand-Glas, while Roberto Cabrera, Vice President of Glass Technology at Vitro Architectural Glass, reviews the organisation's strengths and its ability to solve complex problems together with customers, advancing the role of flat glass production technology.

Andreas Kohl, Senior Vice President Operations, Technics and Quality Moulded Glass, outlines some of the key priorities for the international Gerresheimer Group and Jeff Daochuan Liu, CEO and President at Fuyao Group North America, highlights the company's recent restructuring initiative, as well as the business impact of Covid-19.

Pascale Perez Castellano, Corporate Secretary of Heineken France, discusses the goals of the Verre 100% Solutions charter, while Bertrand Cazes, Secretary General at Glass for Europe, assesses market conditions and future prospects for flat glass in Europe.

Readers will discover an extensive selection of contributed Technology articles from many of the international glass industry's leading suppliers, plus a series of specially written Supplier Focus reports.

We hope you enjoy this latest issue and recommend you also visit www.glassworldwide.co.uk regularly for the latest industry news and the Virtual Marketplace. These are challenging times for everyone but hopefully, our glass industry coverage can help you to keep abreast of what's happening throughout the international glass community.

John Wallis, Editorial Consultant
johnwallis@glassworldwide.co.uk

Contents

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22 Hartfield Rd, Forest Row,
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JOHN WALLIS
Editorial Consultant
Email: johnwallis@glassworldwide.co.uk

ALISON SMITH
Designer for Blue Daze Design Ltd
Email: copy@glassworldwide.co.uk

GRAHAM LOVELL
Senior Sales & Marketing Manager
Tel: +44 (0) 1342 321198
Email: grahamlovell@glassworldwide.co.uk

FRAZER CAMPBELL
Publisher
Tel: +44 (0) 1342 322278
Email: frazercampbell@glassworldwide.co.uk

DEBBIE FORDHAM
Publisher
Tel: +44 (0) 1342 322392
Email: debbiefordham@glassworldwide.co.uk

DAVE FORDHAM
Publisher
Tel: +44 (0) 1342 315032
Email: davefordham@glassworldwide.co.uk

SAM DUNMORE
Administration and Subscriptions Manager
Tel: +44 (0) 1342 322133
Email: samdunmore@glassworldwide.co.uk

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News For the latest news, visit the Hot Topics section at www.glassworldwide.co.uk

Sale of Australasian glass packaging interests completed

A deal to acquire O-I's Australian and New Zealand glass container manufacturing business has been completed by Visy. "We are delighted to be welcoming the O-I Australian and New Zealand teams into the Visy family and we look forward to working with our new team members to integrate a new packaging format and build a bright future for the company" commented Mark de Wit, Chief Operating Officer.

Visy Industries is one of the world's largest privately-owned packaging and resource recovery companies and the O-I deal is worth almost A$1 billion. It is one of the biggest manufacturing acquisitions by an Australian-owned business in Australian business history.

O-I ANZ is the largest manufacturer of glass containers in Australia and New Zealand, with five manufacturing facilities located in Adelaide, Brisbane, Melbourne, Sydney and Auckland and a recycled glass processing plant in Brisbane. Headquartered in Melbourne, the business generated sales of approximately A$754 million and EBITDA of approximately A$124 million in 2019.

"Manufacturing has never been more important to Australia's future" commented Visy Executive Chairman, Anthony Pratt, who owns the business together with his sisters Heloise Waislitz and Fiona Geminder.

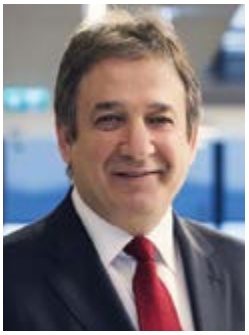
Post-acquisition, Visy will employ 7200 people. "And importantly, we will bring Visy's sustainability culture to O-I, aiming to increase recycled content of glass bottles from one third to two thirds" Mr Pratt confirmed.

"The sale of our ANZ operations is consistent with our strategy to properly align our business with the interests of our global customer base, improve financial flexibility and maximise shareholder value" Andres Lopes, O-I CEO confirmed. "O-I will continue to develop its leading market positions across Europe and the Americas, as well as the company's interests in Asia. The sale of ANZ follows an in-depth strategic review of our global business portfolio and operating structure, which is now substantially complete following this transaction. We received a full and fair price for ANZ and this sale represents a significant milestone in our business transformation as we optimise our structure and prioritise debt reduction" he added.

"We believe Visy is the best fit for our ANZ business, our customers and our employees. Visy is a well-established leader in providing high quality, innovative and closed loop packaging solutions that has operated in Australia for more than 70 years."

www.visy.com ●

Approval to unite operations under a single umbrella



Professor Ahmet Kirman, Sisecam Group Vice Chairman and CEO.

Sisecam Group has received approval from Turkey's Capital Markets Board (CMB) for its plan to simplify its legal entity and shareholding structure. Procedures were announced in April to consolidate the publicly listed main subsidiaries of the group, namely Anadolu Cam, Denizli Cam, Soda Sanayii and Trakya Cam along with Pasabahce Cam, under the umbrella of Sisecam.

Accordingly, a decision on the merger transaction will be made during the Extraordinary General Assembly meetings of Sisecam and its subsidiaries between 26 and 28 August, with the agenda focusing specifically on the merger transaction. Subsequent to the General Assembly meetings, the merger process is expected to be completed during September in line with the provisions of the relevant legislation.

"Driven by our long-term strategies and competitive goals in the global markets, we set out at the beginning of this year to consolidate all our operations under a single company in order to enhance the maturity of our global organisation" explained Professor Ahmet Kirman, Sisecam Group Vice Chairman and CEO. "Uniting all operations under a single umbrella will boost the competitive edge and economic value created by the group. By completing this merger process through the strength derived from our 85 year history, Sisecam will find the opportunity to create synergy in many fields in line with its growth strategy creating sustainable value. As such, we aim to be more agile and swift; build a legal and administrative infrastructure that conforms to global competition; and perform even better for higher share performance to attract investors."

www.sisecam.com ●

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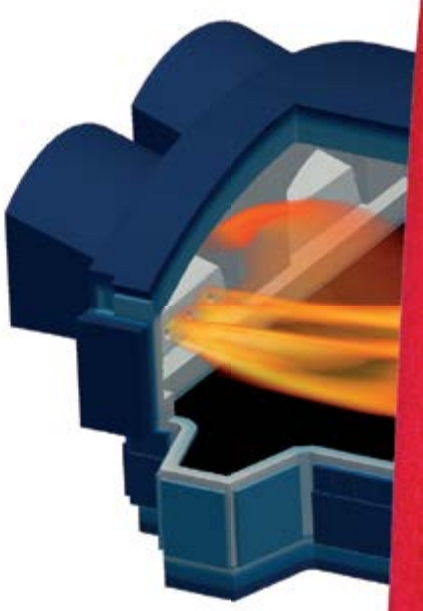

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Advanced coater commissioned in Poland

Guardian Glass recently started full production on an advanced glass coater in Czestochowa, Poland. The state-of-the-art installation will enable the plant to expand production of low-E solar control glass products for residential and commercial applications.

"Architects and builders are increasing their use of energy-efficient products to improve the building envelope and we are committed to supporting our customers by providing them with leading, value-added glass products and solutions" commented Guus Boekhoudt, Guardian Glass Executive Vice President. "This development provides them with an important capability in the region."

Guardian's second float and coated glass manufacturing plant in Poland, being built adjacent to its existing Czestochowa plant, will allow Guardian Glass to meet growing demand for high performance coated and fabricated glass products in Eastern Europe. Czestochowa's original float line recently went through a cold tank repair, increasing its production capacity by around 25%. With both furnaces, the glassmaker is tripling production in Poland, demonstrating its commitment to the continuous improvement of glass products and services for European customers.

Furthermore, Guardian Europe Sàrl recently added two product solutions to its portfolio through strategic partnerships with other industry leaders. These include a building integrated photovoltaic product with ML Systen SA, a leader in this area for 13 years and a strategic partnership with Merck, a leading science and technology company, with whom eyrise dynamic liquid crystal windows are now offered with Guardian Glass coatings.

Guardian Glass advanced glass coater installation in Poland.

"The fact that we were able to execute the completion of the coater in Czestochowa plant safely and soon shall start the new float line there, during Covid-19, is truly an achievement in and of itself" Guus Boekhoudt adds. "The safety and wellbeing of our employees remains our number one priority, as we continue with our vision to create value for our company, customers and society."

The second float line at Czestochowa is expected to start operations in September 2020.

www.guardianglass.com ●

Cosmetics glass furnace commissioned for Indian specialist

Inside the rebuilt 145 tonnes/day furnace at Piramal Glass.

Piramal Glass recently commissioned a redesigned melting furnace for the production of premium cosmetics and perfumery bottles. Based on an existing 100 tonnes/day installation, the end-fired furnace has been reconfigured by HORN Glass Industries with a melting area of 82.8m^2 to produce 145 tonnes/day.

The contract comprised design drawings and equipment (combustion, boosting and reversing systems) for the furnace and eight forehearths. Advanced technology has been adopted to save energy, reduce emission values and extend furnace life.

HORN was responsible for the supervision of all furnace repair work. Because of the ongoing Covid-19 pandemic, however, Piramal took on the supervision and commissioning role, with remote assistance provided by HORN experts in Germany. The furnace was successfully commissioned this June.

www.hornglass.com ●

Calibration laboratory celebrates 50th anniversary

AMETEK Land is celebrating the 50th anniversary of its UKAS-accredited infrared temperature calibration laboratory in the UK. In 1970, the laboratory in Sheffield was the first in the country to be accredited by the then British Calibration Service (BCS), now the United Kingdom Accreditation Service (UKAS), for the issue of calibration certificates for non-contact thermometry.

To date, the laboratory has issued over 22,000 certificates to customers around the world, including industry and research establishments, Formula 1 race teams, other calibration facilities and national laboratories. The laboratory calibrates in accordance with ISO/IEC 17025:2017 (general requirements for the competence of testing and calibration laboratories) and offers a comprehensive service for the certification of infrared thermometers, thermal imagers, scanners and blackbody sources across the range from -10°C to 2500°C.

AMETEK Land's UKAS-accredited infrared temperature calibration laboratory.

Over the past five decades, AMETEK Land has gained vast experience in tackling the non-contact temperature measurement challenges of industry and continues to evolve its service offerings to ensure the delivery of highly accurate solutions that precisely meet customer needs. Additional support services are offered to ensure users are maintaining the accuracy of their temperature measurements, including determining the best method of obtaining traceability for temperature measuring instrumentation; having an independent engineer carry out regular on-site services/checks or returning instruments for certification; ascertaining the emissivity of a material; providing a re-certification reminder service; and offering AMECare service contracts to ensure instruments are professionally maintained and calibrated to operate at peak factory performance levels throughout their lifetime.

www.ametek-land.com ●

Straddle carrier solution

Companies involved in processing flat glass often need to unload containers of glass from delivery vehicles and to place them inside a facility for unpacking. These containers are often loaded over-height (OOG).

A fast turnaround of the delivery truck is required to avoid demurrage costs. Conventional container handlers are unsuitable for this operation, as top lifting is not possible. This equipment is also expensive and has extremely high axle loads that result in yard damage. It also cannot bring a container inside.

The Mobicon straddle carrier connects to a container with rigid arms and twist-lock pins via the bottom corner castings, avoiding wire ropes or chains that allow the container to swing. All operations are performed from the cabin, safely and efficiently.

A Mobicon is very light and has four axles, resulting in low axle loading, making it suitable to drive on light pavements. It can also travel through small doorways, as little as 5m x 4m. It provides significant capex and opex savings compared to conventional container handlers and is used by such flat glass companies as Oceania Glass (Viridian) and Solos Glass.

www.mobiconsystems.com ●

Mobicon straddle carrier.

Ethiopian container plant cold end installation

MSK has delivered a complete cold end installation for the greenfield Juniper Glass project in Debre Birhan, Ethiopia. Juniper Glass is a subsidiary of Consol Glass Africa, the leading glass packaging manufacturer in Sub-Saharan Africa, with operations in South Africa, Kenya and Nigeria.

Germany's MSK installed two bottle conveying lines from the lehrs to the palletising stations, two Semitech fully automated palletising systems, a shuttle car system for mobile pallet conveying, as well as a fully automated Multitech pallet shrink packaging line.

All modules at the Juniper Glass plant are co-ordinated with each other, as the complete system is controlled uniformly by MSK EMSY 6.0 visualisation software.

Earlier this year, a follow-up order was placed with MSK for a decorating line including bottle conveying system, fully automatic depalletising system and pallet conveying technology.

www.mskcovertech.com ●

Silicones enhance aesthetics and performance

In response to recent design trends and to help meet industry requirements for improved energy efficiency and aesthetics of modern architectural glass, Dow has developed advanced, crystal clear silicone bonding technologies that can structurally bond glass and metal elements without penetrating their surface, hence preserving energy while enabling glass aesthetics.

Suitable for frameless glazing as well as glass walls, interior decorative applications, glass lamination and general glass bonding and assembly, the strength, durability and high transparency of these innovative silicone materials offer the potential for different design perspectives and increased natural daylight opening for the interior and exterior elements of building projects.

www.dow.com ●

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Supporting pharmaceutical glassmakers to maximise productivity

The race is on around the world to produce adequate quantities of glass vials for a potential coronavirus vaccine, making high quality packaging available as soon as the vaccine has been perfected. To accommodate the vast levels of demand involved, it is anticipated that global production of pharmaceutical vials needs to be ramped up by 5-10% within two years.

IRIS Inspection machines is supporting pharmaceutical glassmakers in their drive for additional productivity, working closely with such customers as Bormioli Pharma, Gerresheimer Group and SGD Pharma at their various manufacturing location throughout Europe, the Americas, India and China. Few industrial sectors have such stringent quality requirements as the pharmaceutical industry and to meet these exacting specifications, companies are increasingly utilising intelligent inspection solutions.

Image courtesy of SGD Pharma.

The specialist inspection technologies developed in France by IRIS Inspection machines provide essential solutions for the identification of dimensional, finish and low contrast surface defects. These technologies have been perfected in close consultation with the world's leading pharmaceutical glassware manufacturers.

Evolution DIM NEO non-contact inspection equipment is designed to perform a series of critical dimensional inspection tasks, for example, measuring height, minimum and maximum diameter, roundness and barrelling. Among the defects identified are tiny body deformations, non-round sidewalls, diameter deformations and other minor geometric defects in the body, bulged or sunken sidewalls, as well as ware with an out-of-specification height.

Improved verticality inspection is provided with 3D, the Evolution DIM machine calculating the verticality of each container to measure the body or finish shifting via precise, 360° verticality detection. Verticality defects detected with this solution include lean articles, offset finish and bent neck.

A dedicated module provides a series of accurate finish measurements, identifying minimum and maximum external finish diameter, finish height and flatness, plus the height of the finish ring. The deformation defects encountered include bulged finishes and unfilled ware.

The Evolution DIM NEO equipment features a compact design, with up to three body cameras, up to two finish cameras and a dedicated light source. Also available from IRIS Inspection machines is the Evolution 5 NEO finish inspection module. This solution has been developed to identify such sealing surface defects as a chipped finish, LOF or an unfilled finish.

Another of the company's developments is the EVO Ultimate NEO machine for the identification of transparent surface defects, including surface blisters and small laps.

Governments and drug companies worldwide are placing huge orders worth hundreds of millions of dollars and encouraging the makers of glass vials and syringes to add manufacturing capacity. Although this initiative requires immediate preparation, the glass industry is confident that it is a surmountable challenge. IRIS Inspection machines and its innovative ware inspection technologies are available to support the world's specialist pharmaceutical glassmakers to meet these challenges.

www.iris-im.com ●

Agent for Russia and CIS countries

Orientis Technology, based in Sosnovy Bor, Leningrad Oblast, Russia, has been appointed Electroglass agent for Russia and the CIS countries. With an established position as a supplier to the region's glass industry, Orientis Technology will bring valuable local support to existing and new Electroglass customers in the region.

UK-based Electroglass specialises in the development, design and manufacture of electric glass melting systems and equipment. Orientis Technology joins an expanding network of agents and distributors providing service to international customers, from the Americas to Asia.

www.electroglass.co.uk ●

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Plunger inspection

Penico Gauges has completed its development of gauges to help in the inspection of plungers used in the moulding process for glass containers.

The UK company now offers two gauges that are of benefit to mould shops. Both are fully adjustable. The plunger diameter gauge has an interchangeable diameter feature for different plungers and height blocks for setting the varying heights that occur on the gauging point of plungers. Separately, Penico's plunger straightness gauge is also fully adjustable to accommodate the many different types of plunger.

www.penico.com ●

Plunger height gauge.

Plunger straightness gauge.

Moldovan container plants acquired

Via its recent acquisition of the Moldovan glassworks in Chișinău, the Vetropack Group is continuing its expansion strategy in Central and Eastern Europe. The acquisition involves two separate operational units, Glass Container Company and Glass Container Prim.

The glassworks in Chișinău produces approximately 100,000 tonnes of glass packaging annually for the food and beverage industry, which is sold both domestically and in export markets. The factory currently employs some 450 people and generated a turnover of approximately €40 million in 2019.

"With this acquisition, we continue to expand in a region with which we are very familiar – a region where we have almost three decades of glass making experience" commented Johann Reiter, CEO of the Vetropack Group.

www.vetropack.com ●

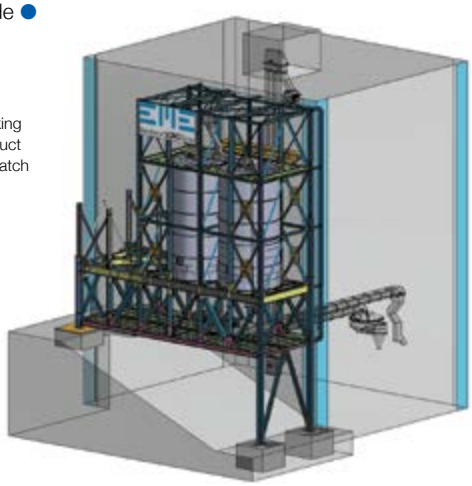
Johann Reiter, CEO of the Vetropack Group.

Batch plant modernisation projects in Germany

To produce sustainable cosmetic glass packaging at its Tettau production site in Germany, Gerresheimer is working with EME to provide the concept and equipment to reconstruct the factory's batch plant. This turnkey project involves rebuilding the batch plant and increasing capacity of the associated recycling equipment.

Last year, EME upgraded Gerresheimer's batch plant in Essen and is currently modernising the batch plant and cullet return system at the glassmaker's Lohr factory, also in Germany.

www.eme.de ●



Gerresheimer is working with EME to reconstruct the Tettau factory's batch plant.

Latest factory expansion completed

Vidromecanica, Portugal, has recently completed the expansion of its premises, the company's third significant expansion in recent years, providing additional space for the design and manufacture of equipment for the glass container and tableware sectors. Based in the glassmaking hub of Marinha Grande, Vidromecanica employs approximately 60 production staff.

Founded in 1984 by Antonio Barreto, Vidromecanica remains a family-run business, involving two generations. This experience, combined with all machinery manufactured in-house by specialists and worldwide partnerships amounts to important and competitive advantages, which Vidromecanica exploits to the full when supplying its clients with equipment.

With its manufacturing technology and high-tech machinery, Vidromecanica develops glass machinery solutions for many glass industry equipment applications. Systems are used worldwide in the container, tableware and technical glass sectors.

Today, the company serves customers throughout the world, to more than 60 countries and provides a wide range of thermal equipment, such as annealing, decorating and toughening, hot and cold end coating and cullet treatment equipment.

www.vidromecanica.pt ●

Vidromecanica has completed three significant factory expansions in recent years.

Third melting furnace project for Italian glassmaker

SORG has been commissioned to design a third furnace for Vetri Speciali in Italy. This follows the successful completion of a project to rebuild a furnace at the glassmaker's Ormelle plant to produce high quality flint bottles, followed by a second project at the San Vito plant in 2019.

To address issues with defective bottles during these investment initiatives, it was necessary to reduce stones and inclusions in the glass. By redesigning the melting furnace with state-of-the-art equipment, the SORG design allowed the glass more residence time in the hot zones of the tank and as a result, inclusions were significantly reduced. The conditioning quality of the glass was improved as well, while lower NO_x emissions and energy consumption were achieved.

www.sorg.de ●

SORG installation at Vetri Speciali in Italy.

Hydrogen industry consortium plans to reduce carbon emissions

Independent Dutch expert in risk management and quality assurance, DNV GL has launched an international industry consortium in collaboration with CelSian Glass & Solar to develop the technology required for a gradual transition from natural gas to hydrogen as a fuel in energy-intensive industrial production processes, such as glassmaking. The programme provides an important building block for the successful rollout of the sustainable hydrogen value chain.

"Existing burner and burner control technology to decarbonise industrial production processes are not yet market-ready, despite great interest and the advantages of hydrogen as a low carbon fuel in high temperature industries" commented Sander Gersen, project leader, DNV GL – Oil & Ga. "Our programme aims to have new burner concepts available within two years."

The programme is a collaboration in the introduction of hydrogen as a fuel for industrial use, aiming to contribute fundamental improvements to existing industrial heating processes to make the gradual transition from natural gas to hydrogen fast and cost-efficiently.

The industry consortium comprises more than 30 private and public partners throughout the hydrogen value chain, including industrial end users, technology suppliers, fuel suppliers and traders, gas transport companies, knowledge institutes and the Dutch government.

www.dnvgl.com ●

High temperature glass production with natural gas.

Detection of wire edge and overpress defects for Carib Glassworks

Having introduced narrow neck press-and-blow production expertise to its manufacturing capabilities in 2019, the Caribbean's leading glass container producer encountered wire edge and overpress defects for the first time. IRIS Inspection machines has worked closely with Carib Glassworks to provide a solution, assisting the customer to take advantage of the increased productivity benefits provided by NNPB technology.

Overpress defects occur when excess glass projects upwards from the inside edge of the finish, often protruding above the sealing surface. They are critical defects in all types of finish and alongside wire edge, they are process-related. The root causes of both defects are the same, resulting from excessive gob weight, incorrect plunger mechanism adjustment or synchronisation and dirt/glass particles disturbing the plunger stroke.

Carib Glassworks is located in Port of Spain, Trinidad, producing both standard and custom-made containers in flint, green and amber for customers in the soft drinks, beer, food, alcohol and juice sectors. Four years ago, the glassworks doubled production capacity to 70,000 tonnes/year via the commissioning of a second melting furnace and three production lines. And in 2019, NNPB technology was introduced. This followed the acquisition of a new IS machine and has allowed productivity to be increased by reducing bottle weights.

Carib Glassworks started working with IRIS Inspection machines in 2015, equipping five production lines with Evolution camera-based, non-contact inspection machines. Having encountered wire edge and overpress defects last year, the glassmaker worked closely with IRIS engineers to identify an inspection solution. Over a period of six months, extensive tests were conducted with the wire edge module from IRIS on two production lines. This dedicated module uses a discriminatory approach, identifying in a binary way an acceptable bottle from even a small wire edge, without compromise. The module is easy to set up and reaches an optimal set up with less compromise and in much quicker time.

In association with several of the glasssmaker's customers, the equipment has been fully validated on many products for a variety of global brands, including Heineken, Desperados, Budweiser, Coca-Cola, Fanta, Sprite, Pepsi, Bec's, Corona and Leffe. Irrespective of glass colour, the wire edge solution delivers the same inspection results on green, amber or challenging flint.

Carib Glassworks has been impressed with the results achieved, so much so that at the beginning of 2020, the press-and-blow lines at the site were equipped with the dedicated wire edge module.

www.iris-im.com

Carib Glassworks hsd been working with IRIS Inspection machines since 2015.

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Richard Katz.

High calibre expertise drives future development

Glass Futures, in the process of building a proposed global centre of glass excellence in R&D, training and innovation in the UK, has announced a series of changes to its board of directors.

With the board comprising eight representatives from the global glass industry, supply chain and academia, Richard Katz, CEO of Glass Futures, commented: "We are delighted to welcome a board of such high calibre experts from various fields who are all passionate about the future of glass. In partnership with a number of leading organisations from around the world, the board will be instrumental in the achievement of our goals and will co-operate closely with the existing advisory committee and our expanding team of full time staff."

The board of directors comprises: Brian McMillan, Chairman Glass Futures (retired Technical Director, Allied Glass); Professor Peter Jimack, Head of Engineering, University of Leeds; Adrian Curry, Managing Director, Encirc Glass; Ludovic Valette, Vice President – Global Technology, O-I; Sheldon Davis, Vice President, Research and Development, Guardian Glass; Yan Cui, Finance Manager, Siemens Digital Industries; Kevin Coles, Finance Manager, British Glass Manufacturers' Confederation; and Richard Katz, Chief Executive, Glass Futures.

At the time of going to press, the *St Helens Star* local newspaper is reporting that Glass Futures has been approved to receive £9 million of funding as part of the Liverpool City Region's £1.4 billion 'Building Back Better' economic recovery plan. If delivered, the £54 million project will have the first and only experimental furnace of its kind in the world with provision for research and development trials to decarbonise the UK glass industry.

www.glass-futures.org ●

Product policy focus


Vanessa Chesnot.

Vanessa Chesnot has joined FEVE – The European Container Glass Federation – as Product Policy Manager. She will cover market access and product stewardship legislation to bring more and more glass products to the market that are safe, resource efficient, sustainable and demanded by customers and consumers. She will also co-ordinate 'Close the Glass Loop', the public-private multi-stakeholder partnership to federate stakeholders of the glass bottle to bottle value chain around a common objective of achieving an EU-wide target of 90% glass collection for recycling by 2030.

Formerly the Head of the Energy & Environment Practice at Grayling Brussels, Ms Chesnot counseled clients in the transport, environment, energy and food industries. She also worked at the Representation of PSA Peugeot Citroën to the EU, handling environment, transport, consumer and competitiveness issues.

www.feve.org ●

Leadership changes at flat glass multi-national


Ron Vaupel.


Rick Zoulek.


Guus Boekhoudt.

Ron Vaupel, President and CEO of Guardian Industries, has assumed leadership of the company's glass business following the departure of Kevin Baird, formerly President and CEO of Guardian Glass.

In further changes at the senior leadership level, Rick Zoulek and Guus Boekhoudt have each been named Executive Vice President for Guardian Glass. Rick Zoulek oversees the company's operations in North, Central and South America, while Guus Boekhoudt will now add Guardian Glass operations in India, the Middle East and Africa to his previous responsibilities in Europe and Asia.

These changes will increase the momentum of the company's continuing operational transformation to ensure that Guardian Glass remains the preferred global supplier of architectural glass solutions. "In this rapidly changing business environment, it is imperative that we understand the complex requirements of our customers and continue to provide the products and services that they value" Ron Vaupel commented.

www.guardianglass.com ●

Italian machinery association leadership team completed


Nicola Lattuada.


Nancy Mammaro.

The Gimav Board of Directors has finalised the team that will lead the Italian association for the next two years, confirming Nicola Lattuada, Partner and Sales Manager at Adelio Lattuada srl and Nancy Mammaro, owner of Mappi International srl as Gimav Vice Presidents.

Confirmed as Treasurer is Cinzia Schiatti, Sales Manager at Officina Meccanica Schiatti Angelo srl.

www.gimav.it ●

Quality assurance management expertise


Martin Küstner.


Davide Bartoli.

Agr International has announced the appointment of Martin Küstner and Davide Bartoli to strategic international positions within the organisation. These appointments are a continuation of the company's ongoing plans to strengthen and expand its sales and service organisations, in order to better support the needs of customers throughout the world.

A 20 year veteran at Agr International, Martin Küstner is named International Sales ▸

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Director, overseeing all worldwide sales-related activities, with the exception of the USA and Canada. Mr Küstner previously headed Agr's Asian operations, where he was instrumental in establishing a sales and service centre in Bangkok, Thailand. He was also responsible for developing a regional sales network throughout Asia that has consistently contributed to business growth.

Davide Bartoli, another 20 year veteran at Agr, takes on the position of International Service Director, overseeing all service and repair-related activities outside the USA and Canada. Mr Bartoli has served Agr in a number of roles including regional European Service Manager, Sales Engineer and most recently, Director of Training. In his latest role, Mr Bartoli applied his thorough knowledge of Agr equipment and implemented programmes to train both Agr employees and customers in the support and operation of Agr equipment. His knowledge and experience of technology to facilitate remote and virtual field support will prove invaluable in this latest role, especially when faced with limitations on travel and face-to-face meetings due to Covid-19.

www.agrintl.com

Flat glass processing equipment leadership


Stefania Stucchi.

Bavelloni SpA, leading Italian manufacturer of glass processing machinery and tools, has announced Stefania Stucchi as Sales Area Manager for Italy and Italian Switzerland.

Ms Stucchi has extensive knowhow in flat glass processing technologies thanks to her previous experience as Sales Manager within Elettroflex. Her primary responsibilities will include selling Bavelloni glass processing equipment, providing commercial support to customers, co-ordinating the domestic sales network and seeking potential growth opportunities within the area assigned.

www.bavelloni.com


Ivan McNeill.


Chris Houghton.


Dennis Langfield.

Extensive plunger manufacturing knowhow

Hunprenco Precision Engineers Ltd has appointed Ivan McNeill as Managing Director. Mr McNeill has worked for the company for 17 years, joining initially as Maintenance Engineer and applying his knowledge and experience gained within other industries (precision engineering, industrial gases/cryogenics South Africa, plastics, rubber and chemicals). This, coupled with his dedication, hard work and willingness to learn has enabled Mr McNeill to advance to his current position.

He will be assisted by Chris Houghton and Dennis Langfield, who are both named as Directors. They have been with Hunprenco for 13 and 34 years respectively, both calling on extensive knowledge of the glass industry.

www.hunprenco.com

Dual leadership at printing system specialist


Daniel Scheerand.


Stefan Holzer.

Germany's Thieme GmbH & Co KG has strengthened its printing systems division, which is now headed by a dual leadership in order to meet increasing market requirements. Stefan Holzer and Daniel Scheer are jointly heading the division, taking over this role from long-serving divisional head Armin Gerland.

Stefan Holzer has been with the company since 2004, as the design engineer of the M-press digital printing machine, co-developed with Agfa. He project-managed its further development from 2008 to 2013. Subsequently, he was responsible for various projects in the screen and digital printing areas. In his role as printing systems divisional head, Mr Holzer will oversee the areas of construction, control technology and production.

Daniel Scheer joined Thieme in late 2019, having previously held several professional posts, including sales engineer, product manager and sales manager in the printing industry. His work in these roles included coating systems, flexographic and web offset printing presses. As joint Manager of the printing systems division, Mr Scheer is in charge of distribution and service.

www.thieme.eu

Latest batch charger order

After 15 successful EME NEND batch charger installations at Wiegand-Glas locations in Germany (Steinbach am Wald, Ernstthal, Grossbreitenbach and Schleusingen), the glass container producer's Ernstthal plant has again placed trust in the equipment's performance and reliability with another order.

For many years, Wiegand-Glas has been using the complete range of different versions of the EME-NEND charger (and the EME-NEND-S charger) with transport screws. Similarly, the latest generation of the EME-NEND family - the EME-NEND-R with vibratory feeder - has been successfully operated for more than a year at the Grossbreitenbach site.

According to EME, there is no uncontrolled entry of false air into the furnace, together with the benefits of reduced NOx emissions, reduced energy consumption, less heat losses as well as less dust formation based on the sealed doghouse. Thanks to the individual adjustment possibilities of the screws and pusher, both the batch charging pattern and batch distribution in the furnace are perfectly matched and optimised for the melting process.

www.eme.de


Latest EME NEND batch charger for Wiegand-Glas.

Roofing cullet generates energy savings

The Ardagh Group's Dongen glass container production facility in the Netherlands reports a reduction in energy use of approximately 10,000 GJ. The team has installed roofing over part of the green cullet area to limit its exposure to weather conditions such as rain and snow.

The roofing has resulted in energy reductions of approximately 10,000 GJ per year because less energy is needed to heat the cullet, thanks to water previously mixed with the cullet no longer being present. The new roofing also leads to less organic waste in the site's wastewater system.

www.ardaghgroup.com

This year's major investment in Schleusingen provides valuable additional manufacturing capacity for Wiegand-Glas.

Greenfield container project delivers efficiency and ecology gains

According to Oliver Wiegand, the target of commissioning a new glass container production facility in Germany in 2020 was extremely challenging in itself, let alone doing so at the height of the global Covid-19 pandemic. In recent weeks, however, this is precisely the achievement realised by Wiegand-Glas and its contractors in Schleusingen, where phase one of a greenfield project has been successfully brought on stream. Wiegand-Glas owner and Managing Director Oliver Wiegand discusses this ambitious project.

Oliver Wiegand is confident that the opportunity for highly efficient production has been created at Schleusingen, while also significantly improving the plant's ecological footprint.

The Wiegand-Glas Group was already well-placed to play an important role in satisfying Europe's growing demand for glass packaging but the completion of this year's major investment in Schleusingen provides valuable additional manufacturing capacity for the family-owned business to expand further.

European Container Glass Federation (FEVE) statistics confirm constantly increasing consumer demand for glass packaging. In the first half of 2019, for example, 2.2% more glass packaging units were sold than in the previous year. And according to Oliver Wiegand, this growth resulted in supply shortages in some sectors.

"To meet increased customer demand, we decided to build a new glass plant at our Schleusingen location" he explains, emphasising that start-up of the new plant also matches the company's plans ultimately to decommission its existing factory at the site. "The Wiegand-Glas strategy is to adapt quickly to market changes" he explains. "On the one hand, we have accommodated positive demand growth and on the other, we have matched the increased quality requirements of our customers."

The increased demand for glass packaging is due to consumers becoming more concerned about the impact of packaging on the environment and public health. "Glass is one of the few materials that can be recycled an infinite number of times and due to its inertness, it has no interaction with the contents."

While market trends have been highly positive, however, Mr Wiegand also acknowledges that the ongoing Covid-19 pandemic will impact the glass industry as a whole, as well as its customers. "Although we will beat the virus eventually, all of Europe will be poorer after the pandemic and this loss of purchasing power will affect consumption behaviour" he warns. "The likelihood is that while people will continue to drink, there will be a trend towards cheaper brands and as a supplying company, we have to adjust to this change in consumer behaviour." ▸

Diverse capabilities

In total, Wiegand-Glas currently operates four manufacturing sites in Germany and delivers an extremely diverse product range. This includes speciality bottles produced in lots of a few thousand pieces, up to multi-million, mass production via the use of dedicated quad gob IS machines. For short production runs, the company has the flexible capability to produce several jobs on the same line.

The Steinbach am Wald factory was acquired by Otto Wiegand in 1926 and produces 3.1 million glass containers every day. With more than 650 employees, the plant houses four furnaces and nine production lines, as well as a dedicated coating facility for the decoration of glass bottles and a specialist cullet recycling facility.

A second factory is located at nearby Grossbreitenbach and was acquired as a joint venture with Treuhand in 1990. Producing 1.2 million glass containers per day, Grossbreitenbach features two furnaces and five high volume production lines, with a total workforce of 218 people.

Glaswerk Ernstthal GmbH became part of the Wiegand-Glas Group in 2016. Featuring three furnaces, nine production lines and a forehearth colouring capability, the factory produces 1.2 million glass containers every day. Just over 500 people are employed at the site. An extra flint glass composition is melted exclusively at Ernstthal, where the company concentrates on speciality ware in short production runs.

Until this summer's greenfield project was commissioned, the Schleusingen factory was responsible for producing another 1.7 million glass containers per day. The site became part of Wiegand-Glas in 2011, following the acquisition of Thüringer Behälterglas GmbH Schleusingen. With two furnaces and five production lines, the original glassworks employs over 380 people. Together with forehearth colouring, the site features a service centre that can assemble bottles with swing stoppers and jars with caps and has the flexibility to pack containers in boxes or crates. Traditionally, a high proportion of widemouth containers and beer bottles are made at Schleusingen, a feature that will continue at the adjoining greenfield glassworks, while also producing other standard and personalised bottles using the latest forming, inspection and packaging technologies.

Historic site

Daniel Wiegand and Friedrich König built the original glass plant in Schleusingen in 1853. After the Second World War, the owner at that time, Adam Heinz, was expropriated by the Soviet military administration. On 1 July 1948, the plant transferred into public ownership but after German reunification, the Treuhandanstalt Berlin acquired all company shares. The business was sold to a US equity fund, who subsequently sold its shares to a Swiss holding company in 1999.

In 2011, Wiegand-Glas acquired the shares of Thüringer Behälterglas GmbH from the holding company and has consistently upgraded and expanded the plant ever since. As a rebuild of the existing flint glass furnace approached, however, the company opted against using the existing buildings and decided instead to construct a new plant on a greenfield site, adjacent to the old glassworks.

"It was impossible to increase capacity and realise our high technical standard in the existing structures" Oliver Wiegand explains. "Our intention is to replace the old furnaces with those in the new plant."

With civil works having started at the end of August 2018, extensive approval procedures were necessary, the glassmaker being required to comply with a large number of restrictions and requirements in respect of emissions, fire safety and other regulations. On 2 June 2020, the first machine was put into operation. Start-up of a second furnace is planned for 2021, ▸

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prior to decommissioning the old furnace at the original Schleusingen glassworks. The site also has a rail connection, which will be used to ship loaded pallets to customers via a private rail company.

Latest technology focus

Wiegand-Glas consistently adopts the philosophy of investing in the latest and best technology available in the market for its glassmaking facilities. As a consequence, investment costs for the Schleusingen greenfield project were high. In return, superior product quality, high efficiencies and excellent working conditions are expected.

Gradually, the original glass plant will be closed down as elements of the new factory are commissioned. "We are currently considering several ideas for using the old manufacturing site" Oliver Wiegand explains "but no decision has yet been made."

In comparison to the original Schleusingen glassworks, the capacity of the new factory will be larger to meet the increased demand for glass packaging. The new furnaces and production lines give greater production flexibility, enabling Wiegand-Glas to react quickly to changing market conditions. The plant is able to produce blow-blow, narrow-neck-press-and-blow and press-blow containers, while the specially designed batch and cullet house permits the cullet content to be varied from zero to almost 100%.

Understandably, the onset of the global Covid-19 pandemic slowed down construction work at the site. Due to strict quarantine regulations, many workers, especially those from other European countries, were not permitted to travel to Germany. Furthermore, deliveries of components and systems from such countries as Italy and France were delayed due to factory closures in these countries.

During the lockdown, between 200 and 300 workers maximum were able to work on the construction site and strict hygiene guidelines had to be enforced. Fortunately, no Coronavirus infections were identified among construction personnel, helping delays to be minimised to just five weeks.

Plant highlights

For the new glass factory in Schleusingen, ZIPPE Industrieanlagen GmbH delivered the batch and cullet house, including automatic batch transport to the two furnaces, as well as corresponding cullet return systems. In total, the plant contains 23 raw material silos and 15 cullet silos, with an overall storage capacity of 8000m³.

Two completely independent batch and cullet lines guarantee safe material supply to the furnaces. As a special feature, the highest flexibility in the cullet composition has been realised by the application of 15 dosing belt scales. The automatic control of this plant is based on the Siemens PCS-7 system, which is integrated into Wiegand's company network.

The SORG regenerative end port furnace is equipped with a highly efficient regenerator (dimensions and checkerwork) and optimised insulation around the furnace and regenerator for the lowest energy losses possible. The design is optimised for best melting performance and low NO_x, including the latest generation of SORG burners.

Featuring the latest single phase transformers, the furnace is equipped with a generously-sized electric boosting system, featuring three separate zones in the melter, as well as a thermal barrier. Water-cooled fixed transformer units installed close to the furnace allow for minimal energy losses, as well as low investment costs for power cables. To prepare for the transition to carbon-neutral energy supply, preparations have been made to further

Continued on page 32 ▸

The newly completed Schleusingen plant is able to produce blow-blow, narrow-neck-press-and-blow and press-blow containers.

High performance batch plant

ZIPPE Industrieanlagen has executed a major order in recent weeks in Schleusingen for Wiegand-Glas. This turnkey project involves a batch and cullet plant, including batch transport, as well as two cullet return systems.

The 900 tons/day batch and cullet plant has been designed to feed two melting furnaces with a capacity of 450 tons/day each. Sand feed to the silos is executed via a mechanical system, while all other raw material silos are fed pneumatically. All silos are weighed in order to measure the exact raw material stock. Eight container scales and two small component scales are employed for weighing the raw materials.

Three high duty pan mixers are used to mix the batch. Via a redundant batch transport system, the batch is then transported to the corresponding furnace pre-silos. In addition, a complex cullet dosing system is integrated into the batch house. Various types of external cullet can be dosed with the help of 12 belt scales. The addition of in-house cullet is executed via three further belt scales directly inside the furnace building.

Additionally, two cullet return systems have been delivered. Five scraping conveyors, as well as proven ZIPPE crusher technology comes into operation. The cullet generated is transported directly into the cullet silos in the furnace building and is fed into the melting process again.

The contract also included the supply of complete steelwork, including silos, equipment delivery and a control system, as well as such services as installation, cabling, pipework, commissioning and training of customer personnel.

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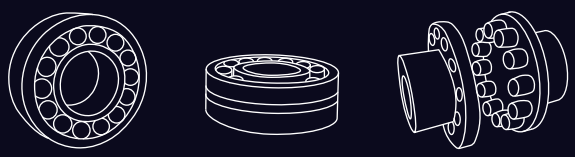

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expand boosting capacity in the future.

The furnace is also equipped with the latest generation EME-NEND-S charging machines and features a completely closed doghouse to avoid false air entry to the furnace and dusting inside the factory.

The SORG glass conditioning system was designed in accordance with the specifications of Wiegand-Glas, where the two outer forehearths are the latest 340S+ type, including an optimised refractory design. The two inner forehearths (SORG STF series) were specially designed to accommodate the widemouth production undertaken on these lines. One is equipped with stirrers and the SORG Conti Drain system for colouring operations. A centralised cooling system for better redundancy and repeatability, less maintenance and lower energy demand is also installed. In addition, Tri-Mer waste gas filters are responsible for reducing emissions to specified values.

Bucher Emhart Glass and Heye International were selected to supply the IS machines for the greenfield Schleusingen project. These machines permit Wiegand-Glas to produce widemouth containers in a double gob configuration, as well as larger quantities in quadruple gob.

The cold end is equipped with the latest inspection technology from Dr Günther and Tiama, while the cold end lines and packaging machines were delivered by Zecchetti. Shrinking machines were sourced from MSK and E&K was responsible for pallet transport from the packaging lines to the warehouse.

Adjacent to the main glass production hall, a new building has been erected to house mould storage, mould repair, IS and cold end workshops, as well as offices, changing rooms and a cafeteria. In order to provide sufficient storage space for the additional capacity, a new warehouse as well as a hall for packaging materials have been built. The transport of packaging material to production, as well as the transport of finished goods to the warehouse, is fully automated via automated guided vehicle systems.

The first IS machine was put into operation at Schleusingen on 2 June 2020.

Optimised ecological footprint

Oliver Wiegand is confident that the opportunity for highly efficient production has been created at Schleusingen, while also significantly improving the plant's ecological footprint. "With regard to quality, we have installed the latest equipment to meet our customers´ requirements, both today and in the future" he explains. "Due to the high degree of automation employed, we aim to be a new benchmark in the deployment of personnel and with the modern waste gas filter technology adopted, we will comply with the latest strict emission regulations."

In addition, the glassworks will recover the maximum energy from furnace waste gases, compressors and lehrs. This energy is used not only to heat offices in winter but also to produce cold water to cool rooms in the production area, control cabinets etc. "We have done our utmost to improve working conditions for our employees."

Wiegand-Glas personnel were responsible for devising what is considered an optimal plant layout for efficient manufacturing and support facilities. In addition, however, specialist consulting firms KKI and CMP provided valuable support for the co-ordination of all contracted companies in the areas of construction site management and project management and utilities respectively.

Oliver Wiegand admits that building a new glass plant in Germany was extremely challenging, taking the company about 18 months to obtain all necessary permissions, for example. Newly created fire protection regulations, work safety and security measures presented significant hurdles, while complying with the limiting values for emissions, noise and water etc is increasingly difficult. "We already know today that we cannot build this furnace in the same way at the end of its campaign" he explains. "The EU Green Deal will not allow for it. These trends are frightening and dangerous because the risk of a higher unemployment rate will increase and it will reduce the wealth of our society."

The Wiegand-Glas owner and Managing Director believes that in the future, energy-intensive industries like the glass industry have to change fundamentally or produce outside the EU. "There are a few good development opportunities to explore like the hybrid melter for example but this alone will be insufficient to comply with EU CO_2 targets" he contends. "I strongly believe in glass because it is a fantastic material with great advantages over other packaging materials" Mr Wiegand concludes. "As an industry, we have to fight together for a great future of glass as a preferred packaging material." ●

While investment costs for the Schleusingen greenfield project were high, superior product quality, high efficiencies and excellent working conditions are expected.

Further information:
Wiegand-Glas Holding GmbH,
Steinbach am Wald, Germany
tel: +49 9263 80-0
web: www.wiegand-glas.de

The Spheres, Amazon's glass-domed headquarters in downtown Seattle was constructed with SOLARBAN and STARPHIRE ULTRA-CLEAR glasses by Vitro Architectural Glass.

Developing the power of partnerships

It was in 2016 that PPG Flat Glass was acquired by Vitro, combining the core values and strengths of two leading North American flat glass manufacturers to create a stronger, single corporation. Roberto Cabrera, Vice President of Technology is responsible for engineering and capital projects for the realigned Vitro architectural glass business. He spoke exclusively to *Glass Worldwide* about his role, as well as the organisation's strengths and its ability to solve complex problems together with customers, advancing the role of flat glass production technology.

"While Vitro and PPG had distinct and complimentary areas of expertise, we held a considerable amount in common, including many of our core values" Roberto Cabrera explains. "Both companies had impressive 100 plus year legacies and we've joined the best of both to create a stronger corporation."

Roberto Cabrera is responsible for engineering and capital projects for the Vitro architectural glass business.

In late 2018, Vitro Architectural Glass went through an extensive rebranding process. "It was more than just a change of colours and an updated logo" the organisation's Vice President of Technology confirms, however. "We realised that our strength lies in the power of partnership and that by working together with our customers to solve complex problems, together is how we can advance what glass can do and be. That's really the essence of what Vitro is all about."

Extensive industry experience

It was 33 years ago that Roberto Cabrera started working for Vitro's automotive glass business in Mexico City. He soon transferred to the float business, however, working in quality assurance, before moving into the technical area as head of R&D, process engineering and part of the glass products development team.

In 1998, Mr Cabrera accepted the position of Corporate Technology Manager, which allowed him to work on several projects across Vitro's container, tableware, glassfibre and flat glass business units. He was named Float Glass Technology Manager in 2009, participating in the acquisition of the PPG flat glass business. Subsequently, he became Technology Director, before becoming Vice President of Technology in 2017.

Today, Roberto Cabrera's main responsibilities are associated with the management of engineering and capital projects for the Vitro architectural glass business. His team is also responsible for process engineering for the company's float and coater lines, as well as its additional processing lines in the USA and Mexican operations.

"I enjoy dealing with new challenges every day, seeking innovative solutions to those challenges and finding ways to implement them" Mr Cabrera confirms. "Starting a project from concept to launch is very satisfying. Building capabilities that help to shape the ▸

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future of the company makes me very proud of the job and proud of the teams that work continually to improve our processes and operations. Working with people from different backgrounds is priceless, lots of learning from all levels in the organisation and amazingly, finding innovation even in the simple jobs."

Commenting on the many day-to-day challenges faced, Mr Cabrera explains that the economics of float glass production force Vitro to identify and develop every possible efficiency edge constantly to achieve better performance from its glass lines. "It takes a mastery of process, equipment and technology, in addition to the training and development of personnel" he says. "In my career, we've recovered float lines from earthquakes, hurricanes and glass leaks. We could not have met these and other challenges without surrounding ourselves with the most capable and knowledgeable suppliers and partners."

Process improvement and cost reduction efforts that help Vitro Architectural Glass to stay competitive are described as key drivers for the team. "We also continually focus on finding opportunities that will allow us to continue to grow."

North American focus

Vitro Architectural Glass is a leader in the North American market (Canada, Mexico and the USA), specialising in products for commercial and residential markets, as well as the automotive industry. Manufacturing facilities are located across the USA, in California, Oregon, Texas and Pennsylvania while in Mexico, Vitro has facilities at Mexicali, Garcia and Mexico City. In both countries, the company produces float and coated glass for the architectural, automotive and specialty sectors, as well as operating fabrication facilities throughout Canada.

In 2016, Vitro announced the first jumbo coater in North America. Started up in July 2018, this line represents what is described as a dramatic leap forward in glass coating technology and expands the company's coating capabilities not only

today but also well into the future.

"We look for the latest and most reliable technologies, as well as those that are cost-effective" says Roberto Cabrera when explaining the main criteria for selecting suppliers to support the glassmaker's investments. "The solutions we choose need to provide value and they need to help us serve our customers with an ample offering of high performance products that meet our customers' expectations."

Energy efficiency gains

In Mexico, Vitro holds 'Clean Industry' certification', while in the USA, the Fresno facility in California has been recognised as an EPA Energy Star-certified facility. It is the first float line in the country to receive this certification.

The glassmaker is highly focused on reducing emissions by using a high percentage of cullet that is recovered, processed, cleaned and used extensively in its furnaces.

Roberto Cabrera is a firm supporter of the annual Conference on Glass Problems which this year will be held as a virtual event on 26-30 October 2020. The 82nd Conference on Glass Problems will return to Columbus, Ohio, USA on 1-4 November 2021.

Furthermore, Vitro is the only company to operate three oxy-fuel float furnaces in the USA, developed using its own technology.

In addition, the development and commercialisation of highly efficient coated products for different regions puts Vitro at the cutting edge of energy efficiency solutions for both commercial and residential buildings and vehicles.

Furnace design priorities

According to Roberto Cabrera, the ability to learn from past experiences and address issues found in furnaces are the elements that help Vitro to enhance its furnace design capabilities. "We always look for the next generation of furnaces that deliver better performance and last longer. We also always strive to execute best practices in hot repair and maintenance initiatives."

To keep track of technology and materials developments that could lead to further advances in melting furnace design, the glassmaker participates in both leadership and contributory roles in a series of different industry technical organisations. This includes participation in the Glass Manufacturing Industry Council, the GlassTrend consortium, the International Commission on Glass and the American Ceramic Society, as well as the National Glass Association, the National Fenestration Rating Council and the Fenestration and Glazing Industry Forum (AAMA and IGMA).

"The glass industry is very competitive, so we are continually looking for ways to increase furnace performance… glass melting is a key factor" Mr Cabrera confirms. "The volatility of fuel sources created the need to develop new technologies to reduce emissions, together ▸

with speeding up melting. Demand for cleaner sources of energy is helping to drive alternative ways to melt glass, so we are always searching for solutions that will allow us to be more cost-effective and more environmentally sustainable."

Vitro is always looking for long lasting furnaces and high quality products that allow the company to have highly efficient operations. "Developing novel techniques to maintain the furnaces in a healthy state, while reducing the impact of defects from refractory materials has allow us to maintain within best performances."

Fostering industry relationships

Together with his Vitro colleagues, Mr Cabrera is a member of the Glass Manufacturing Industry Council Board of Trustees, an active participant in GMIC committees and a supporter of the annual Conference on Glass Problems. "The GMIC helps to promote, maintain and enhance the glass industry and provide support on key topics such as energy, sustainability, AI, safety practices and technology" he says. "An important role is to facilitate open conversation among technical members of the glass industry from the different sectors. Constant communication with other associations in the industry helps to create the roadmap for the future."

A past speaker at the Conference on Glass Problems, Roberto Cabrera is a firm supporter of the annual event. "This is the meeting point for technology providers and suppliers in the glass industry. Networking is a key element and there are always many follow up meetings to discuss various projects."

Future evolution

Vitro Architectural Glass is open to continue licensing its float and coating technologies with strategic partners around the world. Providing the best performing products is dependent on high value manufacturing processes and these will continue to evolve throughout the organisation. While Adrian Sada (CEO) and Ricardo Maiz (President) have driven the growth processes that have made Vitro what it is today, the entire management team has also contributed significant in-depth industry experience.

Talent recruitment and development are an important element of the company's culture, allowing Vitro to be prepared to meet the next challenge. Expertise is gained over time and with proper exposure to all areas of the business. Empowerment and training allow employees to develop professionally in their areas of expertise.

Vitro serves the architectural and construction sectors with popular, high performing low-E brands such as SOLARBAN and SUNGATE. SOLARBAN, for example, is described as the most specified low-E brand by architects in North America. Similarly, Vitro offers STARPHIRE ULTRA-CLEAR low iron glasses to a range of industries, including appliance, commercial construction and defence. In addition to 10 different tinted glass products, the company also manufactures mirror and acid etched glass.

According to Roberto Cabrera, since the 2008/2009 economic crisis, the industry slowly developed over time until last year, when markets softened in the Americas. "With the world crisis resulting from the Covid-19 pandemic, the market will try to find a way to come back to the growth levels of the past" he confirms. "How long this will take is uncertain but the elements are there and it will be a matter of balancing demand and capacity. At this time, the effect on our society is uncertain. How confident the markets are going to respond - and how aggressively - will become more apparent as we continue through the remainder of this year."

Vitro is the largest flat glass producer in North America.

Roberto Cabrera was recognised at a previous Bottero Beijing Gala.

Vitro's best opportunities for growth come from two of its core competencies, namely 'customer intimacy' and 'product leadership'. "Our close relationship with our customers (and their customers and downstream users) helps us gain a rich understanding of market gaps and emerging needs. This knowledge becomes the life blood of our research and development effort, producing the next generation of products and services. Our third core competency, 'operational excellence', is the means by which we seek to capitalise on new product and market opportunities."

SOLARBAN, SUNGATE and STARPHIRE ULTRA-CLEAR glass are trademarks of Vitro Architectural Glass.

Roberto Cabrera's team is responsible for process engineering for the company's float and coater lines, as well as its additional processing lines in the USA and Mexican operations.

Further information:
Vitro Architectural Glass, Cheswick, PA, USA
tel: +1 412 820 8120
email: rcabrera@vitro.com
web: vitroglasshub.com

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Production line in Essen.

Innovative investments match stringent customer requirements

Andreas Kohl, Global Senior Vice President Operations, Technics and Quality Moulded Glass, discusses some of the key priorities for the international Gerresheimer Group in terms of satisfying increasingly more stringent customer requirements and the organisation's growing success in reducing its carbon footprint.

According to Andreas Kohl, Global Senior Vice President Operations, Technics and Quality Moulded Glass, the Gerresheimer Group is always looking at the big picture.

Gerresheimer's Primary Packaging Glass Division maintains a leading position in the production of high quality, specialty products, making glass in Europe, North America and Asia. For moulded glass, three plants are operated in Germany, plus one each in Belgium, India and the USA. Separately, nine plants are located in Europe, North America and Asia to convert tubular glass.

For customers in the pharmaceutical industry, the product range covers vials, bottles, jars, parenteral, perfume flacons and cream jars, plus special glass containers for the food and beverage industry, all made from soda lime type III or borosilicate type I compositions in flint and amber. In addition, type I borosilicate tubing is converted into ampoules, injection vials, cartridges and syringes etc.

The product portfolio for the cosmetics industry encompasses glass containers for perfumes, deodorants, skin care and wellness products. A diversity of clear, coloured and opal glass compositions are offered, with a wide range of shaping, colouring, printing, spraying, frosting and exclusive finishing technologies available.

And for the food and beverage sectors, Gerresheimer supplies both standard and custom miniatures, as well as other bottle sizes for liquid foods and spirits etc. Its products include a range of variations such as amber, flint, coloured and opal glass, diverse shapes and numerous finishing options.

According to Andreas Kohl, Global Senior Vice President Operations, Technics and Quality Moulded Glass, the Gerresheimer Group is always looking at the big picture. "Delivering our products correctly and with no defects to meet all notable quality certified standards is one thing but providing all the extra support pharma companies need is quite another" he explains. "That's where our field quality ▸

engineers come in. They give advice on product selection and specification, plan and optimise filling processes at the pharma company, qualify new products, help with inspection systems, train people to recognise influences not previously mentioned, solve problems and generally reduce the total cost of ownership."

Traditionally, Gerresheimer uses a high proportion of cullet for many of its glass melts, a strategy that makes an important contribution to conserving resources and reducing emissions. Now, the same approach has also been made in the cosmetic glass sector. Drawing on innovative processes, the group has increased the proportion of recycled glass in its glass melt to 35%, while maintaining high quality. This approach has been well received by customers.

Experienced leadership

Andreas Kohl graduated in 1994 with a degree in glass and ceramics engineering and joined Gerresheimer Lohr as a Project Engineer the same year. In 1997, he was named Assistant to the Technical Co-ordinator at Gerresheimer Glas AG in Düsseldorf and has subsequently managed numerous projects in Germany, China and the USA. In 1998, he returned to Lohr as Production Manager, becoming the plant's General Manager in 2003. Since 2016, he has been Global Senior Vice President Operations, Technics and Quality Moulded Glass.

As Operations Manager for Gerresheimer, Mr Kohl can apply his decades of experience in the company's glass production to all parts of the world. His focus is on creating a globally uniform quality standard for customers, while at the same time initiating sustainable production processes.

"Our pharma customers want to prevent health risks for patients" says Andreas Kohl. "Hence the growing demand for the perfect primary packaging that guarantees the pristine condition of medications." According to Mr Kohl, pharma companies are increasingly moving toward zero defect manufacturing and as a primary packaging provider, Gerresheimer is doing the same. "We are constantly expanding our quality offerings so we can offer customers the best solutions. That applies not only to improving product quality but to all other processes as well, such as product qualification and technical services, product development and regulatory support, through to advice on filling processes."

Via computer simulation, Gerrresheimer is able to preform the perfect glass container digitally. Glass drug containers must be break-resistant and free from defects. Traditionally, guaranteeing this status took months of testing with sample moulds on actual production lines. "Today, however, our simulation experts can do it all digitally" Andreas Kohl confirms. "They calculate the perfect glass thickness in all areas and then simulate the flow of glass within the mould, as well as the cooling process, all on a computer. Before making the first series mould or forming a single glass container, we already know exactly how it will work, delivering huge savings in terms of development time, raw materials and energy. So by the time we use the very first glass gob, we already know we'll get the best possible product."

Having successfully

Final setting for the new furnace in Essen in 2019.

mastered this initial step in the process of digitalisation, however, Mr Kohl believes that the next steps are even more challenging. "It is all about entering the future of the perfect glass manufacturing process" he contends. "Developing artificial intelligence in that process and making it independent from external influences is the next level of our manufacturing."

Recent investment priorities

Whenever any of the large furnaces at Gerresheimer's glass manufacturing sites are refurbished, associated forming and inspection processes are updated with the latest available technologies. A major project of this type was undertaken at the Essen plant in Germany last year, for example. When a furnace was upgraded to significantly improve the group's flint glass capacity in a more energy-efficient manner than its predecessor, the opportunity was taken to add another production line, while also increasing the capacity of existing lines.

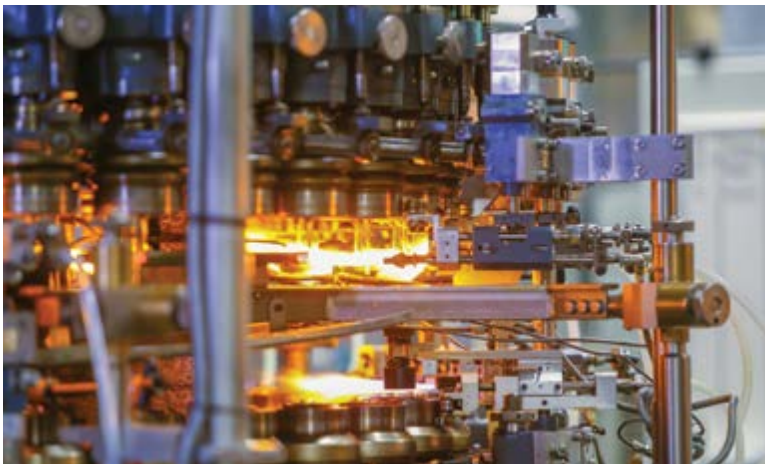
The cleanroom has also been expanded and the options for type II glass significantly increased, quality checks updated to state-of-the-art standards, packaging further automated and in parallel, the entire production process has been digitally networked. This mammoth project was completed in the space of just eight weeks.

Separately, in recent months, the group has opened its Glass Innovation and Technology Centre in Vineland, USA. This facility represents an important milestone in driving future innovations in primary packaging glass, harnessing pooled competencies to develop and test innovative glass products, as well as new process and inspection technologies before deploying them at the production plant next door. Laboratory services will also be offered. "Besides product innovation, it is important not to underestimate the need for innovative manufacturing processes" Andreas Kohl confirms. "We have already mentioned the increasing role of digitalisation. Self-regulating processes enhance our quality and processing capabilities in our production systems for syringes, glass or plastic pharmaceutical packaging and drug delivery devices. By the same token, digitalisation will become part of the products themselves by intelligently connected devices" he adds.

According to Mr Kohl, digitalisation is needed for intelligent production and intelligent products. "When you look at our products, you can't always see the complex, multi-tiered production and inspection that go into them. Harnessing the opportunities digitalisation unlocks is very important at all our plants. We have already digitally networked all machines, production steps and machine operators in many of our glass plants and the rollout continues; it's all about manufacturing execution systems."

Reducing the carbon footprint

Gerresheimer is actively involved in one of the world's biggest environmental initiatives, the Carbon Disclosure Project (CDP), a ▸



Vial production at the Forest Grove plant in Vineland.

Gerresheimer operates three moulded glass plants in Germany, plus one each in Belgium, India and the USA.

London-based, non-profit organisation that surveys corporate greenhouse gas emissions worldwide and develops strategies for companies to react to climate change. The glassmaker is convinced that it will improve medium- and long-term performance if it acts in a responsible and environmentally-aware manner.

With 58 out of a maximum of 100 possible points, Gerresheimer is currently one of the top 6% of companies rated by the EcoVadis sustainability platform in the comparison industry of pharmaceutical suppliers and medical technology.

"Environmental protection concerns and threats associated with climate change motivate us to improve our energy, resource consumption and emission management" says Andreas Kohl. "Our production facilities already rank among the most modern in the world and we are involved in various projects to safeguard our progress in the field of environmental protection. They benefit our customers, investors, suppliers and employees, as well as society as a whole."

Raw materials and resources are used as efficiently as possible, while standardised methods and tools are employed to ensure waste-optimised and low emission processes along the entire value chain to bring about continuous improvements. Gerresheimer ensures strict adherence to international environmental regulations, the positive effects of the measures implemented often far exceeding national statutory requirements.

Towards CO_2 reduction

With every furnace renewal, Mr Kohl is confident that Gerresheimer is moving closer to its goal of CO_2 reduction, as the introduction of the latest furnace technology helps to save electricity and become more environmentally-friendly.

Together with 20 other leading glass container producers in Europe, Gerresheimer is an active participant in the Furnace of the Future project, co-ordinated by FEVE. "Sustainability is an important strategic goal and reducing our carbon footprint plays an important role" Andreas Kohl confirms. "This project represents another important step for us and the entire industry on the way to greater sustainability and efficiency. We are happy to contribute our extensive experience of the glass melting process and hopefully, we will be able to use the new technology in a few years' time. This furnace is a fundamental milestone on the path we have taken towards a low carbon economy and thus towards climate-neutral glass packaging. It will be the first large-scale hybrid oxy-fuel furnace in the world to run on 80% renewable electricity. It will largely replace the current fossil energy sources and reduce CO_2 emissions by 50%."

Mr Kohl explains that while the industry is already working with electric furnaces on several of its 150 glass production plants across Europe, these melters are used only on a small scale and exclusively for the production of clear glass with new raw materials and therefore contain only a very small or no proportion of recycled glass. "With the new technology, it will be possible to produce any glass colour in melting furnaces larger than 300 tons/day, using a high proportion of recycled glass."

Gerresheimer already operates a 100% electrically heated furnace with a slightly lower capacity for the production of cosmetic packaging made of clear and opal glass in its plant in Momignies, Belgium.

Andreas Kohl is confident that Gerresheimer's investments and innovations in the glass business will pay off, helping the group to remain an attractive and efficient partner for customers in the future. ●

Further information:
Gerresheimer AG, Düsseldorf, Germany
tel: +49 211 61 81-00
web: www.gerresheimer.com

Gary Waller (President at Gerresheimer Glass Inc), Dietmar Siemssen (CEO of Gerresheimer AG), Bernd Metzner (CFO of Gerresheimer AG) at the opening of Glass Innovation and Technology Center in Vineland in October 2019.

On the Spot… Jeff Daochuan Liu

Having overseen impressive progress at the world's largest automotive glass facility since its commission in Ohio in 2016, Jeff Daochuan Liu's responsibilities with Fuyao Glass recently expanded to managing all North America activities, including the company's float glass facility in Illinois and operations in Mexico. He spoke exclusively to *Glass Worldwide* about the restructuring, as well as the impact to the business following the Covid-19 pandemic.

GW: What are the benefits of the recent restructuring of Fuyao Glass' North American operations?
In June 2019, we formed Fuyao Group North America. In my role as CEO and President, I am responsible for the OEM business units in the USA and lately we added FGI, our float glass business unit and FYSAM Mexico into the North America Group, with all general managers reporting to me. We are now utilising our resources more efficiently across the whole team in North America, meaning Fuyao Chairman, Cho Tak Wong, is able to focus his efforts on the business in Europe and elsewhere in the world. It is working very well.

GW: Having already registered impressive profit levels in 2018 at the Fuyao Glass America (FGA) automotive glass fabrication facility in Moraine, Ohio, how did that business unit perform in 2019 and in 2020 prior to the Covid-19 crisis?
Our profits further increased in 2019 and before the pandemic, we set record profits for the first quarter of 2020.

Record profits were reported for the first quarter of 2020 at Fuyao Glass America.

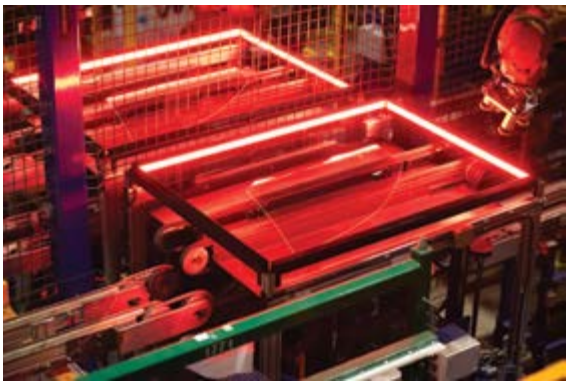
GW: In general, how has the pandemic impacted the business?
We can turn the crisis into an opportunity and do better than our competitors. We are well prepared and the situation actually gives us the chance to increase market share. Even during the pandemic, we were still able to gain new business.

We used the period to be accountable, add to our capabilities and improve our entire management structure. I can already report that the team is doing very well; more than ever before, there really is a real team effort.

GW: How quickly will the automotive sector in North America recover?
Some experts forecast that it will be 18 months before levels return to those before the pandemic… but depending on future waves of the virus, we can get back to levels of normality by the end of this year in the USA. However, social factors could make the recovery slower in Mexico.

GW: Having invested substantially across Fuyao's operations in North America in recent years, are further upgrades planned during 2020?
We have budgeted approximately $40 million for renovating and increasing automation. In a high volume business such as ours, customers require speed… so we have to constantly improve productivity to meet their needs. For ▸

Jeff Daochuan Liu alongside Fuyao Chairman Cho Tak Wong as he announced further investment into the North American operations.



Fuyao is continuing to invest in automation.

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example, we are investing significantly in robots as we move towards Industry 4.0. In terms of numbers, the workforce will continue to grow but robotics can reduce their workload, further improve working conditions and allowing them to focus on more beneficial areas of the process.

We are always pursuing new business and whatever the customer needs, we will invest in new lines accordingly.

GW: So the decision for Fuyao Glass to enter the American region has been vindicated?
We follow customer demands and that's the main reason we came to North America in the first place; there was a real demand for Fuyao to come here and supply. We know the supply chains are so critical and that's why customers were so pleased that we set up in North America. For the automotive industry, we follow the golden QSTP (quality, service, technology and price) values and can offer all the key elements to customers. That's why we continue to gain more programmes and more business from our North American customers.

GW: When competing for share of a potentially reduced marketplace, how will FGA differentiate itself from other suppliers?
We have to do better than our competitors; that's always our goal.

The automotive business is truly a survival game and whoever does the better job will prosper. Our core investments in technology, people and the process put us in a much better position than most to further increase our market share. We have a very solid team, our own supply chain and the competitive tools to provide customers with the very best service.

GW: Having worked with leading technology suppliers such as Henry F Teichmann, Glassline Corporation, Grenzebach, Bystronic glass (now part of the Glaston Group), Mixer Systems and Glasstech at your America operations, how important will their contributions be to achieving your growth plans?
As previously mentioned, we are now investing significantly towards Industry 4.0 and we have been

Jeff Daochuan Liu believes the company's advanced robots and automation is crucial to meeting customer needs and attracting top tiers of young people to the workforce.

able to improve our productivity by a minimum of 30% in recent times. When dealing in high volumes, our customers need us to produce glass faster than ever before and our investments in equipment and automation are crucial to meeting their needs. We have upgraded our operations in many ways and will continue to do so. It is a must.

Another major benefit of investing in new technology is attracting young people to work for Fuyao. The reality in the USA and other countries is that the younger generation often don't really want to work in traditional manufacturing environments. Our investments into such areas as robotics and automation help us attract the top tiers of young people. In fact, some college graduates who have worked with us for only two-three years have already been ▸

A charitable foundation started by Fuyao's Chairman Cho Tak Wong, the Herin Charitable Foundation donated medical supplies to support Ohio's battle against Covid-19.

Continued investment into equipment and automation has aided an increase in productivity of over 30% in recent times.

promoted to managers. They learn quickly and are smart and because we can provide them with an environment to progress and succeed. We have a much younger workforce than a few years ago.

GW: Is Fuyao Glass still prioritising training and safety for its workforce?
Yes, very much so. I am leading the company to build a great culture and that's why safety is our number one priority. We have addressed previous challenges and our incident rate has dropped to such an extent that we are now approximately 30% better than the same industrial standards. We have even received commendations from OSHA (Occupational Safety and Health Administration).

People are the key to our success and they are my priority. We are creating an environment to make us the best company in this region to work for. We care about our employees and they are now caring about the company in return. By providing them with great opportunities, it is leading to a settled and motivated workforce.

We treat our employees fairly, introducing initiatives such as free lunches, regular team building exercises and recognition programmes, employee suggestions and continual improvement programmes etc. We have created a friendly working environment and are building a great culture across our operations.

GW: Is the team now less reliant on expertise from China?
The terrific technical expertise in

Fuyao's Chinese team cannot currently be found elsewhere and is a real advantage for us day and night. Fuyao also has two R&D centres in China, with top tier researchers and we have recently formed strategic partnerships with some really high tech companies.

The Chinese and North American cultures might be different but both have advantages and the teams really appreciate each other. Our philosophy is to combine strengths and this is a key reason why we are successful globally.

We have ramped up our localisation plan across the North American business units and have a master programme to train the local people. Globally, Fuyao has accumulated many years of expertise and day by day, that is being transferred to the local environment… so within the next few years, the majority of employees in America will enjoy the same high levels of proficiency with little input from China.

Fuyao operates the world's largest automotive glass facility in Moraine, Ohio.

GW: Is Fuyao successfully integrating into the local communities in America?

Yes, Fuyao as a company is a major contributor to the communities and personally, I am an advisory board committee member of Ohio county government. We have been making donations to support several non-profit organisations through the Heren Foundation USA, which was established by Chairman Cho. During the pandemic, Chairman Cho's generosity in donating tens of thousands of personal protective equipment to frontline workers in Ohio was recognised by Ohio Governor, Mike DeWine and I also received a letter of appreciation from the mayor.

GW: How will your personal experience of over 20 years in the automotive business be useful during this challenging period for the industry?

In this sector, you need to know your business. My expertise and contacts enable access to all kinds of resources and information that can be used as unique tools to manage the business and be able to talk to customers professionally and knowledgeably. ●

Further information:
Fuyao Group North America, Moraine, OH, USA
tel: +1 937 496 5777
web: www.fuyaousa.com

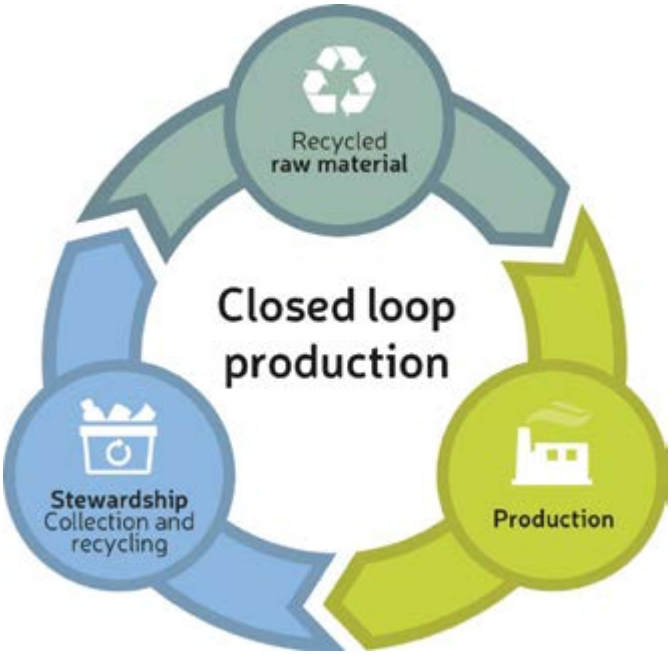
French glass value chain stakeholders share 100% recycling vision

Earlier this year, 24 signatories of the Verre 100% Solutions charter in France outlined their vision for the recycling of glass packaging at a Close the Glass Loop virtual conference co-ordinated by FEVE. Speaking at the event on behalf of the charter's signatories was Pascale Perez Castellano, Corporate Secretary of Heineken France, who explains their objectives for delivering 100% glass recycling by 2029.

Pascale Perez Castellano, Corporate Secretary of Heineken France.

Leading organisations from the glass packaging value chain in France have unveiled an ambitious commitment to achieve 100% glass recycling by 2029. Signatories of the Verre 100% Solutions charter aim to mobilise all stakeholders to strengthen sorting procedures for glass and support the material's reuse where relevant.

According to Heineken's Pascale Perez Castellano, glass is already the most recycled beverage material in France, achieving a combined recycling rate of 86%, or 78% if out-of-home collection schemes are included. "We want to prevent glass waste from ending up in the environment and ensure that glass packaging is collected and recycled" she confirms, speaking on behalf of Verre 100% Solutions charter supporters. "This is a broader societal trend that extends to all materials used. The SUP directive has set a new standard for the recycling of PET (90% by 2029) that could be extended to other materials in the near future. A 90% recycling rate could now be seen as the new normal."



Earlier this year, 24 signatories of the Verre 100% Solutions charter in France outlined their vision for the recycling of glass packaging at a Close the Glass Loop virtual conference co-ordinated by FEVE.

Higher ambitions

Ms Perez explains that the French circular economy bill has favoured the launch of voluntary initiatives, such as the French Plastics Pact. "In a way, this has also inspired us to define our position and ambitions. We realised that we wanted to commit to higher ambitions, to show that the glass value chain is still a leading force in the race to improve our environmental footprint."

France's brewers have assumed a key role in the Verre 100% Solutions initiative, bringing together value chain stakeholders from the local glass manufacturing industry, food and beverage producers, retailers, the hospitality sector, local authorities and the eco-organism. All parties ▸

Verre 100% Solutions charter signatories

- ADELPHE.
- AMF (Association of Mayors of France and Presidents of intermunicipal associations).
- ANIA (National Association of Food Industries).
- BDF (Brasseurs de France).
- BRF (French Refreshing Drinks).
- CITEO.
- FCD (Federation of Commerce and Distribution).
- FEDALIM (Federation of food industries).
- Federation des Chambres Syndicales de l'Industrie du Verre.
- FFS (French Federation of Spirits).
- FFVA (French Federation of Aperitif Wines).
- FIAC (Federation of Preserved Food Industries).
- FICT (French Federation of industrial pork butchers, caterers and meat processors).
- FNB (National Federation of Beverages).
- FNCG (Federation of Fat Bodies Industries).
- GNI (National Group of Hotel and Catering Independents).
- ALLIANCE 7 (Federation of grocery products and specialised nutrition).
- MEMN (House of Natural Mineral Waters).
- PERIFEM (Technical Association of Commerce and Distribution).
- SNFS (French Syrup Syndicate).
- SNTC (National Union of Cider Processors).
- UMIH (Union of Trades and Hotel Industries).
- UMVIN (Union of Houses and Wine Brands).
- UNIJUS (National Interprofessional Union of Fruit Juices).

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have agreed to commit to increasing glass collection and recycling, based on a common vision.

"We already have an effective collection system for glass in France and believe that a properly functioning and efficient Extended Producer Responsibility Scheme will be able to collect more glass – and at reduced cost to consumers, industry and local authorities – than a deposit return scheme."

It is anticipated that existing glass recycling figures can be boosted by bringing together all parts of the value chain, further improving the current system without the growing pains and substantial costs associated with reinventing a completely new recycling system. The goal is to reach 90% collection rates by 2025 and move towards 100% by 2029. The initiative is aligned with the French government that the on-trade represents a specific issue as a major generator of one-way bottles, with the need for a specific operational collection model required. It is acknowledged that transitioning from one-way to refillable bottles cannot be achieved overnight and needs to be assessed on a case-by-case basis.

Heineken, for example, supports such innovative collection models as the Cliiink reward system developed by the Terradona start-up in the south of France, where a smart box can be fitted to municipal recycling bins, making consumers aware of the value of their waste and encouraging them to sort it more carefully. For every item sorted, points are earned that can be converted into vouchers to use in local shops or donated to charity.

In addition, Verre 100% Solutions charter signatories are supporting glass-specific educational campaigns including glass charity campaigns, as well as encouraging the adoption of a refillable business model, where relevant.

Keys to success

Pascale Perez Castellano believes that three key factors will determine the charter's ultimate success. This starts with the implementation of collection points in urban areas, ensuring convenience for consumers. Effective communication is needed to empower people to become better recyclers and thirdly, the project relies on its ability to collect one-way bottles in the hospitality sector based on reverse logistics. "The current lockdown of cafes and restaurants may delay the implementation of this model" she warns.

As well as delivering 100% recycling, reuse opportunities are also being explored, although it is emphasised that reuse works best when transport distances are low, eg in local, closed loop markets. "Gathering data on the environmental and social benefits of refillables is key in order to identify the best and most relevant business models" Ms Perez explains. "This is why the charter supports the creation of a National Observatory for Refillables. Furthermore, we are committed to testing refillable business models and sharing good practices. We call on public authorities to adopt a case-by-case approach for refillables and favour reuse opportunities in local markets where we know it is both economically and environmentally relevant."

Pascale Perez Castellano is confident that glass continues to enjoy strong support from French consumers, who recognise it as one of the most sustainable forms of packaging. "The glass value chain needs to show that it deserves this consumer confidence" she concludes. "France is predominantly a one-way glass market and the charter reflects the reality of our local practices. We need to favour the most effective and efficient system depending on the context, market dynamics and local realities. For other countries, this could be different."

FEVE
The European Container Glass Federation

Further information:
web: www.fedverre.fr

Connecting the glass packaging ecosystem

Michel Giannuzzi, President of FEVE.

Europe's glass collection and recycling stakeholders have launched a major material stewardship programme that connects the entire European glass packaging ecosystem to boost bottle-to-bottle recycling. 'Close the Glass Loop' is a bottom-up, collaborative, public/private partnership that aims to boost glass collection rates to 90% by 2030. The initiative brings together 12 European federations representing glass manufacturers, processors, brands, packaging recovery organisations and municipalities.

According to Michel Giannuzzi, President of FEVE, an associated European Action Plan aims to address structural challenges in the glass collection and recycling chain that are common to most EU countries. With municipalities seen as a key player to mobilise collection, 'Close the Glass Loop' will establish a strong partnership with local authorities to expand source separated glass collection, improve glass collection in large cities and tourist areas and ensure that use, collection and recycling of glass containers is better supported by common guidelines and tools, at all stages of use.

Individual action points will range from organising a municipalities roadshow and best practice workshops, to support pilot projects in densely populated or touristic destinations, develop a roadmap for cullet quality and reinforce co-operation between national stakeholders.

"We have the advantage of working with a material that is 100% and infinitely circular by nature and already a success story in terms of sustainability" Mr Giannuzzi commented. "The more we recycle glass, the less we litter or rely on virgin resources, while also providing premium packaging in terms of quality preservation, health and safety. Today, 76% of glass packaging in the EU market is collected for recycling – but there is more to be done. We need to fully seize the advantages offered by glass and recycle more and better. And to this end, we need the active commitment of the whole value chain. The level of engagement in 'Close the Glass Loop' to date lays really promising grounds for success and I am very much looking forward to the positive impact it will create over time."

Further information:
FEVE, Brussels, Belgium
email: secretariat@feve.org
web: www.feve.org / www.closetheglassloop.eu

On the Spot… Bertrand Cazes

GLASS FOR EUROPE

As Secretary General of Europe's trade association for the flat glass sector, Bertrand Cazes described prevailing market conditions and future prospects to *Glass Worldwide,* preferred journal of Glass for Europe.

glass WORLDWIDE *Preferred journal of Glass for Europe*

GW: With the economy hit hard due to the Covid-19 pandemic, what was the impact on the flat glass industry?

The flat glass industry was no exception and in fact, was probably among the industrial sectors hit the hardest. The first task was to ensure health and safety in industrial operations. The biggest challenge, however, remained that of the rapid and drastic fall in demand for flat glass products.

Automotive assembly plants in Europe were stopped for over two months. Therefore, demand for auto glass was down to nearly zero and automotive glass plants had to be temporarily closed. In countries with most stringent lockdown measures, the building glass market collapsed as the construction industry went to a halt and clients were not in a hurry to have glaziers at their homes to install new windows. This means that the entire value chain of glass processors, IGU makers, glaziers etc all suffered big losses and some cessation of activities in certain parts of Europe.

When it comes to flat glass production, around half of float glass sites had to cease production by way of so-called 'hot-hold' operations, which entail high cost for zero output.

GW: What can we expect in the months to follow?

The situation has already improved since mid-May/early June, with the easing of lockdown measures. Automotive plants resumed production, albeit at very low levels and construction started activity again in most countries. During the summer, demand for flat glass products has continuously grown to flatten at around three quarters of last year's activity levels. However, the situation is very dependant from one country to the next but all industry stakeholders must have witnessed some improvement.

Is the relief temporary or will it last and the market continue growing? To be honest, I don't know but I am a bit pessimistic because most of the activity observed in recent months was about construction projects launched before the crisis and the number of permits for new construction is ridiculously low. When it comes to the glazing/window replacement market, particularly in the residential sector, it remains worryingly low. European consumers remain preoccupied by health conditions when works are undertaken at their homes and the consumer confidence level is such that investment decisions are postponed. Without a rapid pick-up of this market segment, many players in our sector could find themselves in a very delicate financial situation as support measures are lifted. ▸

Window and glazing replacement is at the core of economic recovery says Glass for Europe.

According to Bertrand Cazes, the building sector represents the biggest opportunity for the flat glass industry in Europe. Image: Saint-Gobain and Glass for Europe.

glass technology

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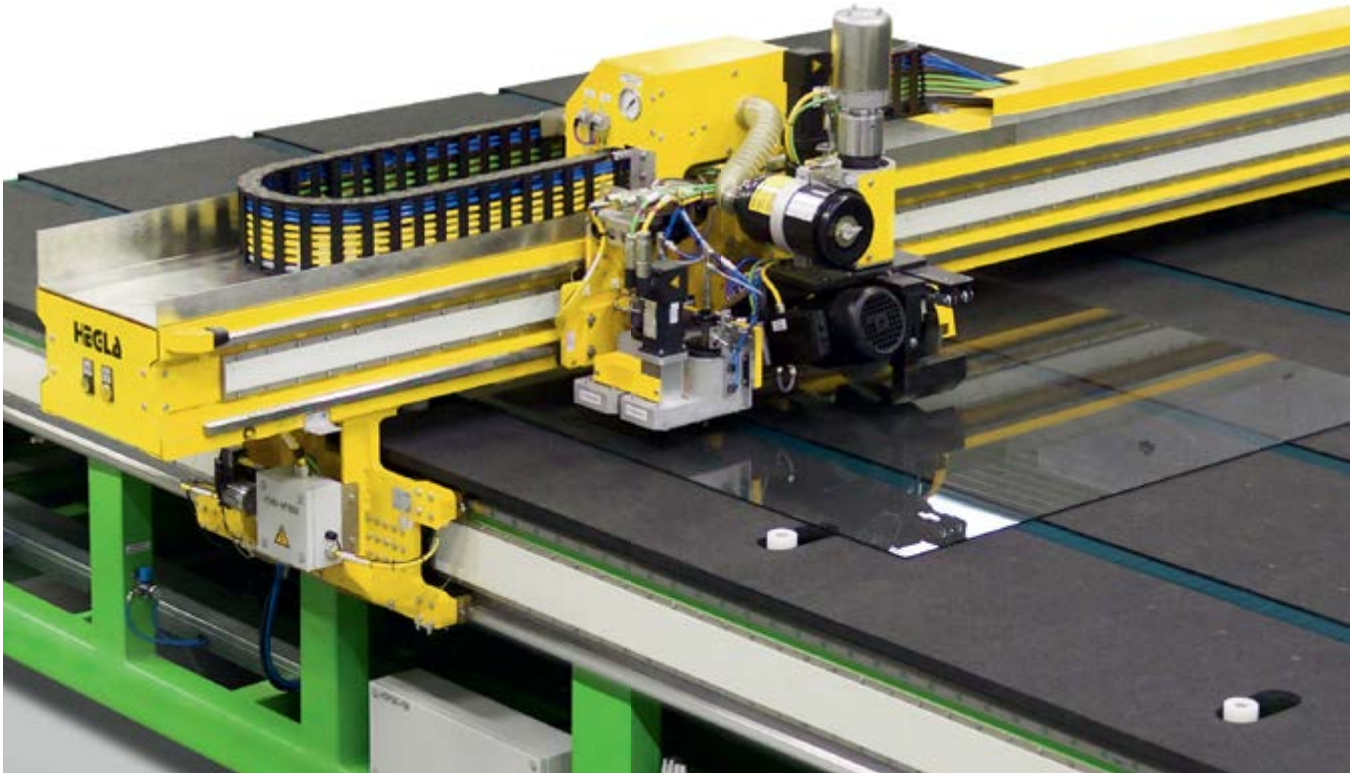

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GW: Looking more optimistically, will economic stimulus packages bring more hope?

I hope so. There is no fatality to a downward spiral!

First, I think we must applaud most Member States' efforts to keep the economy going during the crisis and all emergency support measures put in place. Second, the reaction from European authorities is also very positive when it unveils a recovery package of an unprecedented magnitude. For the first time ever, a plan worth €750 billion is being discussed at EU level! With this plan comes a political declaration to invest massively in the renovation of Europe's buildings, which could generate the much-needed stimulus to the building glass sector.

We must now translate these declarations into actions and make sure that among these actions, plans to massively retrofit Europe's inefficient glazing and window stock are developed.

GW: What are the prospects with regards to window and glazing retrofit plans? What needs to be done to see them being put in place?

Our industry does not need to be shy! Our sector is in danger without effective support measures, so we must call for them. Window retrofit plans could help save lots of energy and CO_2, which is an essential criterion or condition for recovery support measures that are compatible with our climate objectives. Support to window and glazing replacement are measures understandable by the public and usually well-accepted because they resonate with improved indoor comfort and wellbeing. Window/glazing retrofit plans tick all the boxes.

As diverse as we are as players of the flat glass industry, it is our collective task to convince EU, national and local authorities to design such plans and to help them conceive effective measures.

GW: What role will Glass for Europe play alongside all industry players?

As Glass for Europe, we are articulating these messages: Developing the headline arguments and conveying those onto EU authorities. Several papers have been developed and their content shared, as the European Commission is looking at implementing a strategy for a 'Renovation Wave' of buildings.

Our tasks go beyond this, however, with two pillars:

- First, the co-ordination of activities of national glass and glazing associations across Europe. Most of the funds made available by the EU Recovery Plan will be spent by the Member States, which are free to design their own economic stimulus measures. It is essential, therefore, that in all countries, trade associations and industry players call on their government to design such glazing/retrofit plans.
- Second, giving clues on possible measures that are effective at boosting the market in volume but not only. The measures must also be conceived so as to support sales of high performance glazing, be it low-E glazing or solar control glazing. We must improve the glazing specifications for all industry players to enjoy higher added-value and their fair share of it.

Everyone in the industry can play a role to call for and design the plans. I invite anyone willing to engage to check out all materials made available by Glass for Europe and to get in touch with us for co-ordination! ●

Further information:
Glass for Europe, Brussels, Belgium
tel: +32 2 538 43 77
email: info@glassforeurope.com
web: www.glassforeurope.com

Favourable 2019 results and optimistic forecasts reported

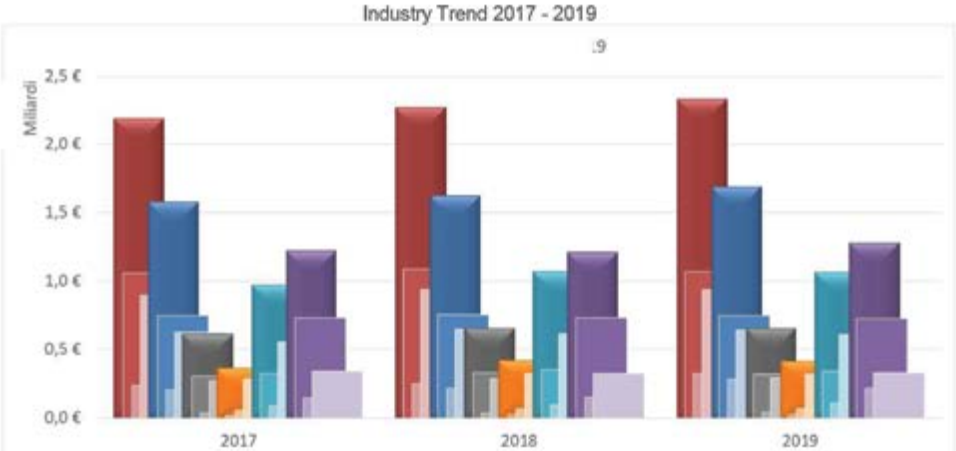
According to Gimav, Italian suppliers of glass processing technologies enjoyed a positive 2019, especially for hollow glass. Expectations were highly positive for 2020, before the Covid-19 pandemic rewrote the script. It is suggested that for now, reliable forecasting is impossible.

Positive results in 2019 (+2.7%) were driven by a rise in exports (+3.7%), allowing Italy's glass processing technologies industry to continue the growth trend that has kept it in a starring role for the last decade. Thanks in part to the revision of the customs codes used in the survey, it achieved an absolute value of overall sales in excess of €2.3 billion.

Domestic sales by Italian manufacturers were stable (+0.1%) and despite sluggish demand (-0.4%), Italian products still fared better than imports (-1.2%). Growth in exports and at the same time, a decrease in imports worked in favour of the sector's trade balance (+5.4%) which, at €1275 billion, accounts for nearly 55% of sales. "This means that for every Euro invested in the sector, we contribute 55 cents to our country's positive trade balance" commented Gimav's re-elected President, Michele Gusti. "Those who determine our country's economic and industrial policies would do well to take this outstanding performance into account by rewarding it more!"

Positive figures were recorded for the industry as a whole, although they are not evenly distributed among the three main sectors involved. In fact, flat glass processing technologies fell 1.3% compared to 2018, due to small losses in exports (-0.5%) and more marked losses (-3.2%) in domestic sales. However, sector imports (down 4.4%) were even more affected by the slowdown in domestic sales (-3.3%).

At the other extreme, in 2019 the hollow glass processing technologies



	2017	2018	2019	18/17	19/18
Sales	2.192.288.959,85	2.275.595.940,33	2.336.173.370,56	+3,8%	+2,7%
flat	1.056.416.041,70	1.086.629.540,49	1.072.138.491,60	+2,9%	-1,3%
hollow	237.029.416,15	250.230.898,93	325.149.158,93	+5,6%	+29,9%
accessories and other tech.	898.844.502,00	938.735.500,90	938.885.720,03	+4,4%	+0,0%
Export	1.578.848.587,48	1.626.214.045,10	1.686.131.033,40	+3,0%	+3,7%
flat	750.049.026,43	757.849.536,30	754.015.933,85	+1,0%	-0,5%
hollow	204.089.060,97	217.742.619,15	287.073.768,30	+6,7%	+31,8%
accessories and othe tech.	624.710.500,08	650.621.889,65	645.041.331,25	+4,1%	-0,9%
Domestic sales	613.440.372,38	649.381.895,23	650.042.337,16	+5,9%	+0,1%
flat	306.367.015,28	328.780.004,19	318.122.557,75	+7,3%	-3,2%
hollow	32.939.355,18	32.488.279,78	38.075.390,63	-1,4%	+17,2%
accessories and other tech.	274.134.001,92	288.113.611,25	293.844.388,78	+5,1%	+2,0%
Import	360.152.167,27	415.975.753,20	411.082.265,30	+15,5%	-1,2%
flat	17.383.488,16	24.887.940,00	23.792.945,40	+43,2%	-4,4%
hollow	58.642.235,00	66.377.145,80	70.613.998,00	+13,2%	+6,4%
accessories and other tech.	284.126.444,11	324.710.667,40	316.675.321,90	+14,3%	-2,5%
Domestic market	970.473.497,37	1.065.357.648,43	1.061.124.602,46	+9,8%	-0,4%
flat	323.750.503,44	353.667.944,19	341.915.503,15	+9,2%	-3,3%
hollow	91.581.590,18	98.865.425,58	108.689.388,63	+8,0%	+9,9%
accessories and other tech.	558.260.446,03	612.824.278,65	610.519.710,68	+9,8%	-0,4%
Trade balance	1.218.696.420,20	1.210.238.291,90	1.275.048.768,10	-0,7%	+5,4%
flat	732.665.538,26	732.961.596,30	730.222.988,45	+0,0%	-0,4%
hollow	145.446.825,97	151.365.473,35	216.459.770,30	+4,1%	+43,0%
accessories and other tech.	340.584.055,97	325.911.222,25	328.366.009,35	-4,3%	+0,8%
E/S	72,0%	71,5%	72,2%		
flat	71,0%	69,7%	70,3%		
hollow	86,1%	87,0%	88,3%		
accessories and other tech.	69,5%	69,3%	68,7%		
Ds/Dm	63,2%	61,0%	61,3%		
flat	94,6%	93,0%	93,0%		
hollow	36,0%	32,9%	35,0%		
accessories and other tech.	49,1%	47,0%	48,1%		
TB/S	55,6%	53,2%	54,6%		
flat	69,4%	67,5%	68,1%		
hollow	61,4%	60,5%	66,6%		
accessories and other tech.	37,9%	34,7%	35,0%		

Gimav industry trends, 2017-2019.

Gimav forecasts for 2020.

sector gained almost 30% over 2018 figures, thanks to excellent performance in both foreign (31.8%) and domestic (17.2%) markets. Proving the vitality of the domestic market (+9.9%), sector imports also increased in 2019 but to a much lesser extent (+6.4%).

'Accessories and other technologies' remained stable, which offset negative performance in international markets (-0.9%) with a favourable upswing (+2%) in the domestic market, capturing demand by Italian manufacturers much better than its foreign competitors, as indicated by the 2.5% drop in imports.

Industry forecasts

This year's meeting of Gimav members again included looking at forecasts for the current year and discussing the results of the 2020 qualitative economic survey, processed in aggregate percentage form. Prior to the Covid-19 outbreak, member companies had projected very positive sector results. Overall, 86.4% of the companies interviewed (Italian and international) anticipated growth and the remaining 13.6% did not foresee any slowdown.

In detail, 91.3% of respondents forecast a rise in growth when considering only foreign markets (8.7% expected them to be stable). While expectations for the domestic market came in at a 'more limited' 76.2%, 19% of respondents expected it to remain stable and the remaining 4.8% forecast diminishing growth.

The effects of the pandemic have dramatically changed industry scenarios and to date, it is impossible to make any reliable forecasts of 2020 performance, especially when considering any further developments that might occur. To make a useful contribution in this regard, the industry report was supplemented with the results of the survey and 'photographs' of the situation during the pandemic. Considering that in 2019, the months of March, April and May contributed more than 26% of the total to the year's results in full lockdown, 43% of the companies were shut down and among the companies that were open, 65% had to stop production completely. Furthermore, 71% of industry companies had to resort to unemployment compensation schemes for at least 70% of their workforce. ●

Further information:
Gimav, Milan, Italy
tel: +39 02 3300 7032
email: gimav@gimav.it
web: www.gimav.it

South Korean glassmakers set to recover from recession

Freelance correspondent Eugene Gerden reports on the measures taken in South Korea to protect the local flat glass community, as it faces the economic downturn created by the Covid-19 pandemic.

The government of South Korea is taking financial measures to prevent a sharp drop in domestic production and the consumption of glass this year due to the Covid-19 pandemic, associated with a reduction of the country's industrial output. This is according to recent statements made by senior Korean national government officials and local media reports. It will take place as part of the existing 76 trillion won ($62 billion) 'New Deal' state spending plan, which has been approved by the Korean government, with the aim of supporting key sectors of the Korean national economy affected by the pandemic. It is planned that part of this amount will be allocated to the needs of the glassmaking sector.

So far, the pandemic has had a negative effect on the South Korean glass industry. While no official statistics are available regarding the volume of glass production for the first half of the year, most local analysts expect a decline of 5-10% on a year-on-year basis. The government hopes successful implementation of the 'New Deal' plan will help to stabilise the situation and avoid massive job cuts.

Innovative focus maintained

The pandemic and associated economic decline, however, will not lead to a change of focus for the local glassmaking sector, which will continue to concentrate primarily on the production of high performance, innovative glasses.

Rapid development of the South Korean glass sector began shortly after the end of the Korean war in 1953 and the appearance of two sovereign states on the Korean peninsula. The financial support provided to South Korea by the USA and other western states in the second half of the 1950s led to the country's rapid industrial development and contributed to the establishment of its first large-scale glass producers.

The beginning of the national reconstruction project in South Korea in 1957 resulted in the acceleration of volumes of residential construction and led to sharp growth in demand for glass. Subsequently, another peak in demand from the construction sector took place in the 1970s and 1980s.

Today, glassmaking remains one of the most well-developed parts of Korean industrial production, with hundreds of companies for various types of glass manufacture. In contrast to neighbouring Asia Pacific nations, where the Covid-19 pandemic resulted in major suspensions of glassmaking activities, the lack of strict quarantine restrictions in South Korea allowed local glass factories to avoid lengthy shutdowns.

Amid the ongoing recovery of domestic and global demand, leading local glassmakers are considering expanding their production capacities, possibly as soon as the second half of the year. One example is Hanglas, who has announced plans to significantly strengthen its position in the domestic market for energy saving glass. The company already maintains a strong position in the local automotive glass sector and expects demand for energy saving glass in South Korea to grow significantly. This optimism results from recently approved state requirements for mandatory zero energy construction of new government office buildings after 2025.

Lee Yong-Seong, CEO of Hanglas, commented: "From 2025, the role of smart glass, such as energy saving glass, will be significantly increased." It is anticipated that initially, these requirements will apply primarily to state office buildings only but subsequently, they will be expanded to include the majority of other newly constructed buildings in the country. According to Lee Yong-Seong, Hanglas has approved investments of about $45 million in the modernisation and expansion of its production capacities. Implementation of these plans is scheduled for the second half of the current year. For example, the company is to replace old equipment at its Gunsan plant, while also reducing the volume of NO_x and SO_x generated

by its production process, as well as materials that cause fine dust.

Hanglas operates two plants, one at Gunsan and another at Busan. The Gunsan facility features three float lines and is the world´s single largest production facility for float glass products. The Busan plant includes one float line and a separate line for patterned glass.

Expansion and optimisation goals

The South Korean market is also considered promising by multinationals operating in the country, many of whom are considering further expansion and optimisation of local production capacities. This includes Saint-Gobain, who has initiated plans to optimise its local business. To this end, the company recently completed the sale of its local construction glass business, involving two flat glass production units and a processing line on the basis of a deal valued at €240 million.

Most local analysts believe this move will allow the company to focus on other development priorities in the local glass market. This is especially important because of the ongoing Covid-19 pandemic, which is forcing producers to pay closer attention to expenditure.

Analysts also believe a major focus for Saint-Gobain and other global players involves the production of complex, sophisticated glass types, particularly those with high-added value, such as coated glass that could be used as a cold insulating material.

During the global recession of 2008-2010, the share of local glassmakers in the domestic market significantly declined. This was due primarily to a decline in the domestic demand and the influx of cheap glass imports from China. It forced many South Korean glassmakers to revise their portfolio in favour of more complex, high priced glass materials. This trend is expected to continue for the next decade at least.

Experts believe the competitiveness of the South Korean glassmaking industry should be further increased via the introduction of smart factories, as well as digitalisation within the sector. According to recent statements from Korean Chamber of Commerce and Industry experts, a shift to such concepts will require the implementation of massive re-organisation by many domestic glass producers. From its side, the South Korean Ministry of SMEs and Start Ups plans to provide support to domestic glassmaking enterprises during implementation of these plans, paying particular attention to small and medium size companies.

Ministry analysts expect most domestic glassmakers to focus primarily on developing their domestic market, although interest in foreign expansion may also grow. To date, some local producers have already achieved serious progress in this field. Last year, for example, KCC Corp, South Korea's largest producer of building materials and chemical products, announced plans to build a large glassmaking factory in the Russian Far East.

Under the terms of this project, the factory will specialise in the production of flat glass, while its capacity will reach 800,000 tonnes per year initially. During a second stage, the factory will launch the production of mineral wool and glassfibre. The volume of investments in the project is estimated at $250 million. Construction work will begin shortly.

Leading Korean analysts in the field of glassmaking believe one of the reasons for the acceleration of foreign expansion by domestic glassmakers this year is related primarily to an anticipated decline in the volumes of residential construction in South Korea this year due to the pandemic. This, they suggest, will restrict local demand growth in 2020. ●

About the author:
Eugene Gerden is a freelance correspondent

Turning old into new

A customised retrofit makes existing systems fit for the future and is frequently also more economic than investing in new equipment. Minor but decisive refurbishments in the course of a technology update are often sufficient to boost performance. Lower energy consumption, leading to lower costs and significantly better productivity are other advantages. According to René Kius, the automation experts at futronic have the highly specialised knowhow that is essential to implement complete or partial, individually tailored solutions for targeted modernisation projects.

When it comes to cost-effectiveness, product quality, productivity and energy efficiency in industrial production, customer expectations are rising continuously. That is why more automation is also needed in the glassmaking industry. Digital – and hence sustainable – automation solutions are becoming more and more commonplace in new machinery and equipment: The Industrial Internet of Things (IIoT) is rapidly gaining ground here. But what about existing production lines?

"IS machines are very robust" explains Murat Yolaçan, a sales engineer at futronic. Provided the system and its mechanical components are carefully maintained and regularly overhauled, "they have a service life of 25 or 30 years, if not more." That is not quite so easy as far as the electrics are concerned. Not that the technology is liable to give up the ghost at some point – it simply cannot stay abreast of the IT's rapid innovation cycles. In other words, "there comes a time when something or other is hopelessly out-of-date and there are no spare parts anymore."

Upgrading machines to state-of-the-art

"To keep pace with modern manufacturing trends, the systems need to be retrofitted with, or converted to, the latest, higher performance generation of control and drive technology in the course of their lifecycle" Murat Yolaçan continues. "As a minimum, the software installed in them should always be up-to-date."

The aim is to achieve a significant improvement in productivity and product quality, coupled with a noticeable reduction in production costs, by using energy efficient technologies. Of course, modern controls and drives also make a system more reliable – its availability is increased and there is less downtime. A comprehensive retrofit is simultaneously a chance to expand the system's functionality. And last but not least, it makes equipment and machinery fit for Industry 4.0.

Experience with retrofits

The challenge: Every retrofit entails manipulating what tends to be heterogeneous plant and machinery from multiple manufacturers, exchanging obsolete controls and drives and co-ordinating everything in a harmonious whole. It is a complex task that calls for specialist expertise. Specialist expertise like futronic's. On the one hand, the company's in-house specialists can draw on a huge knowledge base of the various systems. On the other, they have also gathered a wealth of experience in extensive retrofit projects worldwide on behalf not only of major glass container and tableware manufacturers with large production lines but also of businesses operating on a much smaller scale. Their knowhow is moreover the outcome of partnerships with leading producers of machine and system components at the hot and cold ends, frequently over a period of several decades.

The spectrum of retrofit projects ranges from low budget for modernising 4-section machines to high end solutions involving 24 sections. futronic also has the necessary technology and project experience to retrofit reject systems, feeders and lehrs, for instance, right up to the three axis palletiser at the end of the production process. A high degree of flexibility – essential for efficient production – and maximum investment security are guaranteed.


Murat Yolaçan, sales engineer at futronic, is a firm believer in the rejuvenation of equipment and machinery.

Demand for specialists

Projects like these, which can often be complex, always follow more or less the same pattern. The

More automation means improved operator safety in the machine's immediate vicinity, consistent product quality on a high level and better productivity, for instance because the time required for job changes or for starting up the machine is significantly shorter.

framework conditions and the technical specifications of the machine and system components to be modernised have to be clarified at project meetings, ideally on-site at the customer's premises. "During this phase, we also check that what the customer is looking for is actually feasible" Murat Yolaçan adds.

Finally, the engineers at futronic set to work formulating the technical details, designing the cable ducts and planning the electrics – all in continuous consultation with the project partners. As Murat Yolaçan observes, "Every project is unique. The more meticulously we plan and co-ordinate upfront, the more precise the data and machine dimensions used in our designs and the more attention we devote to critical aspects at an early stage, the smoother the final implementation and commissioning will be." And the less likelihood there is of downtime.

During the production process proper, futronic's technicians fill the control cabinets and wire them along with the cable ducts, indeed the entire electrical equipment. Murat Yolaçan emphasises that all components undergo thorough testing before a machine leaves the loading bay at futronic "to rule out any unpleasant surprises on the construction site." In many cases, the customer also sends a representative to Tettnang for the final acceptance.

Training and customer service

Commissioning on-site at the customer's can take anything from five days to two weeks. It includes assembly of the cable ducts, as well as all wiring work and installation of the control cabinets. The system is then started up for the cold run, in which all components are operated overnight at no load. The equipment eventually goes productive during the so-called 'gob-in'. The gob weight is subsequently adjusted and the machine is gradually run up to normal capacity. Not until the first glass containers roll off the line without a hitch is the system formally accepted by the customer.

Broad customer training, especially if the operators are new to the machine, is always an important part of the commissioning phase. It goes without saying that futronic's service engineers remain available to provide support after commissioning is over. "Comprehensive customer service is something we take for granted" Murat Yolaçan confirms. ●

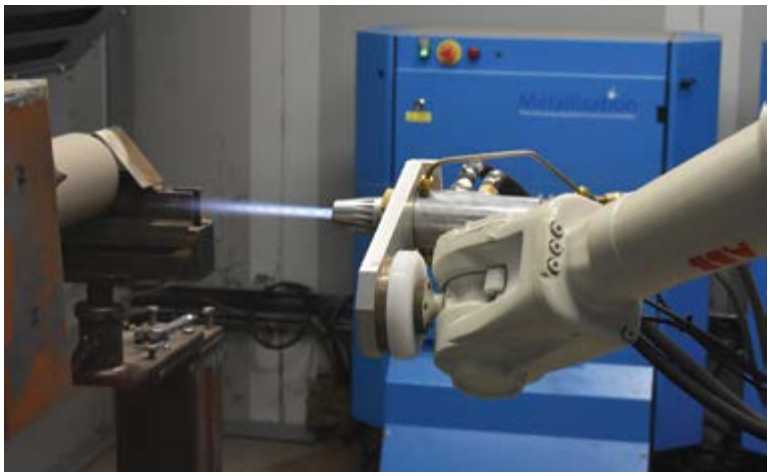
About the author:
René Kius is responsible for corporate communications for futronic

Further information:
futronic GmbH, Tettnang, Germany
tel: +49 171 1915263
email: sales@futronic.de
web: www.futronic.de

Building on unrivalled plunger and cooler production expertise

Hunprenco has been supplying the glass container industry throughout the world with quality plungers and coolers for over 50 years. After-sales service is an important element of this family run company's continued success in an increasingly demanding market. Chris Houghton reports.

Examples of the components supplied by Hunprenco.



Hunprenco's recently completed spray facility.

As well as being a world leading manufacturer of plungers and coolers, Hunprenco enhances its portfolio with a Precision Engineering Division that is capable of producing a wide range of components to customer requirements, either from drawings or sample components. This division has a full range of turning, three, four and five axis milling, supported by up to five axis cylindrical grinding and has the ability to manufacture, coat and grind components as required.

Utilising advanced machining techniques, the Precision Engineering Division has the ability to manufacture a multitude of components used across a wide range of industrial sectors.

A dedicated inspection department and laboratory checks all machined components and coatings.

In-house balancing machine.

Hunprenco recently commissioned a state-of-the-art, robotically-controlled thermal spraying facility, capable of spraying a wide range of thermally applied coatings including alloys, carbides and ceramics, using HVOF and plasma. This facility is supported by a fully equipped metallurgical laboratory to ISO9001:2015 standard. Thermally applied coatings are utilised in a wide range of applications and industrial sectors. Thermal coatings can provide protection against temperature, corrosion, erosion and wear and are an integral component in the creation of a high quality product. Through sample analysis, the company is able to ensure that the coatings meet customer requirements.

Types of coatings available include cermets (eg WC/Co), ceramics (including thermal barrier coatings, alloys and metallics). These coatings can be used for new products and also to refurbish components to prolong the life of the part.

Finish machine roller.

Hunprenco's facility is supported by a dedicated inspection department and laboratory that checks all machined components and coatings to ensure they meet customer requirements. The company actively engages with customers on the development of new processes and applications to meet on-going customer requirements.

The dedicated workforce is experienced at working to engineering drawings and also to reverse engineer sample components supplied by customers. Hunprenco has the ability to offer a complete service from samples/drawings, thermally applied coatings, balancing and finish grinding to a high standard. ●

About the author:
Chris Houghton is Technical Manager at Hunprenco

Further information:
Hunprenco (Precision Engineers) Ltd, Filey, North Yorkshire, UK
tel: +44 1723 890105
email: info@hunprenco.com
web: www.hunprenco.com

Batch and cullet plant specialist celebrates 100th anniversary

A specialist in batch and cullet plants, recognised by customers throughout the world, ZIPPE Industrieanlagen celebrates its 100th anniversary in 2020. Some 250 people work for the head office in Germany, with local sales and service offices and 30 representatives providing support to international customers. Dr Bernd-Holger Zippe and Susanne Zippe detail the company's history and its growth into a leading supplier to the global glass industry.

The origins of ZIPPE Industrieanlagen date back to 5 June 1920, when Alfred and Maria Zippe were married in Haida/Novy Bor, Bohemia. On the same day, Alfred founded his own enterprise.

Alfred Zippe was a master craftsman and a marine engineer, while his wife Maria was a certified accountant. The fledgling company started by working for the Bohemian crystal glass industry. It was instantly successful and grew rapidly.

After 1945, the company moved to West Germany, restarting in a small garage in Wertheim/Main. Alfred Zippe senior was joined in the business by his son Alfred 'Fred' Zippe junior, himself a master craftsman and mechanical engineer.

Fred Zippe junior designed, built and installed the first batch charger for a glass factory in Germany in 1952. He purchased a used car, visited many other glass factories in the 1950s and discovered that there was a need for automatic batch chargers. To date, ZIPPE has built and delivered more than 1400 batch chargers of all types to international glass factories.

Example of a Zippe batch plant installation in France.

Batching innovations

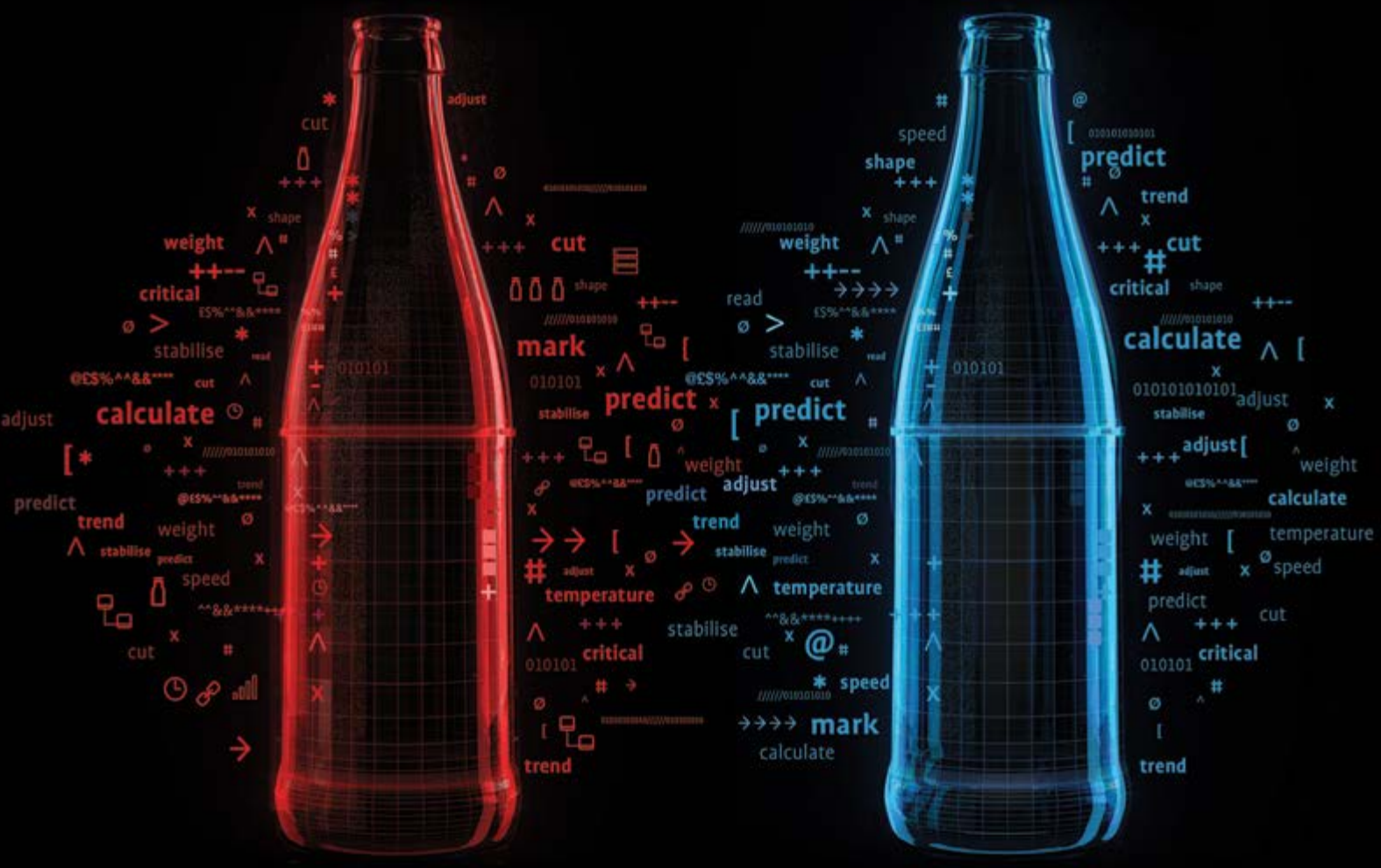
It was in 1960 that ZIPPE designed and built the first automatic batch plant for a German glass container factory. This represented another important step forward for the company, which subsequently delivered and installed its first batch plant overseas (to Nigeria) in 1963.

In 1964, the first automatic cullet return system was established by ZIPPE, who also developed cullet crushers, scraping conveyors and glass level controls. The company continued to grow rapidly. A specialist automation and controls department was established, a division that continues to be very important today. And subsequently, a civil works department was added to handle growing demand for turnkey projects.

Edith Zippe had joined the company as a certified ▸

Wiegand-Glas, Germany is among ZIPPE's customers.

Alfred Zippe, founder of ZIPPE Industrieanlagen GmbH in 1954.



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The ZIPPE headquarters in Wertheim in 1960.

The ZIPPE Engineering Centre in Wertheim.

accountant, adding substantially to the organisation's financial stability. The business grew from 40 employees in the early 1950s to over 200 by 2000.

Float activities lead global expansion

In 1986, ZIPPE built its first automatic batch plant and weighing line for a float glass facility; the first of many. To date, the company has built more than 88 float glass batch plants for almost every major flat glass producer worldwide. This expertise has led to the creation of a wealth of experience, from which the company, its engineers and customers can all benefit.

More than 800 automatic cullet return lines, in excess of 1360 crushers for all types of glass production and the first batch and cullet preheaters are examples of the important innovations developed by the company, so other challenges are always welcome!

Dr Bernd-Holger Zippe, grandson of the founder, joined the company in 1979. He became Managing Director in 1987 and CEO in 1991, when Fred Zippe went into retirement. Under his guidance, ZIPPE started to globalise by following and servicing customers throughout the world. Subsequently, Dr Philipp Zippe, great-grandson of the founder, joined the company in 2006 and became CEO in 2016, when his father retired into Chairmanship.

Experienced workforce

Literally hundreds of dedicated employees, often the best in their field, engineers, craftsmen, supervisors, managers, secretaries, office employees of all types have served the company throughout the decades. And to match their development requirements, ZIPPE has consistently focussed on its own training programmes. "You can hardly learn to become a batch plant specialist at university" says Dr Philipp Zippe. "You have to learn it through experience."

Customers continue to benefit from the decision to maintain all departments under one roof in Wertheim. Sales, development, mechanical engineering, hardware and software planning, mechanical quality production, export knowhow, documentation, auditing… all departments work together seamlessly.

The world of glass production has seen many changes in the past 100 years. Throughout this period, ZIPPE has always tried to follow one principle: 'Listen to the customer. Fulfil their needs in the best possible technical and economical way.'

Today the ZIPPE group of companies also includes MMB in Mügeln, Saxony, a highly specialised and effective production facility, as well as Lahti Glass Technology Oy for engineering and special batch plant and weighing technologies in Finland. In addition, the group maintains multiple shareholdings in electronics and engineering companies in different parts of the world – all with one aim – to give the best possible and reliable service in the field of raw materials handling to glass factories worldwide. ●

Batch plant installation at Wiegand-Glas in Germany.

About the author:
Dr Bernd-Holger Zippe is grandson of the founder and Susanne Zippe works in public relations and marketing for ZIPPE

Further information:
ZIPPE Industrieanlagen GmbH, Wertheim, Germany
tel: +49 93 42 - 80 40
email: zippe@zippe.de
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Flat glass processing plant specialist looks to the future

Following the announcement that Anders Dahlblom will take over as President and CEO of Glaston Corp in February 2021 at the latest from the retiring Arto Metsänen, *Glass Worldwide* spoke to Sasu Koivumäki, acting CEO, about the management team's immediate priorities for the diversified flat glass processing machinery specialist.

Sasu Koivumäki.

It was in 2002 that Sasu Koivumäki joined the Tamglass business unit in Tampere, Finland, providing a good grounding for him to learn about the international flat glass processing industry and understand the processes employed by the company's customers. During a successful 18 year management career within the organisation to date, he headed Glaston America's sales and services network between 2010 and 2012, before returning to Finland as Glaston's Chief Financial Officer.

Mr Koivumäki also headed the group's SVP machines business in Tampere for almost two years, before being nominated as Chief Operating Officer, including responsibility for managing the successful integration of Bystronic glass within the business. This required him to relocate to southern Germany, in support of Glaston's ambition to further strengthen its position in the flat glass processing value chain. As a result of this initiative, Glaston has emerged as a significant player in the diversified flat glass machinery business, providing customers with superior knowhow and the latest available technologies.

Earlier this year, Sasu Koivumäki also assumed global responsibility for sales, enhancing his ability to understand the Glaston business from several different perspectives. Having worked in Finland, the USA and Germany, he is also responsible for the organisation's factory in China. "To date, I have enjoyed 18 years in this extremely interesting industry, where everyone seems to know everyone else!" he comments.

Leading an experienced team

In advance of Anders Dahlblom joining Glaston from Owens Corning, where he has been working since 2019 as VP and Managing Director of the European insulation business unit, Sasu Koivumäki is pleased to take on the temporary role, albeit at a time of major economic uncertainty as a result of the global Covid-19 pandemic.

"Taking on the responsibility is a big honour considering the quality of people we have in the organisation" he explains. "And yet, although I have over 18 years' experience with Glaston, if you take into account that many of our 800 strong workforce also have multiple decades of experience with the company, collectively there are thousands of years of experience and expertise at Glaston. To have the task of directing that experience, energy and commitment is a huge responsibility but something I can be truly proud of."

There are clear advantages to someone in-house moving into the role, however. Arto Metsänen turns 65 next year and having worked closely with Sasu Koivumäki for over 10 years, a smooth transition for customers and employees alike is assured.

"Dealing with capital equipment always involves long relationships and processes and I still fully believe that people buy from people; getting to know people and earning that trust takes time and we have that experience in abundance within our team" confirms Mr Koivumäki, who will continue in his position as COO, Head of Sales and Integration, Deputy to the CEO and a member of the Executive Management Group when Anders Dahlblom assumes his position as CEO and President.

Weathering the pandemic

Sasu Koivumäki reports that Glaston's European operations have been running throughout the Covid-19 pandemic. Although some office personnel have worked from home, shop floor employees at the factories have been largely unaffected. It was necessary to close the factory in Tianjin for several weeks over the Chinese New Year, however.

International travel restrictions have impacted many businesses in recent months but because Glaston is present ▸

Via its R&D facilities and expertise, Glaston is focused on continuous improvement.

Anders Dahlblom has recently been named successor to Arto Metsänen as President and CEO of Glaston Corp and will assume the role by February 2021 at the latest.

in many different countries around the world, it has been possible to continue installations and to service customer requirements. "We endured the economic crisis in 2008 and it wasn't really until 2012 that we started seeing many positives again" says Sasu Koivumäki. "The fact that the business flourished after the last crisis provides us with confidence and many opportunities now. I have no doubt that we will come through even stronger than before."

Successful acquisition completed

Mr Koivumäki confirms the successful integration of Bystronic glass within Glaston in recent months but warns that the journey still continues. "The acquisition was exactly the right thing to do and has made us much stronger" he adds. "Our overall strategic goal remains unchanged… our ambition is to be the industry's innovative technology leader, realising its customers' highest ambitions in glass. We are a proven, trustworthy partner that focuses on customer needs and we see customers coming back year after year."

Because Glaston and Bystronic glass were already operating in a similar way, with similar customers and experiences throughout the world, the integration has been a smooth process. "We were able to resolve how both companies could benefit from each other and use their knowledge to expand our product range and service to customers" says Sasu Koivumäki. "Sharing standard operating systems is also a real advantage."

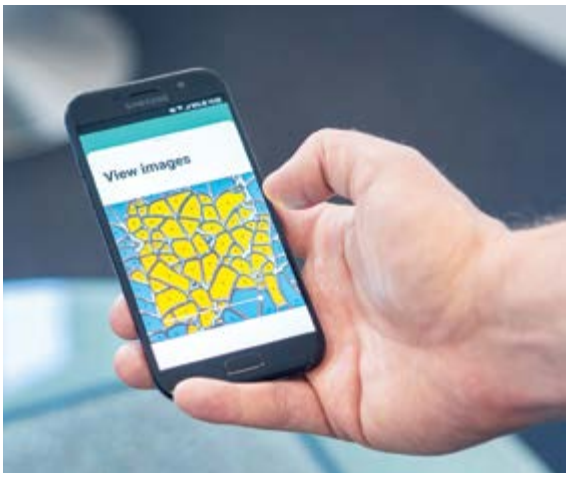
Customer reaction to the acquisition has been very positive. "For those that were already customers of both Glaston and Bystronic glass and for other companies that were not, it's been a real benefit to use the relationships to cross sell products and offer wider solutions to customers who are investing" Mr Koivumäki explains. "Our increased product range is a major advantage to everyone and there are already excellent results with customers."

A series of developments were planned for launch at the postponed glasstec 2020 exhibition and there is continuous improvement and enhancement across all products. Automation has been applied to all products, via digitalisation and optimisation throughout the process.

Importance of digitalisation

Digitalisation is considered especially important to attracting new talent and young people to the organisation and the combination of the team's existing expertise with digitalisation is described as a good combination. "Our knowhow and the data available from digitalisation are in synch and that's really good to see" says Sasu Koivumäki. "Glaston has been focusing on digitalisation for the last four-five years. It is something that I have personally supported strongly because I believe it is a must for the whole industry. It's a huge opportunity to provide our customers with more data to further improve their processes and eventually increase automation."

Celebrating Day One of the integration at Bystronic Lenhardt GmbH in Germany.



Glaston has been focusing on digitalisation for the last four-five years. Glaston Siru is an example of how AI automates the glass fragmentation test.

Development initiatives are constant, the key being to put good information to good use. "The benefits are already there and will become greater and greater. It is a really good investment for us in terms of service to customers and attracting young people to our company" Mr Koivumäki adds.

Glaston believes it can assist customers to become less operator-dependent as they may have been in the past. The company is also helping customers that have people joining from outside the glass industry with little knowledge of glass processing. "Our technological knowledge can help accelerate their entry in the industry and is a real benefit" says Sasu Koivumäki.

Positioned for industry recovery

Via its R&D facilities and expertise, Glaston is focused on continuous improvement. The company is now in the enviable position of having pre-processing and heat treatment under the same roof, delivering machines and services for the production of heat-treated glass, insulating glass manufacturing, automotive and display glass processing. "Not only do our products give us a really good starting point as the industry recovers, we can broaden the product range even further in the future" Mr Koivumäki contends. "The other key factor is that globally, we have such extensive experience and relationships in the industry, even more so since the Bystronic glass acquisition."

The business is already seeing a very active market again in China, with an order backlog leading to investments in new equipment. In Europe, activity is increasing and even during the crisis, activity was relatively high in the German speaking regions. "With our geographical reach, being in close contact with our customers is a major advantage because we know their needs and what we have to do to react accordingly" says Sasu Koivumäki. "It's extremely critical that we are able to understand clearly what is happening in those locations."

Further information:
Glaston Group, Tampere, Finland
tel: +358 10 500 500
email: info@glaston.net
web: www.glaston.net

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Front view of the Koenig & Bauer Kammann 12,000m² production facility in Löhne, Germany.

Open house set to demonstrate tradition and innovation

In an exclusive Q&A interview, Matthias Graf discusses the latest digital printing equipment innovations from Koenig & Bauer Kammann, plus current priorities for the German printing machinery specialist.

Having moved into its new 12,000m² production facility in Löhne, Germany at the beginning of this year, Koenig & Bauer Kammann GmbH is all set to present its latest developments and machines to a wider audience. Originally, of course, these announcements were scheduled to take place during the glasstec 2020 exhibition in October, an event that has been postponed until next June.

Instead, to give interested customers the possibility to become fully informed about its latest machines and the innovative features conceived for existing equipment, Kammann is planning an 'open house' from 5 October until 6 November 2020. "This open house event is planned for an extended time period, since we want to observe health regulations, which allow only a limited number of people at any given time in our show rooms" explains Managing Director Matthias Graf. "Also, with a reduced international flight schedule currently available, our customers might not have the possibility to visit us within a shorter time period" Mr Graf adds.

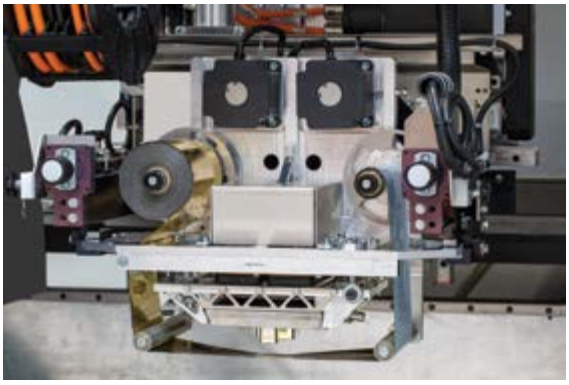
The centre of attention and highlight of the presentation will be the recently announced HS300 series and the latest version of the Kammann digital printer series.

Setting the benchmark

The HS300 is a highly specialised machine for cylindrical glass containers, such as beer and soft drinks bottles. With a design speed of 300ppm, it is up to 50% faster than other machines in the market and sets a benchmark in the industry. However, besides the output, the HS300 has some special features, including a contactless pre-registration and print image inspection system. Designed as a continuous motion machine, it is intended to operate 24/7, both in-line and off-line.

According to the company, the productivity of this machine is a quantum leap forward, which is extremely important in such a competitive high volume market. At the same time, Kammann was able to objectively improve the print quality, for which the colour to colour registration is an important indicator. The Kammann team has engineered the machine to be installed in-line with glass manufacturing, so it is capable of withstanding high temperatures and other harsh conditions.

A completely different market segment is covered by Kammann's line of digital printers. Designed to apply high resolution images that cannot be reproduced by the screen printing process, on any shape articles, such as rounds, ▸



The latest Kammann hot stamping module is suitable for new machines and also for installation in existing screen printing units.

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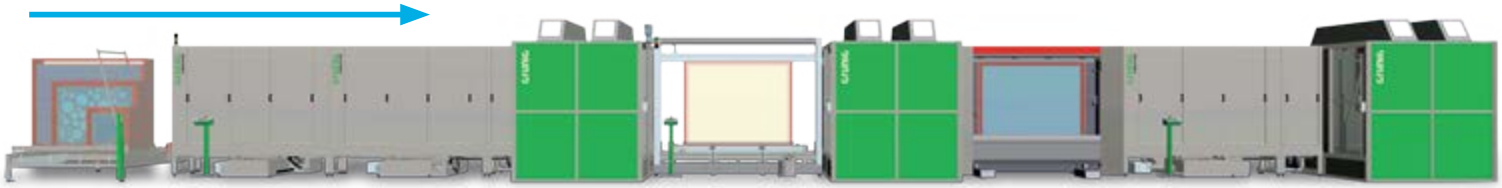

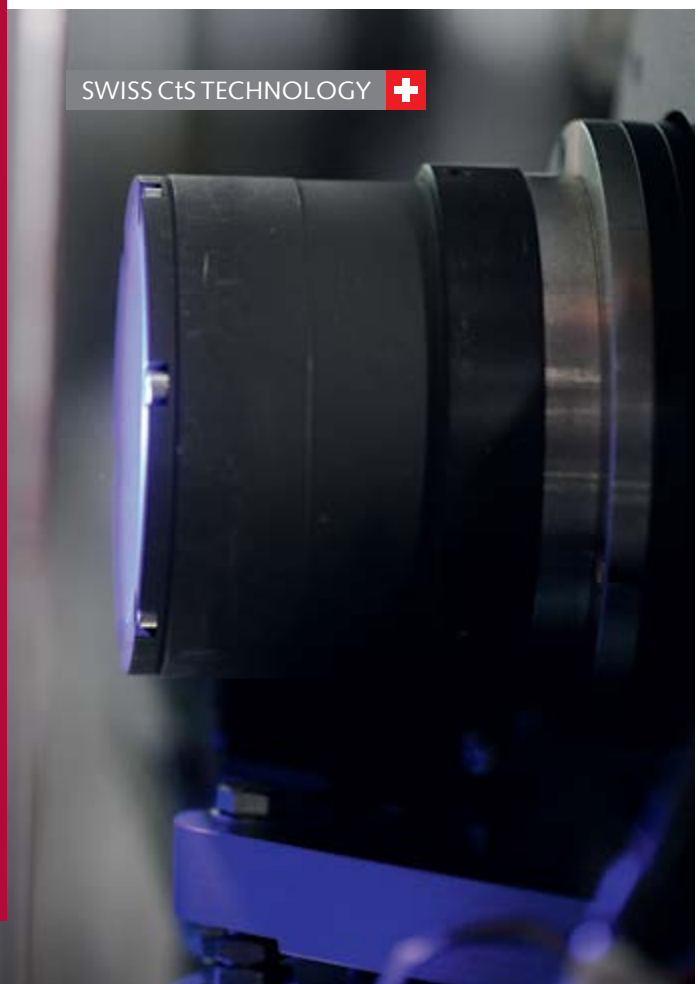

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Koenig & Bauer Kammann is all set to present its latest developments and machines to a wider audience.

The HS300 print station has been specially designed for high speed printing.

ovals, flats and any other given form, the Kammann digital series has become the best selling machine in this area.

Products, such as spirits bottles, drink ware and cosmetic flacons are all suitable to be decorated by this process. Furthermore, it is interesting to note that printing multiple passes of clear digital ink can imitate embossed glass, which makes the need for new moulds redundant, especially when it comes to small production runs.

Market status identified

Speaking to *Glass Worldwide,* Managing Director Matthias Graf offered more information on the current market status and his company's initiatives in the months ahead:

GW: How did the Covid-19 crisis affect your business in the first six months of 2020?

Since we have confirmed orders until the beginning of next year and our supply chains have worked even better than was to be expected, I can say that the first and second quarters was 'business as usual' as far as production was concerned. Of course, the number of incoming orders fell sharply after the lockdown but recovery is on the way. Orders from various geographical regions that came in last month make us believe that people believe in an economic recovery.

Secondly, we are currently very busy installing many machines that were delivered in the past three-four month but could not be installed, because of closed boarders and other restrictions. This adds to the workload but we can manage.

Digital printed embossing effect.

Example of a 3D print.

GW: You will have an 'open house' event later this year. Can you elaborate a little bit about this?

We were ready and well prepared to present our new developments to clients during this October's glasstec show. After the show was postponed, we decided that we did not want to wait until next year and chose the 'open house' as a preferred format, since we believe that machines need to be seen and evaluated in operation. Our new factory offers all necessary conditions to host such an event.

GW: Can you explain, why the HS300 and Kammann's series of digital printers are setting benchmarks?

In both cases, it is higher productivity and better print quality. The HS300 is a brand new continuous motion machine design with features such as a dual squeegee head for each print station, which allow the highest speeds and adding print quality at the same time. Another innovation is our print image camera inspection system, which is able to analyse various parameters of any printed image at maximum operating speed.

Our digital printers for glass can be upgraded with a second print head on each print station, allowing a speed increase of up to 50%. This is good news for customers!

GW: Would you like to share any other developments with us?

Besides the previously mentioned developments, we offer new auxiliary equipment, such as in-line/off-line movable print image inspection systems. Also, the new foil transfer station for small images, which can be flexibly installed into an existing screen printing station of a K15CNC will create a lot of interest for sure.

Besides the design of products and processes, we strongly focus on the integration of various processes onto existing equipment, to build what we call a hybrid machine. Using a digital primer as a base to apply a foil on an article is an example. ●

Further information:
Koenig & Bauer Kammann GmbH, Löhne, Germany
tel: +49 5744 7710-0
email: mail@kammann.de
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Multiple furnace projects completed during Covid-19 crisis

Indian furnace contractor Furnotherm has successfully completed a series of construction projects for local glass plants in recent months, illustrating its ability to execute several projects simultaneously at different locations. According to Managing Director, Jogendra Singh, much of this work was undertaken during the challenging social and business conditions created by the Covid-19 pandemic.

Two projects were successfully completed on behalf of Piramal Glass in Kosamba at the beginning of the year, for example. This included the rebuilding of a 40 tons/day glass container furnace at the beginning of January. The project was finished in record time, six days ahead of schedule.

Subsequently, an existing 100 tons/day furnace at the Kosamba site has been enlarged to 145 tons/day. This job involved the fabrication and erection of 300 tons of steel and the installation of approximately 2800 tons of refractories, along with the erection of furnace cooling ducts and associated equipment. Work started in mid-February and was completed by mid-June.

A greenfield furnace construction project has also been completed on behalf of SCHOTT Glass in Jambusar, India. Furnotherm was responsible for the fabrication and erection of steelwork for the T66 project, along with refractory installation. Steel fabrication started before India's Covid-19 lockdown but refractory installation began during lockdown, in the third week of April.

Separately, Furnotherm has extended the existing batch house at Jambusar. This involved the fabrication and erection of different silos and steel structures, plus the installation of batch house equipment.

Two important projects are also being executed this year for Sunrise Glass in Surat, India. This includes the supply and erection of steelwork for a greenfield 225 tons/day furnace project, while also rebuilding an existing 180 tons/day furnace. Started at the end of May, the second project has involved dismantling and rebuilding the furnace. Construction was completed in record time, with production initiated at the beginning of July. ●

Furnotherm offers a comprehensive range of furnace construction services, including draining, demolition, rebuilds, heat-up, steelwork, refractory installation, utilities, electrical and instrumentation work.

About the author:
Jogendra Singh is Managing Director of Furnotherm

Further information:
Furnotherm Glass Projects India Pvt Ltd, Thane, Maharashtra, India
tel: +91 22 2584 2101
email: glass@furnotherm.com
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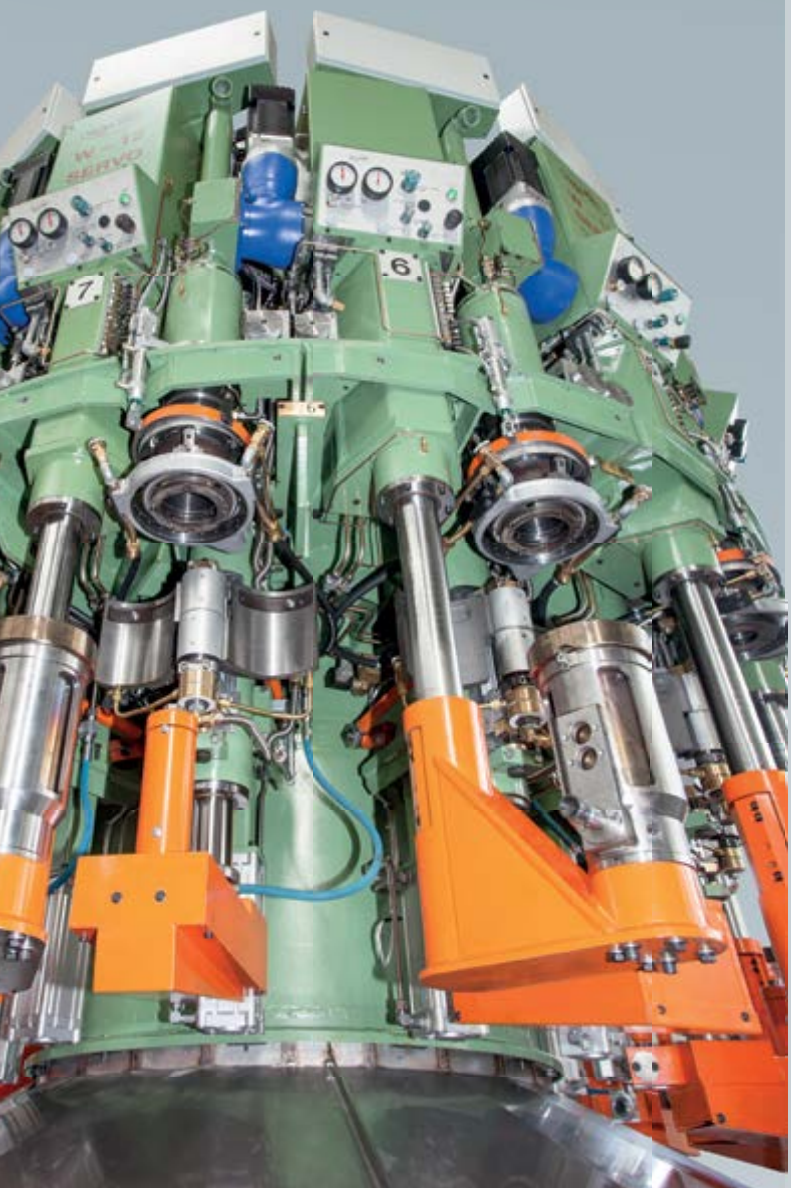

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Developing non-contact glass container inspection solutions

USA-based Applied Vision Corp has specialised in the development of non-contact glass container inspection solutions for more than two decades. Initially, systems were supplied exclusively to OEMs serving the industry but today, the company is successfully delivering its own technologies direct to a growing network of glassmakers.

According to Jeff Hartung, Executive Vice President – Glass, innovation is critical to the success of the Applied Vision business model, solving the difficult challenges that exist for its customers in ways that maximise value. A technology leader of non-contact glass container inspection systems, Applied Vision Corp has been developing innovative machine vision solutions since its founding in 1997.

With decades of valuable industry experience to call upon, President and CEO Amir Novini left his position as Vice President of Marketing and Product Development at LumenX and set out to deliver the world's most advanced machine vision systems to the container industry, quickly growing Applied Vision into an international market leader in machine vision inspection technology.

"Our knowledge base and expertise pre-dates the creation of Applied Vision Corp" Jeff Hartung explains. "That said, we supplied our systems to Emhart Glass in 1997 for its vision equipment exclusively until 2013, when we exited the contract and began to develop our own systems."

Mr Hartung confirms that glass is an extremely strategic part of the company's growth and its future success. "We see glass as a sustainable rigid packaging material from ecological and health points of view" he says. "Glass packaging is a beautiful medium for consumers."

The Applied Vision corporate headquarters is located in Akron, Ohio, USA.

Product innovations

With an intense focus on colour as well as continual technological advancements, Applied Vision has been able to solve longstanding challenges in the field of rigid container inspection. The Applied Vision equipment portfolio has evolved via the increased use of the full electromagnetic spectrum, improved patented lighting geometries, machine learning software technologies and advancements in the inspection of highly decorated/embossed and non-round containers.

The product range includes Volcano SSB, which provides inspection of sealing surfaces including wire edge, base, base stress, mould number reading, vision plug and vision dip and saddle. Also available are Volcano SW, a system that provides opaque and transparent defect inspection, sidewall stress and dimensional inspection, Neutron for non-contact, non-rotate wall thickness inspection and Multiview Cyclops to accommodate inline standalone sealing surface, wire edge/overpress, knockout and flange finish inspection requirements.

"We envisage a future where containers are inspected without contacting them" says Jeff Hartung. "This will eliminate the need for rotary carousel inspection machines that are costly and difficult to maintain, often requiring the need for additional conveyance and inspection legs. We are quickly converging on this solution, ▸

Volcano is a state-of-the-art, multi-station inspection suite for glass containers, utilising patented illumination and inspection technologies.


The Applied Vision management team.

Jeff Hartung, Executive Vice President – Glass.

which will optimise the layouts and improve efficiencies for the cold end of glass plants."

In support of its technical innovations, Applied Vision's worldwide network of sales and service operations is increasing as the company's glass business expands into different regional markets. "We know how important regional support is to our customers" Mr Hartung confirms. "In addition to our engineering and manufacturing headquarters in Akron, Ohio, we have sales and service offices in Spain, Poland, Egypt, UAE, Thailand, Malaysia, Singapore, the Philippines, Mexico and Brazil. Japan and China are served by full service distribution operations."

In total, Applied Vision employs more than 100 people worldwide, with over 80% of personnel coming from technical backgrounds in electronics and vision application.

Positive customer relationships

Glass manufacturers that adopt Applied Vision technology are expected to benefit from reduced cost of ownership, improved inspection with fewer false rejects at higher quality levels, with the provisions of important feedback for the forming process and a lifelong partnership with unparalleled support. "We listen and apply" says Jeff Hartung.

Initially, the company focused its efforts in the USA but is now expanding its coverage to Latin and South America, the Middle East and Turkey. This includes the creation of significant alliances with Ardagh Group, Glass – North America (USA) and Gurallar Cam Ambalaj (Turkey). In both instances, good customer relationships have been created, primarily by listening to one another and working together to solve problems.

Turkish glass container specialist Gurallar Cam Ambalaj, for example, selected Applied Vision's Volcano glass inspection systems for its second furnace project in Kutahya. "We chose Applied Vision for this project because of their commitment to new technologies that support our strategic focus, as well as our positive experiences working with them on past projects" commented Abdullah Gayret, General Manager of GCA Gurallar Cam Ambalaj. "It is clear that the future will belong to the most advanced, efficient and technology-driven companies and we strive towards the future in collaboration with our global suppliers and business partners."

Looking ahead

Among the biggest challenges facing Applied Vision is how best to accommodate growth, develop talent within the organisation and select the correct talent from outside the business in a way that both supports the company's growth and maintains its culture. Among the organisation's greatest opportunities is the creation of a non-contact, full vision-based solution for the international glass container industry. In addition, Applied Vision is currently working on automating other offline and laboratory measurements, as it continues to differentiate itself from competitors via advanced software, illumination techniques and advanced optics.

The company has strategies in place to continue its rapid expansion into the glass container industry business, doubling its turnover within four years. Although the ongoing Covid-19 pandemic has provided a few challenges,

Neutron is the world's only glass wall thickness inspection technology that measures both thick and thin areas over 100% of a container, irrespective of shape or colour, using no contact at full line speed.

mostly related to project delays or to installations. However, as a result, this situation has created the need for more virtual support mediums like instructional videos and more remote meetings. "Order intake is ongoing and although a few larger projects may be delayed, we don't anticipate any significant interruptions to our operation" Jeff Hartung confirms. ●

Further information:
Applied Vision Corp, Akron, Ohio, USA
tel: +1 330 926 2222
email: sales@appliedvision.com
web: www.appliedvision.com

Twenty five successful years of software engineering

The glass industry faces numerous challenges in terms of technology, ecology and profitability but dealing with these topics is essential. According to Anne-Sophie Lelièvre, however, the basics should not be forgotten; meeting final customers' needs remaining a top priority. With 25 years' experience in manufacturing execution systems, Vertech' combines these elements in a single system and allows glassmakers to deliver products in compliance with their final customers' specifications, while having all necessary KPIs to face current challenges successfully.

This year, SIL celebrates 25 years of software engineering dedicated to production supervision for glassmakers producing hollow glass, tableware or tubes. In 1995, Vertech' was a pioneer by dealing with digitalisation in glass manufacturing. Throughout this period, the French company has equipped more than 650 production lines throughout the world, from Europe to Asia, through the Americas and into Africa. SIL was the first manufacturing execution system dedicated to glassmakers. It has evolved over the years and has always adapted to glassmakers' needs and available technologies.

All five software products are complementary and make SIL a consistent and complete manufacturing execution system for glass plants.

Expertise, innovation and service

The Vertech' team combines two areas of expertise: Complete knowledge about glass manufacturing processes and precise knowhow in software engineering. Software engineering for the glass industry is the company's only core activity, a situation that grants a high level of specialisation. Service – more particularly, through the availability of customer support or the realisation and follow-up of customised projects – has always been considered as a priority. Through plant visits, SIL installations and on-site upgrades, Vertech' employees have consistently stayed close to glassmakers' processes and requirements.

Over the past quarter of a century, SIL has evolved via a series of technological innovations. Some time ago, for example, some SIL products were transferred to the Web for matters of security and user experience. In addition, the more frequent use of multiple devices such as tablets in plants has also been anticipated by software engineers,

Time goes by but the final objective has remained the same at Vertech': Meeting glassmakers' needs (image courtesy of Vertech').

who are developing systems by considering these latest standards. From the outset, a yearly version including new features and improvements of the software is launched.

Everywhere in the glass plant and even further

Over the years, SIL has become a complete system, with many features for different products, each having its own scope and objectives. SIL collects data everywhere in the glass plant; on the production line, of course but also at the batch plant, at the palletiser, in the quality laboratory and in the mould shop.

Data collected by the system is then displayed on fully customisable dashboards. These dashboards, as well as data reporting and extracting tools, go beyond the boundaries of the plant. They are also available at a group's headquarters, where senior managers can access multiple plant dashboards.

Restructured range of products

The company's 25th anniversary represents a good opportunity to restructure the SIL products. Their full extent of features remain available, while being re-organised. All five software products are complementary and make SIL a consistent and complete manufacturing execution system for glass plants:

- SILProd collects and displays data on production lines.
- SILXQual is dedicated to quality control management on produced articles, raw materials, pallets or resorted articles.
- SILXMold ensures the traceability of single moulds and mould sets through the management of repairs and dimensional controls.
- SILXManager, as indicated by its name, is the interface dedicated to managers and includes reporting and data extraction tools for analyses.
- SIL4.0 is the latest product dedicated to Industry 4.0 and is actually more like an individual project, adapted and developed for each single plant.

With this comprehensive solution, the entire manufacturing process is supervised. All production information is displayed in real-time, articles are controlled in line with final customers' specifications and KPIs for consistent analysis are shown on dashboards. In short, everything glassmakers need to boost productivity and to make good decisions.

Since 1995, the Vertech' team has been working to provide the most advanced manufacturing execution system for the glass industry (image courtesy of Vertech').

About the author:
Anne-Sophie Lelièvre is Communications and Marketing Manager at Vertech'

Further information:
Vertech', Chalon-sur-Saône, France
tel: +33 385 981 919
email: vertechsales@vertech.eu
web: www.vertech.eu

A more sustainable source of inspiration

It was 50 years ago that SORG introduced the first all-electric VSM furnace. According to Volker Müller, having supplied more than 100 of them and electric boosters for more than 500 fossil-fired furnaces worldwide, the German family-owned manufacturer still leads the way with its sustainable solutions.

SORG's electric melting team includes electrical engineers, mechanical engineers and industrial management assistants. Technical development and pre-engineering are included in the quotation phase, with all calculations and key equipment design carried out in-house.

Systems are tailor-made to individual customer needs and boundary conditions. Technical documentation is provided to help resolve day-to-day problems, while commissioning support and free after-sales monitoring helps to advise when electrodes need pushing or replacing, along with expert maintenance assistance from SKS/ Sorg Feuerungsbau.

SORG's VSM all-electric melter.

Melting glass, not glaciers

In light of the target set by the Paris Agreement to reduce carbon emissions to net zero by 2050, the global glass industry is facing a huge challenge to find more renewable energy sources. The overall disadvantage also of modern glass melting furnaces is that they are fossil-fuelled, with many installing electric heating only to increase melting performance and glass quality.

As high energy-intensive installations, furnaces continue to produce significant CO_2 through the combustion of fossil fuels. Efforts are underway to reduce CO_2 emissions and slow down global warming. The European Union goal for climate neutrality by 2050 means the complete eradication of fossil fuels, leaving electrical energy as the most logical alternative.

The VSM rotating crown.

All-electric origins

The cold top vertical melting principle of SORG's Vertical Super Melter has proved to be the best technology available for glass furnaces using only electricity as their energy source.

Patented in 1970, the VSM produces all kinds of glass, especially

high quality glassware ranging from borosilicate glass to tableware. The all-electric melter's main strength lies in how easy it is to run. Without combustion and waste gas treatment equipment, only a small number of auxiliary aggregates have to be installed, operated and maintained. This, along with the general furnace design, results in a shorter repair downtime.

Solely electrically heated, it produces no CO_2 emissions during the melting process and reduces energy consumption in a number of distinct ways. No energy is lost in terms of large quantities of waste gas, only generating a relatively small amount from the decomposition of raw materials in the batch (batch gases), as well as water vapour from raw material humidity. Removed from the furnace superstructure and cleaned by a small baghouse filter, this prevents in-factory dusting and the clean waste is released into the environment without any further treatment.

As the main process steps take place in the vertical direction of the furnace, the outside surface area of the cylindrical melting tank is relatively small.

SORG's rotating crown batch charging system achieves a perfectly even coverage of the melt with a layer of raw materials. This batch blanket acts as an insulating layer on top of the melt and an integrated batch preheater, resulting in superstructure temperatures of between only 150°C and 300°C.

Increased demand for all-electric melters in localities with high environmental requirements has led to urban glass producers being allowed to extend production capacity only by switching to a furnace technology that avoids emissions of air pollutants like sulphur dioxide or nitric oxides. In areas with high hydro power potential or limited supply of natural gas, electricity is the cheapest energy available.

Reduced carbon footprint

For the global glass industry, the greatest challenge is to reach climate neutrality in a foreseeable period. The future of glassmaking requires sustainable melting technology. Classical combustion technology, like the regenerative firing principle that has been used for more than 150 years, will soon be gone.

The concepts of hybrid melting and alternative combustion fuels still have a long way to go. All-electric melters have proven technology and may see a renaissance in the production of special glasses. By implementing certain process changes, they make an ideal alternative for mass produced glasses like containers.

Even though such a long-term commitment is extremely difficult due to undefined boundary conditions, it is possible to commission a first design stage melting furnace almost conventionally today. Simply by boosting shares of more than 10% in the total energy and increasing the use of electricity over time in accordance with the changing regulations, this furnace concept has the advantage of greater flexibility, especially if there is the possibility of future fossil heating using green hydrogen.

The need to reduce emissions is now more important than ever. And as long as there is a sufficient supply of carbon-neutrally generated electric energy, the only solution for sustainable glass production is electric melting. ●

The VSM Vertical Super Melter is a registered trademark.

About the author:
Volker Müller is Head of Electric Melting at SORG

Further information:
Nikolaus SORG GmbH & Co KG, Lohr am Main, Germany
tel: +49 9352 507 0
email: nsorg@sorg.de
web: https://sustainablemelting.sorg.de/

Multi-layer measurement for laminated glass applications

The latest technically advanced features in laminated glass applications, such as automotive windscreens, architectural glass, safety glass or bulletproof glass, have resulted in ever more demanding measuring requirements. The high quality and precise functionality demand on multi-layer laminated glass can only be met through ultra-precise measurements. Marvin Krebs describes a device that is capable of measuring all the layers of such laminated glass with the required precision.

There is a growing need for multi-layer measurement of laminated glass in a wide range of applications. In the automotive industry, for example, features such as head-up displays (HUDs) are becoming increasingly common in premium models. As more and more cars are equipped with HUD windscreens, automotive manufacturers need a fast and reliable means of measuring the multiple layers and parameters to check whether the HUD is functioning correctly.

Example of a state-of-the-art imaging windscreen (HUD display).

Challenging inspection parameters

Multiple parameters have to be controlled to ensure the correct functioning of an HUD. The size and position of the HUD inside the windscreen must be just right – usually 30cm-40cm from the left- and right-hand edge of the glass. Only a minimal degree of waviness is acceptable in the driver-facing glass layer (surface 4 in figure 1).

The PVB foil sandwiched between the two glass layers must be of a predetermined thickness and have a precisely angled wedge shape, with the thickness decreasing from top to bottom. This is essential because the wedge angle and changing thickness of the wedge must be absolutely correct to ensure the HUD imaging has no optical errors, such as blurring or incorrect images.

Moreover, the PVB may only have a minimal degree of waviness. The so-called ICE coating or transparent thin film, which is an important additional safety, heat-insulation and water-repellent feature in many premium cars, is only about 5-10µm thick but has to be measured with high accuracy as well.

Last but not least, it is important to detect any post-autoclave air inclusions or defects in the windscreen to ensure the strict quality standards are met. These parameters are just some examples for the multiple measurement requirements for automotive glass. The requirements for multi-layer laminated glass for architecture, safety or bulletproof glass (eg in compliance with ISO norms) are equally demanding.

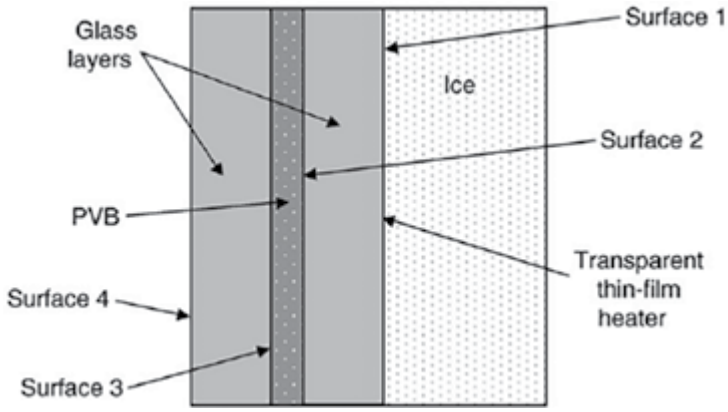

Figure 1: Surface 4 faces the driver; surface 1 is the outside surface of the windscreen.

Solution

The CHRocodile 2 IT interferometric sensor is the only device capable of measuring all the glass and PVB layers in such multi-layer laminated glass applications. The very small differences in the refractive indices of glass and PVB mean that interferometry is the only measurement technology capable of resolving all the layers in, for instance, windscreens (figure 1).

The sensor enables high speed measurements at up to 70 kHz and offers excellent lateral (5.5µm) and axial resolution (4nm) along with a wide measuring range of 17mm in glass (n=1.5). It is also ideal for highly reflective ▸

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surfaces and can resolve all the layer thicknesses and topographies of the thin transparent film (ICE coating), the outer and inner glass layers and the PVB foil.

Although the CHRocodile 2 IT uses a compact optical probe of only 15mm in diameter, it has a large working distance of 40mm (with 100mm as an alternative option) and enables quick scans over large areas, eg an entire windscreen or any other kind of laminated glass.

Outstanding technology

The CHRocodile 2 IT interferometric sensor offers up to 70,000 non-contact thickness measurements per second. The sensor's measuring technology delivers results of outstanding precision, irrespective of the surface texture or finish.

As a result of the extremely high dynamic response and outstanding signal-to-noise ratio of the CHRocodile 2 IT, it can be used to measure a wide variety of different surfaces. Moreover, the robust measuring technology is perfectly suited for the use in harsh industrial environments.

In the measurement of multi-layer laminated glass, the sensor is an outstanding solution for automotive glass, architectural glass and other demanding glass applications. ●

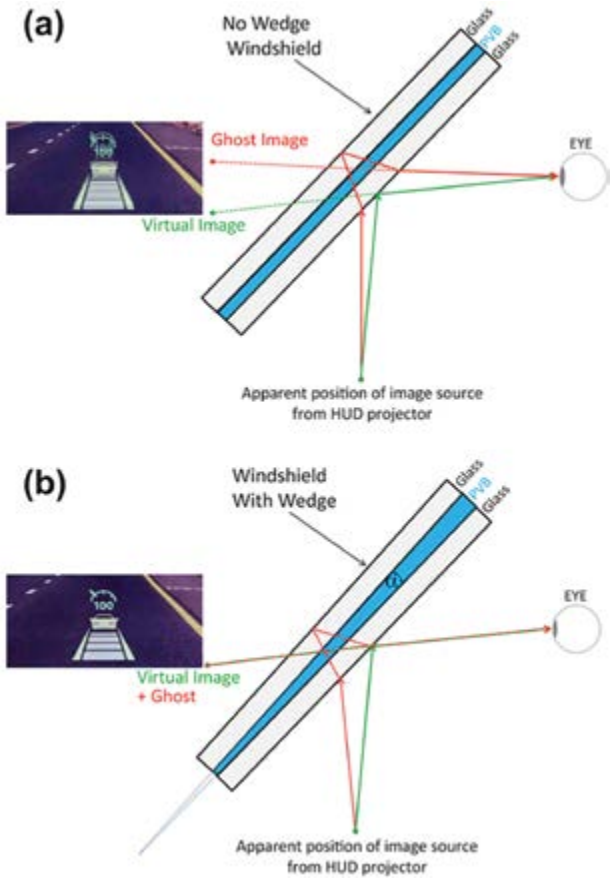

Figure 2: (a) shows an incorrectly shaped wedge angle of the PVB, resulting in a blurred image on the HUD; (b) shows a PVB with a correct wedge angle leading to a sharp image on the HUD.

About the author:
Marvin Krebs is Business Unit Manager Glass at Precitec Optronik

Further information:
Precitec Optronik GmbH, Neu-Isenburg, Germany
tel: +49 6102 3676 183
email: m.krebs@precitec-optronik.de
web: www.precitec.com

German plant upgrade features advanced production technologies

Ardagh Group's Germersheim glass production facility in south west Germany has been the subject of a substantial investment in recent months. One of the facility's two melting furnaces has been completely rebuilt and as part of associated production shop investment projects, some of the glass container industry's most advanced manufacturing technologies have been purchased. This includes specialist production machinery from Heye International GmbH, one of the facility's longstanding partners.

Germersheim is one of eight plants operated by Ardagh in Germany, located near Speyer, where some 280 people are employed.

An intensive 150 day repair schedule was undertaken to make production more efficient and environmentally-friendly, preparing the Germersheim glassworks for continued successful operation in the future. As well as renewing the green furnace, the batch plant has been upgraded and new NNPB production equipment has been installed. An annealing lehr has been replaced, as well as the basement cullet return system, while existing supply facilities for compressed air, gas, water and electricity have been either rebuilt or overhauled.

The Heye feeder mechanisms feature the latest front plates and spout casings.

The rebuilt regenerative melting furnace serves four production lines, two of which have been equipped with the latest SpeedLine IS machines from Heye International. This equipment features the safe, user-friendly, easy-to-clean, flexible and fast Multilevel security concept. It is designed to comply with HACCP standards and employs a modular design for simplified maintenance and service. The use of standardised components reduces the number of spare parts required, while existing machine mechanisms are also reusable.

One of the new IS machines is a 12-section 6 1/4in double gob installation, while the second is a 10-section 5in double gob SpeedLine. The production shop's other two lines feature existing Heye IS machines. The feeders for these lines have been modernised with the latest Heye front plates and spout casings.

Commenting on the successful completion of this project, Stefan Döring, Technical Service Manager for the Germersheim facility, expressed his team's positive response to the working relationship established with Heye International engineers. "There was a very good co-operation with respect to pre-works engineering, FAT organisation, machine installation and commissioning" he confirmed. ●

Heye International 10-section 5in double gob SpeedLine IS machine.

Further information:
Heye International GmbH, Obernkirchen, Germany
tel: +49 5724 26-0
email: marketing@heye-international.com
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The synergy behind furnace management technology success

PaneraTech recently exceeded 500,000 refractory measurements with SmartMelter technology. Yakup Bayram discusses what the company has learnt from these measurements and how the combination of people, technology and data has been instrumental in its success.

When CEO Yakup Bayram and his team began working on SmartMelter in 2007, the focus was on the development of the technology. Ten years later, the company had patented sensors and proprietary data analysis that measured refractory walls within 5mm. Now, after half a million measurements and over 300 inspections since 2017, PaneraTech knows that its success is about more than an innovative sensor. It is about the people, the data and experience gained and the commitment to continuous improvement as the technology is used to help glass manufacturers achieve uninterrupted production.

"SmartMelter is really the synergy between the tool that collects the radar signal, the data experts who analyse that signal and the knowledge that our team brings from our experience and partnerships in the industry" said Dr Bayram. "And the process actually starts before the sensor is on-site at the plant."

Preparing for an inspection

A SmartMelter inspection begins with a review of material construction and binding steel details of the furnace. From this information, a digital furnace model is built for the radar experts on the data analysis team. There are two reasons for this important step. First, radar signals move differently through different materials, so this step is essential for accurate interpretation of data. However, this is also what makes it possible for a customer to see exactly where maintenance and repairs need to be targeted.

"Furnace experts are involved with the customer from the beginning, working to optimise furnace coverage with an inspection plan" Dr Bayram explained. "The customer has a conference call with the team in advance to discuss any issues such as access to tight areas or steel areas."

At the plant

Once a plan is created, the equipment is sent to the plant and a technician helps first time customers label each area of the furnace to correlate with the digital model. When customers are presented with a final report, they can see exactly which blocks needs attention. The labelling and mapping into the digital model is what makes that clear. After this is done once, the model is ready for future inspections.

Next, the plant staff is trained to use the sensors. This usually just takes half a day. The SmartMelter sensors are small and lightweight and very easy to use. This entire stage is often done remotely. In over 95% of repeat SmartMelter inspections, the customer performs the radar signal acquisition with remote support from a technician. As tighter restrictions have been placed on outside visitors, most first time customers are also choosing this option. However, if a customer prefers on-site help and can allow it, a technician can be provided.

"We like to say that we are a global company, who is local to everyone" said Dr Bayram. "We can ship our equipment anywhere for our customers to use with a dedicated remote technician. Our field engineers are based in three different countries and can travel to the plant for extra help. Our certified partner, Fosbel, has technicians located all over the world. We also have contract technicians in multiple areas. If a customer really wants in-person help from someone who speaks their local language, we can arrange it."

When the furnace is labelled and the staff is trained, radar signal acquisition begins. This data is collected as the staff touches each block with the sensor, according to the inspection plan.

Data analysis and interpretation.

Data analysis and interpretation

The data analysis team receives each radar signal that the plant collects and the data is analysed for quality and interpreted into a measurement. This team is made up of radar experts led by advanced engineers with PhD degrees. The advanced signal processing algorithms that make SmartMelter measurements possible are the result of decades of research.

Sometimes an analyst will ask the plant personnel to take more refined measurements in specific areas. Now that they have seen hundreds of thousands of radar signals, their protocols for interpretation are more refined. ▸

Preparing for an inspection.

See Page 148

"Change is only another word for growth, another synonym for learning" *Charles Handy*

Sheppee technical and product support

Protocols for this team's work are continually improved, based on customer validation data. The scientists on this team are always looking for ways to improve quality based on their experience with hundreds of inspections. This, in addition to advanced algorithms, is one reason for SmartMelter's high level of accuracy.

SmartMelter has recently published its accuracy based on customer validations through multiple methods, such as drilling, hook measurements, cold repairs (material recovery) and hot repairs. Out of 305 inspections, SmartMelter has only missed the presence of glass twice, both in the early stage of penetration into the insulation.

"Both of these happened in the early years of the SmartMelter and they were just small amounts of glass that the protocols at the time did not recognise" Dr Bayram explained. "We have updated our protocols since then, based on what we've learned and we've had zero misses since. We can actually identify glass one-three years before visual or thermal indications."

PaneraTech also published low numbers for false alarms. The customer validations reveal that SmartMelter reported an anomaly or thin wall, where there was none in only six cases. This number is best explained by the company's quality assurance process. Because SmartMelter targets a zero miss rate, the data analysis team flags anything that looks abnormal in the walls as an anomaly. Then, the manufacturer is quickly able to resolve the anomaly through small drilling or through a follow-up inspection that shows whether there has been active growth.

Review by furnace repair experts

Once the data analysis team has completed the inspection, furnace experts review the results to determine the level of risk and make maintenance and repair recommendations. They use knowledge gained from hundreds of inspections and best practices from across the industry to assess the reliability of the refractory. The SmartMelter team can assess reliability of a furnace bottom up to two years and a lower sidewall up to one year. Manufacturers find it valuable that they can now know if they are safe to run their furnace for another year or two years without a glass leak. The team can also make recommendations for overcoat optimisation for high wear areas such as the metal line, throat and electrodes/bubblers.

At the plant.

When a customer is working with certified partners such as Fosbel, the partner is also involved in this phase of review. SmartMelter reports enable targeted repair quotes that accurately reflect the materials and labour needed. The customer can be confident that the repair team will arrive prepared, preventing the lost time that can often happen with surprises.

Customer teleconference

Finally, a teleconference is held with the customer to review the results of the inspection and discuss the recommendations made by the SmartMelter team. The value given in the final report is made possible by the collaboration that happens between barrier-breaking technology, radar experts who continually strive for perfection and furnace experts who have learnt from 500,000 measurements and counting. The collective knowledge from this half million measurements and experience from performing over 300 inspections equips the team to make predictions that were not possible before.

"Our customers now get to benefit from the data and experience we have acquired through hundreds of inspections" said Dr Bayram. "We are always evaluating what we have learned and applying that to our practice so that our customers can have as little interruption as possible to their production." ●

SmartMelter is a registered trademark of PaneraTech Inc.

About the author:
Dr Yakup Bayram is CEO at PaneraTech

Further information:
PaneraTech Inc, Chantilly, VA, USA
tel: +1 703 719 9666
email: info@smartmelter.com
web: www.smartmelter.com

Latest developments in pharmaceutical tube processing

Via its acquisition of Spain's Kyp Accesorios, a manufacturer of ampoule processing machines with almost 30 years of experience in international markets, OCMI Group has consolidated its position as a leading supplier of borosilicate glass tube processing lines for pharmaceutical containers. Alessandro Crescentini outlines recent developments within the group.

The advent of the Covid-19 pandemic, which has seriously affected different economic sectors from Asia to South America in 2020, has failed to stop the activity of the OCMI Group at its facilities in Italy, Spain, France and India, of course in absolute compliance with safety regulations and with the primary purpose of safeguarding the health of employees and others directly or indirectly involved in the group's activities.

In recent months, the OCMI Technical and Commercial Departments have continued to keep in touch with customers worldwide, providing fast and remote assistance to analyse and solve technical issues. Once the health emergency is overcome, the group is ready to provide even more punctual technical assistance to all customers globally, thanks to the integration of colleagues at Kyp Accesorios.

From a technological perspective and with its enlarged structure, OCMI is able to offer more options to end users for the different steps of glass tube processing, especially for ampoule manufacture. One of the group's main initiatives is to minimise the manual handling routines of operators, in line with the needs of pharmaceutical companies. The companies of the OCMI Group have created a team to analyse the best options of each discipline and thus be able to offer the best solutions for customers.

Complete ampoule line from tube loader to automatic packaging.

Camera inspection system for dimensional and printing control.

Forming

Ampoule forming machines with 30 stations are manufactured at the OCMI facilities of Moderne Mecanique and Kyp Accesorios. The latest version of these machines has been adapted to control both the automatic loader and forming machine. It features an integrated cabinet with touch screen, where operators can check such production parameters as the number of tubes loaded, the number of items produced for each tube and the number of pieces to be produced to finish the current batch, as well as the speed of machine and chuck rotation. Defective stations can be excluded from loading from the control cabinet.

Featuring 36 stations, the FA36S ampoule forming machine is manufactured in Italy with the capability for bottom forming. This allows users to produce one more ampoule for each glass tube and reduces glass wastage accordingly.

Hot end camera control

The hot end camera control system for installation on OCMI Group ampoule forming machines with 30 and 36 stations allows operators to check production in real-time during hot forming. The differences of glass temperature between the tubes are corrected via the self-regulation of oxygen levels in the last burners placed before the forming area or, as an alternative, through the mechanical self-regulation of burner flame action.

The system comprises two cameras; the first infrared camera detects the heating level of each glass tube, while the second makes the final control for rejection or acceptance.

Data obtained can be organised in statistics to check rejections for each defect or the efficiency of each working shift.

Annealing

Annealing lehrs are offered with electrical or gas heating. Both options are completely interchangeable in Moderne Mecanique and Kyp lines. The recently announced gas-fired design ensures the same quality results of the electrical lehr in terms of ink brightness and strain removal from the glass surface. The combustion chamber where the gas burners are installed is completely sealed by quartz glass, protecting the ampoules from contamination.

The electrically powered lehr is the standard design supplied by Moderne Mecanique and Kyp, incorporating a recently introduced alarm sensor that indicates when heating elements malfunction.

Cold end camera system

In line with the requests of pharmaceutical companies, the camera control system for the inspection of printing, colour rings and OPC is now becoming a standard feature for ampoule post-forming lines. Developed by Kyp, this system allows users to check for printing defects, OPC dot and cut sizes and colour rings quality. It is suitable for installation on Moderne Mecanique and Kyp post-forming lines.

This camera inspection system is now the subject of further development to implement additional functions and checks according to market requirements.

Packing

The packing operation is one of the most critical procedures during the processing of empty ampoules, since traditional box filling could cause scratches, cracks or cosmetic defects, without the possibility to install any devices for further inspection. Pharmaceutical laboratories are increasingly demanding of their suppliers with regard to the final quality of containers delivered, so any device studied to reduce direct handling by operators invariably requires their approval.

The automatic packing machine is equipped with a rotating table, where four or six boxes (according to the customer's capacity needs) are positioned into dedicated steel trays and guides.

Job changes can be made through additional parts supplied for the adaptation of the vacuum picking arm or, as an alternative, with the automatic adjustment of vacuum cups distance according to the box length.

Automatic packing machines developed by OCMI and Kyp allow the same number of containers to be placed in all boxes without empty spaces. The operator can set the number of ampoules per row, the number of rows per box and the filling configuration (parallels or shifted rows) via a user-friendly touch screen. ●

About the author:
Alessandro Crescentini is Sales Manager at OCMI-OTG

Further information:
OCMI-OTG SpA, Milan, Italy
tel: +39 023909181
email: alex.crescentini@ocmigroup.com
web: www.ocmigroup.com

Head protector links for hot glass handling conveyors

Graham Womersley discusses the development of head protector links for use in the conveying of hot glass containers.

It been over 18 years since the first commercially produced head protector link for use in the conveying and handling of hot glass containers was launched by Pennine Industrial. The company was granted its original head protector link (HPL) patent (EP124117) in 2002. The original HPL was designed with the simple purpose to protect the riveted pin head that protruded from the side of hollow glass handling conveyor chain. This unprotected inverted tooth glass conveyor chain design was first used in the 1930s and for nearly 70 years, most mass produced inverted tooth conveying chains had exposed pin heads.

In the 1960s and 1970s, the manufacturing speeds of hollow glass containers on the smaller, slower IS machines of that time meant chains with protected pin heads were not required. However, due to the rapid development in the latest generation of high speed hollow glass container making machines towards the end of the last century and the demand to transport hot glass containers away from the forming machine at much faster speeds and on much longer conveyors meant that changes to the chain design were required.

The original HPL was designed to protect the riveted pin head that protruded from the side of hollow glass handling conveyor chain.

Higher speed implications

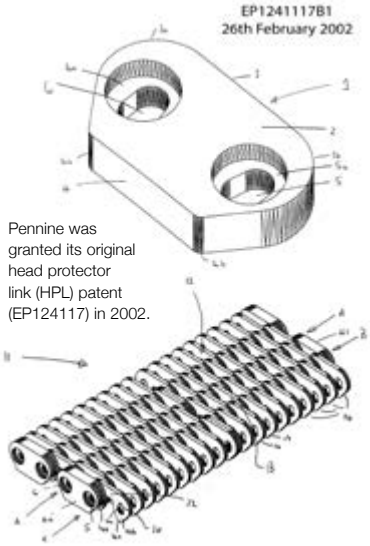
The higher conveyor chain speeds on glass handling conveyors that were growing in length meant the wearing faces between the pin head and guide plates were subject to greater friction, even if and when aligned correctly. If, however, there was any misalignment between the conveyor chains and sprockets or the conveyor chains and unprotected pin heads, this would result in rapid wearing of touching components and would result in either partial or total chain failure.

At the turn of the century, Pennine Industrial was starting to work with local glass plants in and around Yorkshire to overcome the problem of rapid glass container conveyor chain failures.

By 2001, the company was already undertaking in-house trials and in 2002, the first patent was granted. But this was only the start. Over the next 10 years, the company went on to develop 12 different types of head protector link to allow them to fit the system on the complete range of chains. This included multi-guide HPL, side-guide SHPL and central guide CHPL.

A thicker option with a deeper countersunk head meant extra clearance could be designed into the chains of more demanding, hotter or dirtier application in the glass industry. Low profile and extended pitch designs were added over the years to complete the set of 12 different HPL designs.

Special infill links like the PennGuard system were also developed and used on conveyor chains that needed a completely flat top running surface to provide seamless transfer of small or unstable glassware.



Pennine was granted its original head protector link (HPL) patent (EP124117) in 2002.

Transfer forward to the start of 2020, nearly two decades since the first concept and the Pennine head protector design is operating in over 40 countries around the world. The company now has a US patent (US 10,358,293 B2) and a European patent (EP3348497) for its latest head protector, the Swiftlink.

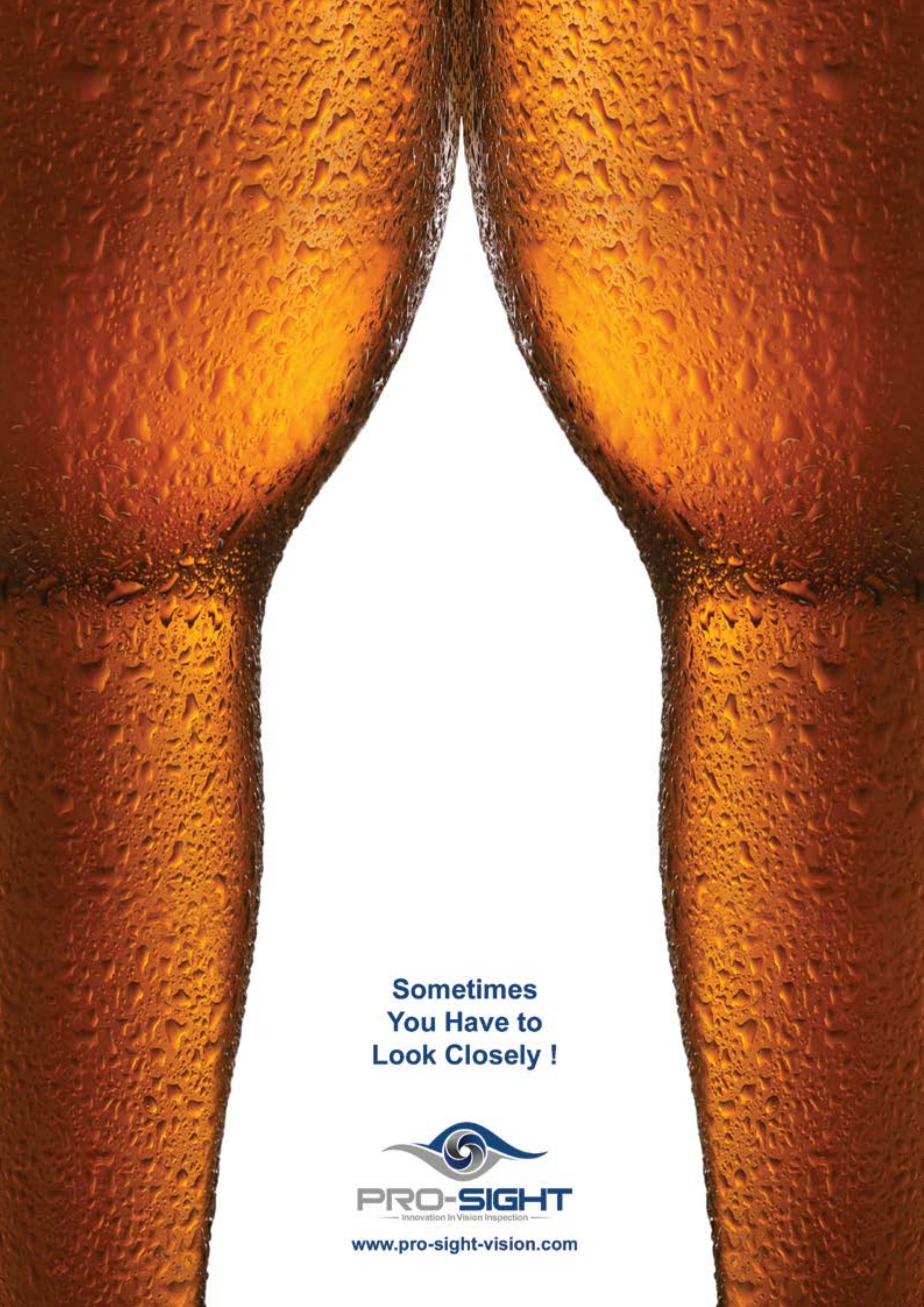
Swiftlink was designed to provide a different style of head protector that not only creates an uninterrupted transfer surface but also provides the ability to rapidly connect a chain when combined with Pennine's Pennlock system. ●

Swiftlink is a registered trademark of Pennine Industrial Equipment Ltd.

The Swiftlink joining process.

About the author:
Graham Womersley is Sales Director at Pennine

Further information:
Pennine Industrial Equipment Ltd, Skelmanthorpe, Huddersfield, UK
tel: +44 1484 864733
email: sales@pennine.org
web: www.pennine.org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A dream team for productive and space saving stacking

For its latest glass handing machines for stacking sheets of glass, SCHOTT chose the space saving, six axis robot from Comau, which also included the complete integration of Siemens' Sinumerik Run MyRobot / Direct Control in the robot arm. Tobias Wachtmann reports.

As one of the world's leading technology groups in the fields of specialty glass and glass-ceramic, SCHOTT – with headquarters in Mainz, Germany – is an innovative partner for many sectors, including the home appliance, pharmaceutical, electronics, optics, life sciences, automotive and aviation industries. Its success means that the company often faces the task of expanding its production capacities. SCHOTT has always placed great importance on a homogeneous IT environment – and deployed an internally consistent controller portfolio from Siemens for its automation tasks.

SCHOTT's main factory in Mainz, Germany (source: SCHOTT).

Robot for glass handling

That is why the company chose a six axis robot from Comau for one of its new line concepts for stacking flat glass as one of its latest investments. The Italian industrial automation specialist is known for its efficient solutions that cover the entire manufacturing process for a number of industries. It is active in three business segments: Automation systems (assembly lines for vehicle body assembly), powertrains (assembly lines for the powertrain) and robotics (sale of industrial robots). Robotics was exactly what was needed for the SCHOTT project, because the technology group was seeking a space saving robot, as well as a solution with an integrated, open Siemens control system that SCHOTT could also flexibly intervene in and programme at any time.

Direct link between robot kinematics and drives

SCHOTT found the ideal partner in Siemens, which has been pursuing an integrated robot strategy for many years. What this involves is the complete integration of the Comau robot arm in Siemens' Sinumerik system environment.

The robot arm can be controlled directly via Sinumerik Run MyRobot /Direct Control, with no need for external or embedded robot controllers or drives. With Sinumerik Run MyRobot /Direct Control, the mechanical robot model is integrated in Sinumerik CNC.

The direct control concept considerably simplifies the configuration of the controller hardware and optimises the spare parts management process. The Sinumerik-controlled robot technology provides further improvements in terms of accuracy and dynamics, as well as the benefits that come from a single-source controller concept.

Numerous benefits

This solution benefitted SCHOTT in a number of ways. It saved the company additional engineering costs, because it relies on existing tools from Sinumerik and the TIA portal. It also eliminated the need to develop more expertise and the training outlay associated with a robot controller. As a result, maintenance can be performed by the company's own personnel, which has made SCHOTT faster and more flexible in terms of its troubleshooting. And finally, plant and machine operators can continue to work in their familiar plant and machine control environment, thus eliminating the need for familiarisation time or additional training. ●

The project involves the complete integration of the robot arm from Comau in Siemens' Sinumerik system environment, which is made possible by the technological partnership between Comau and Siemens (source: Comau).

About the author:
Tobias Wachtmann is Head of glass business at Siemens

Further information:
Siemens AG, Karlsruhe, Germany
email: tobias.wachtmann@siemens.com
web: www.siemens.com/glass

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Temperature measurement on ultra-thin flat glass

According to Torsten Czech, the Optris CTlaser G7 infrared thermometer measures up to 1200°C and is ideal for use during the manufacture of ultra-thin flat glass materials.

Touch displays, such as for smartphones and tablets, use ultra-thin glass, which bring special challenges for temperature measurement technology in their manufacture. For this application, Optris has introduced the CTlaser G7 infrared thermometer, which can precisely measure the surface temperatures of glass components in the range of 100°C up to 1200°C.

The optimum spectral range, which for flat glass is normally 5 µm, cannot be used for extremely thin glass components due to the higher transmissivity of the material. For this reason, Optris developed the CTlaser G7, which works at a special wavelength of 7.9 µm. This spectral range is optimised for low reflection measurement on ultra-thin flat glass.

Measurement errors, which are caused by the transmission of radiation, are therefore virtually eliminated. The measurement error is only 1% of the measuring value, or 1.5 °C at low temperatures.

Double laser simplifies setup

The infrared thermometer has an integrated double laser that marks the exact measurement location, thereby making setting the application easier. The smallest size of the measurement spot at a measurement distance of 70mm is just 1.6mm, so that the temperature can even be measured on very small objects. The CTlaser G7 features a 45:1 optics with selectable focus and a compact sensor head size. This makes it very easy to integrate the thermometer into various applications.

With a standardised two-wire interface, measurement values can be transferred to a supervisory control system, for example a PLC. Output can be adjusted to the exact requirements of the application. In this way, averaging, minimum or maximum value logging, as well as an extended hold function with threshold value and hysteresis, are possible.

Optris CTlaser, complete with box.

Up to 85°C without additional cooling

The CTlaser G7 is ideally suited to the environmental conditions that prevail during glass manufacturing. With ambient temperatures up to 85°C, it works without additional cooling.

For even higher temperatures, Optris has developed the CoolingJacket Advanced, a matching cooling housing for infrared thermometers like the CTlaser G7. The cooling protects the sensing head and can be achieved by either water or air (cooling with air up to 100°C and with water up to 315°C). Even cooling of the cables in such an ambient temperature is possible.

Measured data evaluation

The licence-free temperature analysis software Optris Compact Connect allows easy and fast parameterisation of all stationary infrared thermometers. It is also used for analysis and documentation of measured temperature values to optimise process control. Especially useful is the function to save temperature information for further processing in Excel or MS Word.

For the Optris CTlaser, there is also the possibility to enter up to eight different emissivity values of different materials with corresponding alarm thresholds to monitor several processes simultaneously with triggered data acquisition.

Another strong feature is the use of the device in combination with the IRmobile app from Optris. With this app, all infrared temperature measurements of the CTlaser G7 can be monitored on a connected smartphone or tablet. ●

Optris CTlaser sensor head.

About the author:
Torsten Czech is Head of Marketing at Optris

Further information:
Optris GmbH, Berlin, Germany
tel: +49 30 500 197-45
email: lorenz-oliver.riegel@optris.com
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High zirconia fused cast refractories

Tomoyuki Ide discusses AGCC's experience and achievements in the development of high zirconia fused cast refractories for borosilicate and aluminosilicate glasses, as well as glass ceramics, TFT glass etc.

AGCC's ZB-X series of high zirconia fused cast refractories benefit from the group's 40 years of accumulated experience and achievements. The product displays excellent corrosion resistance to molten glass and achieves the highest quality without stone and blister defects. It has been widely used in furnaces for borosilicate and aluminosilicate glasses, as well as glass ceramics, TFT glass etc.

Two material types are available, ZB-X9510 for standard duties and ZB-X9540 with high electrical resistivity. ZB-X9540 is especially suitable for use as electrode blocks in electric melting furnaces that need high electrical resistivity in particular (table 1).

Furnace paving application

Applications for ZB-X9510 have increased because of its excellent blister and stoning potential, as well as its good corrosion resistance. A test simulating the glass contact part of soda lime glass is shown in figure 1. αβ-alumina fused cast refractory (hereafter αβ-alumina), 41wt% ZrO_2 AZS fused cast refractory (hereafter AZS41) and ZB-X9510 are evaluated in the crucible test.

For αβ-alumina and AZS41, blisters and stones increased as temperature increased clearly but that of ZB-X9510 increased by a smaller amount.

When αβ-alumina is heated above 1350°C, the solubility of alumina in the molten glass increases and blister and stoning potential become worse. The microstructure of the interface between AZS41 or ZB-X9510 and the glass after the corrosion test is shown in figure 2. AZS41 has an altered layer between the refractory and the glass and ZrO_2 particles also separate toward the glass. On the other hand, the interface between ZB-X9510 and the glass is smooth and the ZrO_2 particle does not separate. There is the glass phase at the grain boundary of ZrO_2 particles in fused cast refractories and the gas component is dissolved in this glass phase. If the amount of these glass phases increases, blisters tend to occur as the glass phase melts. As results, in AZS41, which has large glass phases, blister and stones occur with temperature but ZB-X9510, which has small glass phases, can maintain a low level.

In an inspection after the campaign, the altered layer and blisters were not found in the area where the ZB-X9510 paving was used. In addition, the amount of blisters was small even if the furnace temperature fluctuates during operation. Based on these results, ZB-X9510 has been adopted more widely in the furnaces of tableware and container glasses because of the excellent blister and stoning potential (figure 3).

Application as electrode blocks

When manufacturing glass with high electrical resistivity such as borosilicate and aluminosilicate compositions, a refractory with high electrical resistivity is required for the electrode block (figure 4).

An example of temperature simulation using ZB-X9510 and ZB-X9540 electrode blocks is shown as figure 5. There is no temperature difference around the electrode block between ZB-X9510 and ZB-X9540 for soda-lime glass, which has low electrical resistivity. But for ▸

	ZB-X9510	ZB-X9540
SiO_2	4.0	9.3
Al_2O_3	0.8	1.5
ZrO_2	94.5	88
Na_2O	0.4	0.02
Others	0.3	1.2

Table 1: Typical value of ZB-X Series chemical composition.

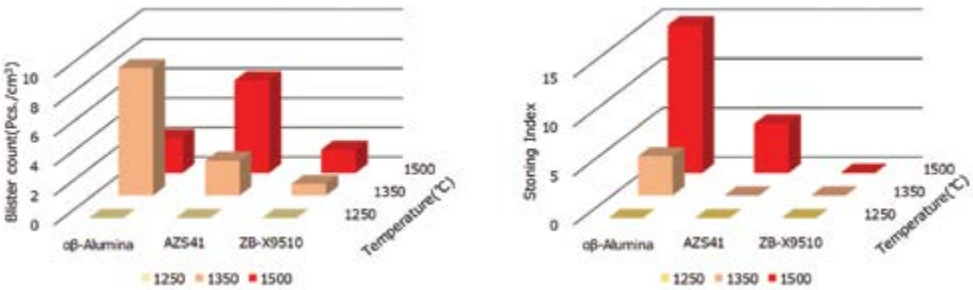

Figure 1: Blister and stoning potential with the crucible test.

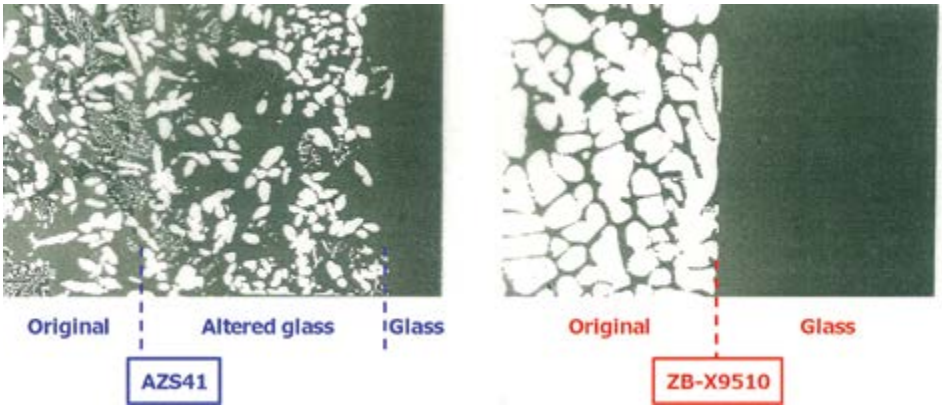

Figure 2: Microstructure after the corrosion test.

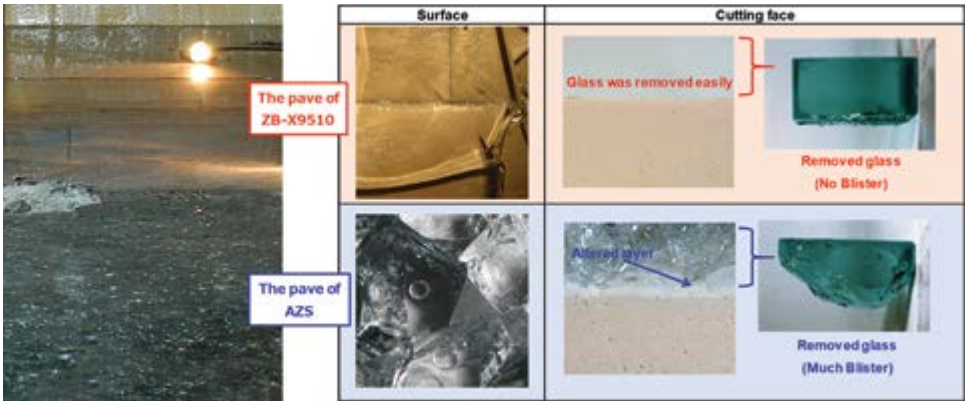

Figure 3: Blistering and stoning potential of ZB-X9510 and AZS after the campaign.

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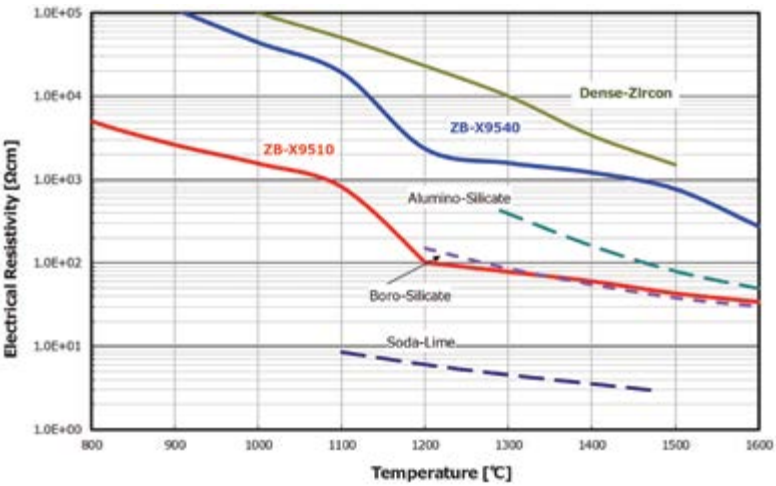


Figure 4: Electrical resistivity of ZB-X9510 and ZB-X9540.

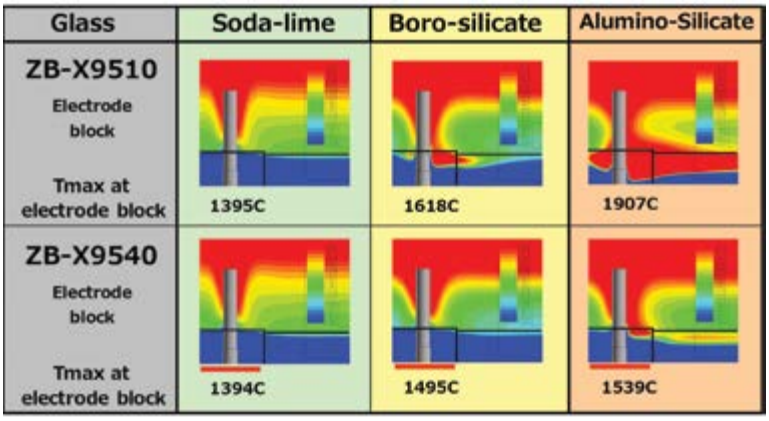


Figure 5: An example of temperature simulation for three kind of glasses.

aluminosilicate glass, which has high electrical resistivity, the temperature of the ZB-X9510 electrode block is about 360°C higher than that of ZB-X9540. This is the cause that the ZB-X9510 electrode block, which has lower electrical resistance than the molten glass, is heated by Joule heat and the temperature of the electrode block rises. As the temperature increases, the corrosion of the electrode block increases exponentially and the furnace life becomes extremely short, so the selection of this refractory is very important.

ZB-X9540 and dense zircon are candidates for refractories that have high electrical resistivity and can be used as glass contact parts. Dense zircon is the refractory with high electrical resistivity and excellent corrosion resistance to the molten glass at temperatures below 1600°C. But zircon decomposes and corrosion resistance to the molten glass of dense zircon becomes lower at temperatures above 1600°C (figure 6). This is the reason why ZB-X9540 is necessary when manufacturing glass with high electrical resistivity at 1600°C or higher.

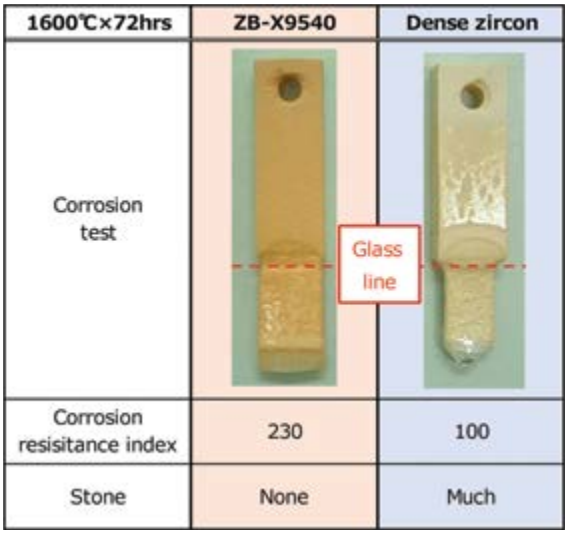


Figure 6: The corrosion test of ZB-X9540 and dense zircon for borosilicate glass.

Conclusion

AGCC has 40 years of achievements with its ZB-X high zirconia fused cast refractory series, which exhibits high corrosion resistance to molten glass and excellent minimal glass contamination potential. Due to these properties, the series is well-suited to furnaces for high quality glass. ●

About the author:
Tomoyuki Ide is Manager, Application Group, Development Centre, AGC Ceramics

Further information:
AGC Ceramics Co Ltd, Takasago City, Hyogo, Japan
tel: +81 79 447 7337
web: www.agcc.jp

Power racks for an electric distributor and forehearths under final inspection at Electroglass.

Where next for emissions reduction and energy cost saving?

According to Richard Stormont, all-electric distributors and forehearths can play a crucial role in the glass industry's quest for reduced emissions and energy cost savings.

Lowering production costs, reducing harmful emissions, conserving resources, improving quality to avoid waste - every manufacturing industry is looking at these in one form or another and none more than the energy-intensive and competitive field of glass manufacture.

Focus has rightly been on melting technologies, where high capacity electric boosting of fossil fuel-fired furnaces, as well as all-electric melting, are playing and will continue to play an ever greater part. There are, however, other stages of the manufacturing process where existing and proven technologies are delivering major savings in energy consumption and cost and therefore emissions. Key among these is the adoption of electrically heated distributor channels and forehearths.

Control panels for Electroglass electric distributors and forehearths under test.

Proven technologies

Electric distributors and forehearths are not new. Electroglass has been designing and supplying them throughout its 44 year history. Historically, many of them have been for the conditioning of volatile glasses, notably borosilicates, fluoride opal and lead crystal. There have also been many container glass electric forehearths with capacities of up to 120 tonnes/day.

It is only quite recently, however, that many in the high volume sectors of the industry including container producers, high capacity glass fibre producers and others have come to view the typically very substantial energy consumption and energy cost savings that this technology brings, coupled with the elimination of combustion gas emissions, glass quality benefits and operating ease as forming an important part of their plans. As part of this, significantly higher capacities and channel width designs of 48in, 54in and 60in (1220mm, 1370mm and 1524mm) have been introduced.

Energy cost and energy efficiency

In most parts of the world, electricity is considered an expensive form of energy compared to gas or oil. On the basis of cost per unit of energy, electricity in many areas can be between one and a half times and about four times the cost of gas. But if a well-designed all-electric forehearth needs less than one tenth of the energy input compared to an equivalent gas-fired forehearth, it becomes a highly economic as well as environmentally-friendly solution.

Such an extreme difference in energy efficiency between two technologies requires explanation, as they are both designed to perform the same task - temperature conditioning and conveying glass between the melting and forming processes.

Electroglass' Electroflex all-electric distributors and forehearths are heated entirely (or almost entirely in the case of dark coloured glasses) by radiant elements installed over the glass surface. Heat transfer to the glass is by direct radiation from the elements and by re-radiation from the refractory roof and sides of the compact element chamber. Heat loss from the element chamber and superstructure refractories is kept to an absolute minimum by high efficiency insulating materials.

In contrast, the thermal efficiency of gas firing in the confined superstructure of a distributor or forehearth channel is very poor, with restricted combustion space and little or no effective heat recovery from the combustion gases. The net heat transfer from gas flame to glass represents a very small proportion of the gross energy input, with the majority of heat energy lost to the environment in the combustion gases and structural heat losses.

Operating cost comparisons

The energy consumption and therefore the operating cost of any distributor or forehearth, gas or electric, depends on many factors, in addition to the heating technology used: Channel length, width and depth; refractory construction and insulation levels; entry and exit glass temperatures; pull rate. While variations in these may result in a wide range of consumptions and costs, in the large majority of cases studied and implemented by Electroglass, actual energy consumption of Electroflex all-electric distributors and forehearths can be of the order of 10% that of the directly equivalent gas-fired distributor or forehearth and energy cost savings are typically between 60% and 90%. These are not merely calculated figures, they are confirmed by the actual results of direct conversions from existing gas installations to electric.

Emissions eliminated

Many technology changes introduced to reduce harmful emissions from industry succeed in that aim but result in increased production costs. Changing from gas heating to electric in the industry's forehearths and distributors not only typically delivers major operating cost reductions but cuts energy consumption to a fraction of conventional systems and eliminates process emissions entirely.

Meeting operating needs today and tomorrow

Energy consumption, energy cost and greenhouse gas emissions - Electroglass technology in all-electric forehearths and distributors is providing efficiency solutions to each of these issues. However, improvements in these characteristics should not be accompanied by disadvantages in others.

Control

Channel heating arranged in a number of independently powered zones provides precise automatic temperature control with a variety of control, monitoring, data logging and connectivity options and has always been at the centre of the Electroflex forehearth design. ▸

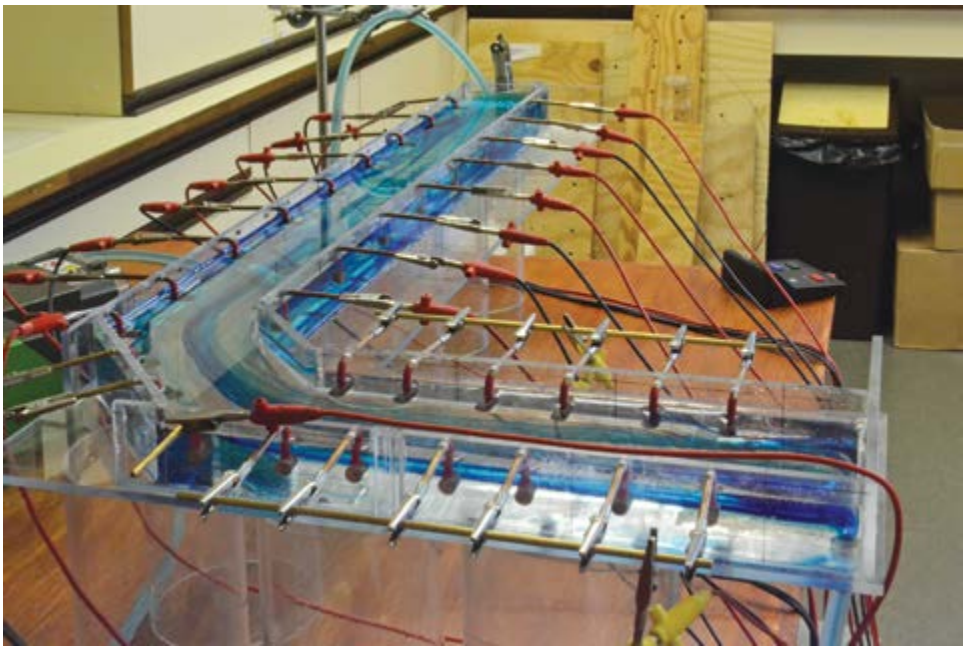
Thermal homogeneity

With today's lightweighting and high speed forming of glass containers, good thermal homogeneity of the glass entering the spout is essential. It is an inevitable characteristic of flow of a viscous liquid in a channel that the centre of the stream flows faster than the sides. This combined with heat loss through the sides of the channel means that without corrective measures, the glass at the sides becomes significantly cooler than the centre.

Electroglass' profile radiant heating elements apply heat directly and preferentially to the sides of the forehearth channel to counteract this thermal inhomogeneity, with a degree of temperature profiling that is difficult or impossible to achieve with the multi-directional heating effect of gas burners and their combustion gases. An Electroflex forehearth can deliver thermal homogeneity index figures of over 98%, as measured at the spout entry.

In dark coloured glasses, a small amount of supplementary heating can be applied in the forehearth conditioning section by means of the Electroglass Temptrim immersed electrode system, further improving side-to-centre and top-to-bottom thermal homogeneity and gob weight control.

An option for wider forehearth channels is independent side-to-side heating control, specifically deigned to counteract the 'short cut' flow path around corners from distributor to forehearth and the resultant temperature profile imbalance.



Physical modelling of an Electroglass Electroseal electric forehearth.

Temperature response

Operating power may be extremely low, typically of the order of 15 to 30 kW in total but the installed transformer and element power in say an 8m (26ft), 900mm (36in) wide forehearth may be approximately 120 kW and it may be equipped with 11 high-loss centreline radiation cooling damper openings, meaning a rapid temperature response time, up or down.

Cooling by high capacity radiation openings also avoids the surface chilling effect of the forced air cooling of most gas-fired forehearths, allowing heat loss from the main body of glass and mostly from the flow centreline, where it is typically hottest.

Campaign life

Using generally the same refractory channel and superstructure refractory grades as gas forehearths and distributors, there is no difference in the life expectancy of the electrically heated equivalents and with such low power loading, Electroglass expects the heating elements in Electroflex installations to last for the campaign. They are easy to replace and some operators have even re-used elements in a second campaign.

Glass colour consistency

Inevitable variations in the combustion gas atmosphere over the glass surface in a gas-fired forehearth can have a marked effect on glass colour and colour consistency. In the radiant element electric forehearth, the atmosphere is simply air, with no such effects.

The combined picture

Few technologies in the glass industry offer such scope for cost savings, emissions elimination and operating advantages as the relatively simple change from gas to electric in distributor and forehearth heating. And with some basic information, it takes just minutes to assess the benefits and cost savings in any particular case. ●

A 48in (1220mm) channel width container glass Electroglass Electroflex forehearth in operation.

About the author:
Richard Stormont is Managing Director at Electroglass

Further information:
Electroglass Ltd, Benfleet, Essex, UK
tel: +44 1268 565577
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Fixed drop guide product range extended

Following on from the success of the Bottero parallel and Emhart 565 versions of its fixed drop guide, Graphoidal has extended the range further to include the Heye dual motor arcuate shear mechanism, Bottero dual motor arcuate shear mechanism and Emhart/Bottero/81 arcuate shear mechanisms. Andy Stevenson reports.

For over five years, the systems have been in operation on parallel shear mechanisms on a wide range of production. Now the fixed drop guide system is available for the above-mentioned arcuate shear mechanisms.

For the consistent loading of gobs into the blank mould, it is essential that the gobs are correctly loaded into the gob distributor funnels. Any deviation from the ideal loading into the funnel will deflect the gob in the following delivery system. As a result, the gobs will reduce speed and control of the loading will be lost. Many containers are also rejected due to loading marks that are easily picked up with today's sophisticated inspection machines.

With most standard shear mechanisms, the gob guides travel together with the shear blades. This makes attempts to stabilise the gob more difficult. Faster production speeds and bigger IS machines mean that the cutting speeds have increased significantly in terms of both cuts per minute and the velocity of the shear blade movement. As the gob guides travel together with the shear blades, they now approach the gobs at higher speeds. The impact on the gob becomes increasingly uncontrollable due to the inertia and wear from the shear mechanism.

This is where the Graphoidal fixed drop guide is a huge advantage. Only a stationary drop guide, fixed in position can stabilise the gob and eliminate any swinging after the cut. Each gob guide can be independently adjusted for side to side, back and forward and up and down movement. Because the gob guides are stationary, it gives stability and consistency.

During the shear cut, the lower blade tends to slightly push the gob away from the centre of the orifice. The glass stream before the next cut swings back when the shear blade is pulled back. This swinging back is a part of the movement of the next gob's lower part and needs to be stopped. The fixed drop guides cushion the impact of the lower shear blade when cutting, ensuring that the gob is stable when falling.

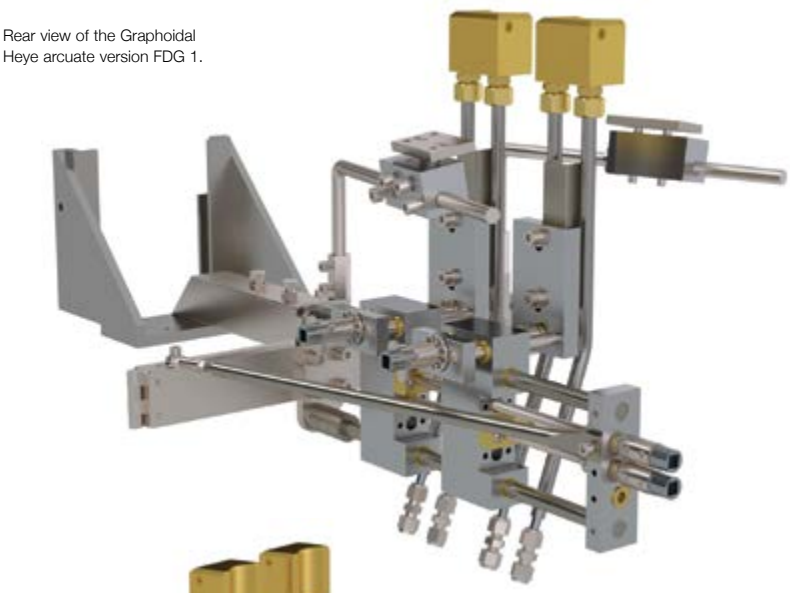
An additional benefit of the fixed drop guide is the reduction in weight of the moving drop guides, which place a higher load on the whole shear mechanism, leading to increased wear of many parts involved in the cutting movement. The result of this is an uncontrolled shear cut and poor loading of the gobs.

Higher cut rates, especially with lightweight gobs, often result in difficult loading due to a wrongly positioned/out of parallel gather. This in turn results in the tumbling effect through the delivery rather than a slick transition through funnels, scoop, trough and deflector into the blank.

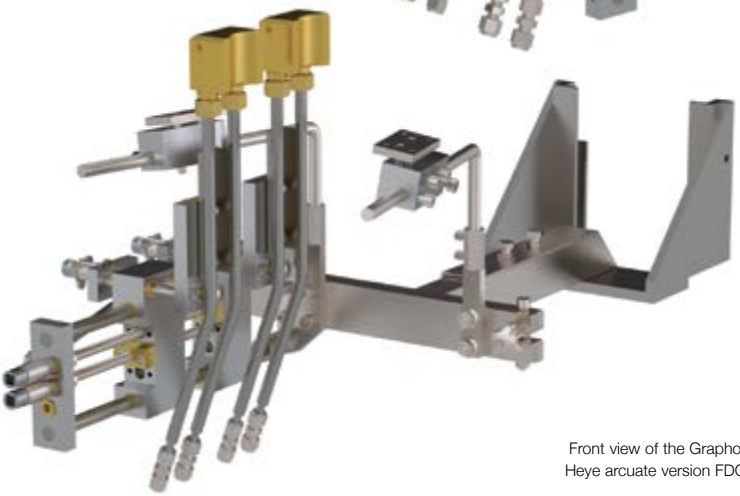
Furthermore, the shear spray conditions have improved on the gob guide side. In the past, the gob guides always stood in between the shear spray nozzle and the shear blade. Now, the shear blade can be sprayed freely behind the drop guides. Cooling and lubricating of the blades is better optimised and the lifetime of the blades increased.

A glass container user of the fixed drop guide gave the following testimonial: "I'm not used to giving compliments at all, just raw truth… the best equipment I ever installed in the last 18 years."

This positive feedback is not only as a result of the optimised production. By removing the traditional gob guides and adjustment mechanisms from the shear mechanism, significant weight is removed from the mechanism. This lessens the wear on the shear mechanism, providing a considerable cost saving in both spare parts and maintenance labour cost.



Rear view of the Graphoidal Heye arcuate version FDG 1.



Front view of the Graphoidal Heye arcuate version FDG 2.

About the author:
Andy Stevenson is Sales Manager at Graphoidal Developments

Further information:
Graphoidal Developments Ltd, Chesterfield, UK
tel: +44 1246 266000
email: sales@graphoidal.com
web: www.graphoidal.com

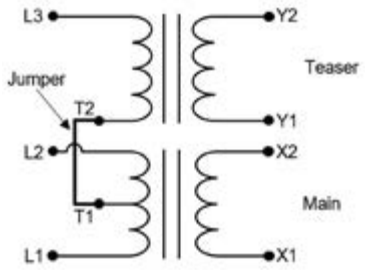
Sizing up furnace boosting power supplies - From grid to glass

As hybrid furnace designs seem to be a sensible option for glass manufacturers to start reducing CO_2 emissions by moving away from fossil fuel, René Meuleman discusses considerations to be made when scaling up electrical power supplies and why collaboration is a necessity.

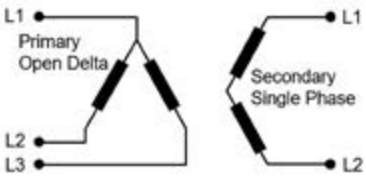
In whatever way furnace designs will change in the near future, it is clear that the related process and power supply control systems will also need to adapt to run more complex glass melting and conditioning systems with maximum efficiency. Since the introduction of the PID controller in 1933, then early SCR (Silicon Controlled Rectifier) controlled power supplies in 1956 and the first DCS systems in 1959, no game changing developments have evolved the way furnaces, refiners and forehearths are controlled.

Of course, process control systems have become more powerful, stable and reliable, capable of storing more data and running complex model predictive control strategies but the way they interact with operators has not changed much. Similar can be said for SCR-controlled power systems which, even though they have become digitally-controlled, much more precise and equipped with sophisticated features such as automatic transformer load tap changing (LTC) and predictive load management (PLM) power management strategies, the basic control methods are still the same.

Furnace designs, specifically those for commodity glass melting purposes, have not advanced much either since regenerators and oxy-fuel were introduced. But now the industry needs to move into a new age of glass melting, starting with glass container manufacturers, who need to catch up with customer and government demands to dramatically lower their CO_2 emissions, often within a given timeframe.



Two-phase power control is achieved using a Scott-T transformer.



Single-phase power control is achieved using three-phase to single-phase conversion transformers.

Many options for reducing the carbon footprint of glass manufacturing are being researched and developed but some of them have already been available for many years. Electric melting, for example, is perceived as being a new method but it is a proven technology that has been around for as long as regenerative furnaces and the availability of electrical energy. Hydrogen combustion, however, still needs more investigation to become a feasible green technology and there are concerns about its future availability and price.

Today, it seems that the most sensible way to reduce CO_2 emissions is to increase the use of electrical melting energy, together with some additional natural gas (NG) firing in an oxy-fuel configuration; a so-called 'hybrid furnace' design. This article will focus on the utilities around this type of design, as NG could be replaced by hydrogen-oxy combustion at a later stage.

From the grid

Assuming 80% of the melting energy for a hybrid furnace must come from electrical power, perhaps the most important point is that the electrical power content would need to increase from the traditional 2MW supplied to a typical electric boosting system today, to 12MW and more. It is likely that forehearth heating systems will become electrical as well and in this respect, therefore, an average glass container furnace unit would need to have an installed electrical power capability of 15MW or more.

Most existing sites have at least two furnaces in operation and single furnace greenfield sites seem to be commercially unattractive because of overhead costs. The resulting additional 30 to 50MW of electrical power would need to be installed or made available on existing sites to enable the move away from fossil fuel.

A 600kVA Eurotherm single-phase power supply control system cabinet using the EPower advanced power controller.

Not all sites have that amount of electrical power available and there might be concerns regarding the capacity of the local grid. Other considerations are whether there are enough green certificates available to cover the electricity consumption and how kWh prices and emission penalties may develop in the future. Eurotherm by Schneider Electric offer Energy and Sustainability Services (ESS) to help answer those types of questions and help glassmakers to make the correct decisions.

To the glass

In traditional regenerative furnaces with some additional electrical boosting, the boosting system already needs to be efficient. But in envisioned hybrid furnace designs, it will become the main energy source, which will have a major impact on OPEX. From a physical size point of view, a traditional 2MW furnace boosting system is relatively easy to manage. A 12MW version will of course be much larger scale. However, the size should not obstruct the positioning flexibility of electrical components. In that respect, the Eurotherm by Schneider Electric historical design strategy of building a completely oil-free electrical system is a great advantage, specifically if power ratings increase and legislation and insurance issues become stricter.

Instead of the traditional transformer, imagine nine oil-filled variable transformers sitting close to the furnace, in order to keep power bus or cable losses low. The Eurotherm design utilises water-cooled SCR/transformer-based power supplies,

capable of being positioned as close to their corresponding electrodes as local conditions allow. The design also separates the incoming three-phase network into single-phase power supply units, with each single-phase system using automatic load tap changing technology.

Currently, Eurotherm is working with leading furnace suppliers to investigate the best possible electrode firing layouts, because it is important to consider all of the related furnace equipment designers' challenges and goals, including electrical power efficiency and CAPEX considerations. From an electrical power supply point of view, Eurotherm can provide control for three-phase systems (open delta) but also for two-phase systems (using Scott-T transformers) and even for single-phase (using three-phase to single-phase conversion transformers).

In this respect, together with furnace construction designers, Eurotherm can look closely at cable or busbar layouts. At 12MW of power, resistive and inductive losses can cause major problems that can only be solved by integrating the power supply systems into the furnace construction design. Sidewall cooling has been integrated into the steelwork of the furnace for many years. Now a similar approach is needed for the power lines and perhaps the transformers. Not an easy job but fortunately, both furnace and power supply designers have recognised that there are overlaps in technology that need to be assessed to achieve the most efficient melter design.

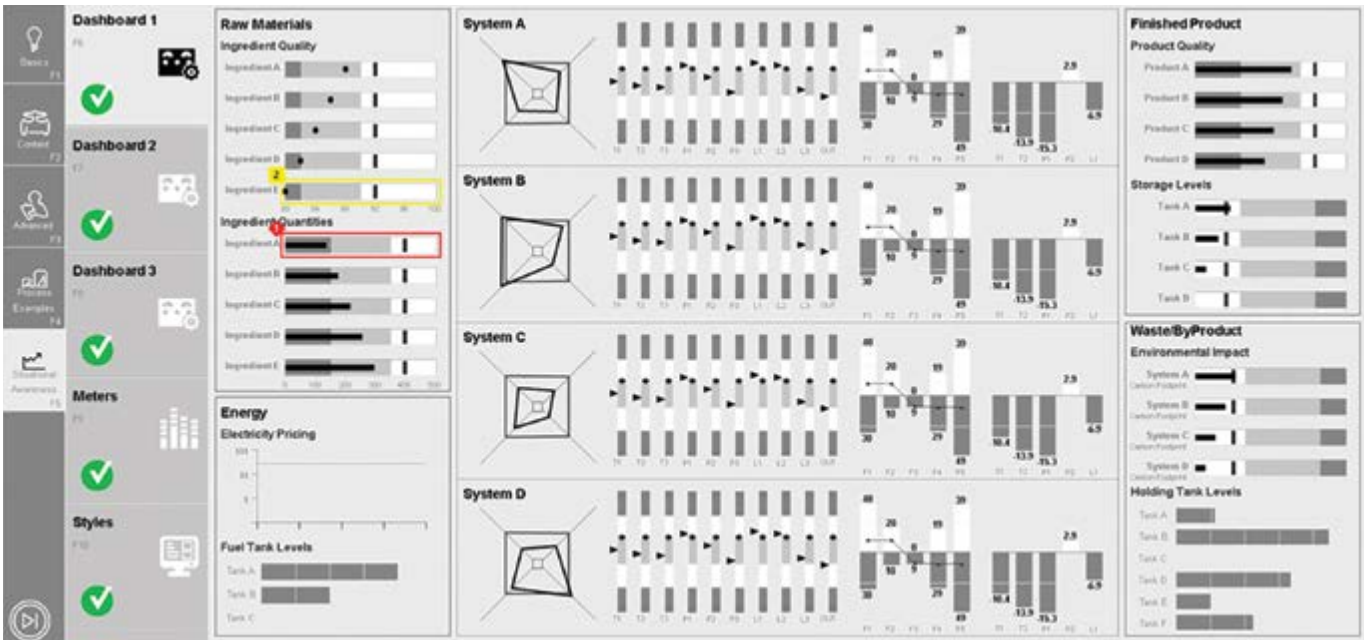
Being able to apply 12MW of electrical power or more to a furnace will also dramatically increase the number of electrodes needed. Managing the temperature profiles and convection currents will require a specific way of managing the amount of electrical power supplied to specific parts of the furnace.

While designing the layout of the different electrodes and the way they are fired against each other is a specific skill provided by furnace designers, the design also has an impact on the resistivity, currents and voltages applied to the electrodes. Firing electrodes positioned closer to each other has a positive impact on the resistive and inductive losses and cabling layout. But it reduces the resistivity between the electrodes and consequently, increases the amount of current they need to endure to accommodate the same amount of power, compared to if they were positioned further away from each other.

With higher current, an increased electrode surface is required. Otherwise, it leads to increased wear of the electrode. It also impacts the cable diameter and transformer design. This simple example explains how just one furnace design parameter has an impact on many other design considerations outside the furnace, demonstrating how having all competencies working together can lead to the best overall melter design. Alternatively, oversimplifying the electrical power supply can diminish the advantages that the furnace designer may be able to provide.

The traditional thinking, only in terms of three-phase systems and believing that the energy is released somewhere between the electrodes, was and is a mistake! Like many things, the best solution is often a compromise and improvement opportunities need to be worked out via collaboration on both the furnace and power supply design.

Once the design is decided, it will need a process control system that is capable of assisting operators to manage the multiple energy sources feeding power into the melting tank. Process models that have been used during the design stage should be used to set up multiple model predictive controllers to manage the combustion energy and all the electrical boosting zones in a way that achieves the best, stable glass quality against energy consumption ratio. The partnership between CelSian Glass BV and Eurotherm is helping customers to get world-leading process control and advanced control integration, while the combined analytics and machine learning skillset are of great value for ongoing developments. ▸



HMIs designed to enhance situational awareness can help operators quickly recognise and act on the most important parameters.

Managing the grid

There are other challenges concerning the move from natural gas towards electrical power. One of them is peak power demand, which does not apply to natural gas but does to electrical power, as it has an impact on kWh tariffs. It should be emphasised that using the flexibility of the electrical boosting system to stabilise the grid and getting lower tariffs in return is proven technology. However, once the electrical power consumption goes up, as it will in a hybrid design, tweaking the power consumption will have an impact on energy tariffs, as well as the quality of the glass.

It makes sense, therefore, to find the precise range in which the electrical power can vary, without impacting glass quality. It may not be the highest priority during the first operational period of a new hybrid furnace but once bottles are produced and quality is acceptable, operational costs will be the next discussion. Energy supply management software is available, such as Schneider Electric's award-winning EcoStruxure Power Monitoring Expert, which is designed to help power-critical and energy-intensive facilities maximise uptime and operational efficiency. EcoStruxure is Schneider Electric's IoT-enabled, open interoperable architecture and platform.

Another subject that should not be underestimated is the challenge that maintenance staff will face in the case of an electrical power outage. While a typical 2MW boosting system can withstand running at 50% for several hours in the event of an equipment failure in the system, a boosting system that must cover 80% of the melting capacity will be significantly more problematic to deal with and have a much bigger impact if power is lost. To mitigate this, modular-based control system designs with built-in redundancy, easy component replacement, predictive maintenance and perhaps even augmented reality can improve maintenance and repair time. Eurotherm systems have this type of capability, including a bonded on/offsite spares service as part of a service level agreement for quick replacement and repair of parts.

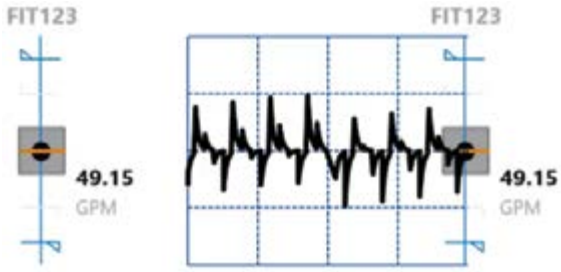
The way the electrical power supply is monitored will become more complex. Therefore, it should be recognised that the way the system interacts with the operator needs to be straight forward and easy to manage. With increasing data coming from the process, visualisation improvements such as HMIs designed to enhance situational awareness can help operators quickly recognise and act on the most important parameters. Operators might also want to retain their traditional HMI design when already needing to understand the workings of a new type of furnace. What is important is that suppliers find the best possible way of using what they have in their toolbox to construct the best possible solution for the user.

Conclusion

The hybrid furnace, the all-electric furnace, the furnace of the future, the hydrogen melter and the submerged burner melter might all sound like brand new designs but they are not. All the electrical and process control buzz words in the text above might also sound like the latest developments but they are not. What really is new is that the glass industry is entering a new age, focused on reducing carbon emissions to zero and reducing waste, while securing business futures and continuing to be able to drink cold beers out of glass bottles.

All furnace designers and related companies have their specific knowledge and design capabilities. However, their weaknesses and limits should be recognised and they should all start to move on from the way furnaces have been designed over the last 40 years.

Only through collaboration based on trust and respect can the glass industry ensure that glass stays in its position of being the best packaging material for many food and beverage products, while having the lowest environmental impact. As always, Eurotherm by Schneider Electric is already collaborating and ready to provide the power supply and process control part, aimed at helping to improve the overall 'from-grid-to-glass' system as part of the overall glass manufacturing facility. ●



Example of a Situational Awareness HMI faceplate with predictive trending.

About the author:
René Meuleman is Business Leader for Global Glass at Eurotherm

Further information:
Eurotherm Ltd, Worthing, West Sussex, UK
tel: +44 1903 268500
email: rene.meuleman@se.com
web: www.eurotherm.com/glass

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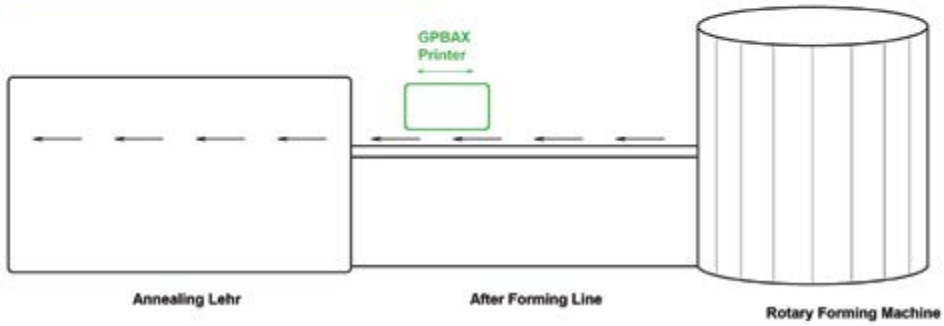
Enamel-based digital printing on hollow glass

Manuel Bernroitner discusses the route to abolish screen printing and introduce serialisation/track and trace solutions on primary glass packaging.

The origins of screen printing go back to the 19th Century or the first decades of the 20th Century. While this technology has evolved over time, there were hardly any revolutionary approaches to new developments in the marking and the decoration of glass, except for a few outliers based on different analogous principles. Now there may have been good arguments for this technology in the past but the present decade of the 21st Century at the latest should slowly and steadily herald the end of screen printing.

Where and how the printing system can be integrated into production lines of tubular glassware.



Towards organic and inorganic digital printing

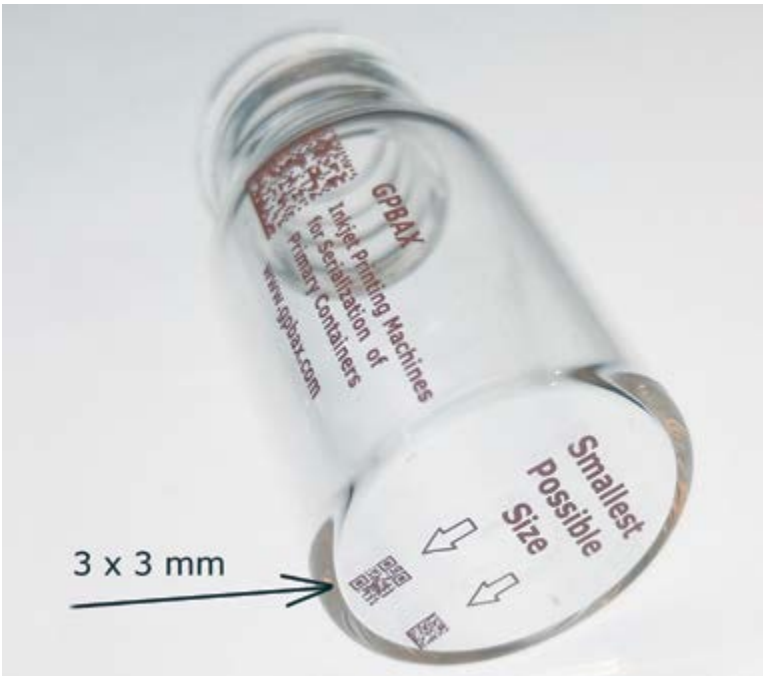
In recent years, some manufacturers have already started to offer inkjet-based digital printing systems. The focus here, as is the overall standard in digital printing, is on the application of organic, mostly UV or air curing inks that are particularly suitable for applications with low to medium resistance requirements. The big gap concerned enamel-based printing for highest resistance requirements.

While resistance is often neither required nor desired for some, mostly decorative applications, this 'organic' technology often fails in demanding functional applications. Just think of autoclaving, lyophilisation and often enormous stress during disinfection and cleaning in the laboratory and medical sector. GPBAX - as a bi-national joint venture in the digital printing and glass processing sector, is proud to be probably the first company worldwide to offer a solution for such an ink, as well as for the digital printing technology required for its application. Its ink is applied by ink jet and then fired above the softening temperature of the glass, creating a virtually unbreakable bond.

This solution should be correspondingly interesting for manufacturers of pharmaceutical and laboratory glassware, where it is still common practice to apply functional and decorative markings by screen printing with ceramic glass inks fired at similar temperatures above 500°C. With this technology, the process is now being put on a 'digital' basis, with significant, positive possibilities arising.

What advantages may there be? In contrast to the 'analogue' technology, the fully digital inkjet technology offers the following benefits:

- Possibility to print track and trace - codes/serialisation: As there is no need to use masks, stamps, screens or other auxiliary products, every single print can be modified and a complete, permanent serialisation of the produced products can be achieved and traceability from hot production to the end user (patient) can be achieved.
- Template modification by mouse click: The time-consuming set-up and adjustment of screen printing masks is 100% eliminated. All templates are created digitally, transferred to the GPBAX printing system and the data to be printed is generated via connection to the existing data management system. All this is only a matter of a couple of mouse clicks.
- Heavy metal issues: Since the ink used was developed almost from scratch, care was taken from the outset to prevent the use of dangerous heavy metals (lead, cadmium etc). ▸



Markings applied on a small borosilicate vial (10ml), showing minimum size of traceability codes.

- Coating thickness control: Every marking is made from individual drops, each with a known drop size. By controlling the amount of drops per unit area, the amount of ink or the layer thickness of the marking can be controlled with maximum reproducibility. Problems with chipping of the marking due to inconsistent layer thickness settings can thus be actively avoided.
- Closed system with minimised ink consumption: The entire ink reservoir forms a closed system, from which only the ink quantity actually required (a few millilitres per fully printed square metre) is taken. This makes it possible, for example, to serialise several million pharmaceutical bottles with only one litre of ink.

How it all began

GPBAX came across the topic of digital printing on borosilicate glass in the laboratory glass sector. Here, especially in the production of volumetric glassware, there are still many manual work steps to be carried out to calibrate the vessels and manually mark them by screen printing. Since autumn 2017, the company has been working on a solution to automate and digitalise all these steps, always with a view to the strict requirements for marking resistance resulting from ISO 4794.

After a 30 month development period, GPBAX now offers both liquid-free measuring technology and enamel-based digital printing technology for the production of these vessels. At the beginning of the development process, the pharmaceutical glass sector was not in mind at all. All the more reason to be pleased that this technology now creates possibilities for serialisation, traceability and digitalisation, very likely providing benefits all the way to the end user.

Volumetric glassware can be marked with codes linking to a product's individual certificates.

About the author:
Manuel Bernroitner is CEO at GPBAX

Further information:
GPBAX GmbH, Rossbach, Austria
tel: +43 650 82 83 974
email: sales@gpbax.com
web: www.gpbax.com

Mouth polishing system gains popularity for glass bottles

According to Barbara Antonini, Antonini's specialist glass bottle mouth polishing system is characterised by its flexibility.

A specialist in the manufacture of annealing and decorating lehrs, Antonini has developed a high performance mouth polishing system for glass bottles. This sealing surface polishing equipment is increasingly popular within the industry, especially in Latin America. Treatment is carried out on the upper surface of the bottle orifice before annealing. It is particularly relevant for glass bottles that are subsequently sealed with a cap and where the consumer's lips are placed directly against the surface to drink. As such, the bottle mouth is a critical area, making the mouth polish system a necessity to meet the high standards demanded by major beverage manufacturers.

From a production perspective, this part of the process is very important and delicate, especially when considering the potential effects of cooling, inaccuracies and burrs etc. The system's main targets are:

- To smooth the mouth of the bottle.
- To eliminate burrs.
- To protect the bottler from risks of failure of the crown cap.
- To ensure that the consumer is not at risk of swallowing glass particles.
- To ensure that the consumer is not injured when drinking directly from the bottle.

Juri Mazzei is the Project Manager for Antonini's mouth fire polishing system.

System concept

Many glass factories employ inspection equipment to analyse the mouths of glass containers using industrial optics and infrared LED lighting. The functionality of the mouth polishing system is a logical concept, with the heart of the system being a mixer that supplies the mixture to the burner heads. It is a proportional mixer and the air inlet is accompanied by a calibrated orifice that decides the maximum flow. Modulation takes place by means of a motorised butterfly valve and a zero governor. The modulated air pressure signal is transmitted to the zero governor by the reference line; the mixer has a limiter that establishes the relationship between the fluids, so that it will keep constant throughout the work time range.

A potentiometer installed at the entrance of the lehr allows adjustments to the valve opening and to regulate the flame type. Perfect flame regulation provides the possibility

Assembling the mouth polishing system on an Antonini lehr.

Measuring the length of tubes to reach the correct height.

Teamwork has helped Antonini to achieve an important result.

to heat only the upper surface of a bottle's mouth. Immediate verification is possible because the mouth of the bottle becomes red, while the colour of the bottle neck remains unchanged.

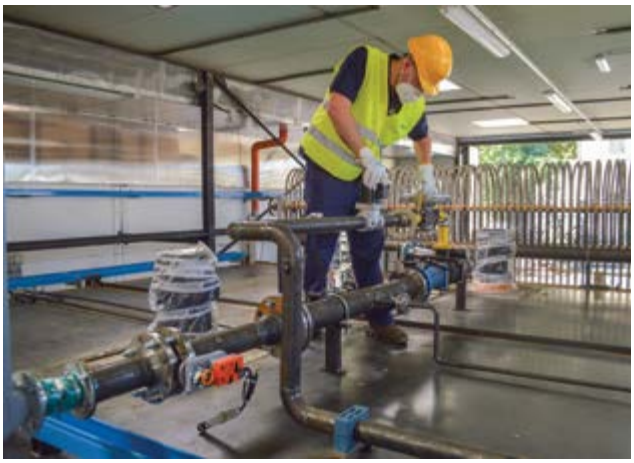
Flexible approach

A key advantage of the Antonini mouth polish is the flexibility provided. It is possible to power the flame of the device from the local electrical cabinet and the burners are transversely movable, so the mouth polish can stand a variable number of rows of bottles.

The device guarantees a fine adjustment of the alignment with the bottle burners during production. Furthermore, the tube position height can be adjusted during working sessions.

To achieve speedier regulation, it is possible to supply optional interchangeable masks, according to the type of production and the number of bottles. Thanks to the presence of pilot burners and electronic flame detection at both ends, optimal safety and security are provided.

Antonini has also developed control technology for gas and air consumption to simplify regulation and make the settings repeatable for certain job runs. When production is reduced, it is possible to close some burner heads. ●



Equipment assembled on top of a lehr.

About the author:
Barbara Antonini is Managing Director at Antonini

Further information:
Antonini srl, Empoli, Italy
tel: +39 057 193221
email: com@antoninisrl.com
web: www.antoninisrl.com

Preventative furnace inspection expertise

Antje Birkenfeld emphasises the importance of regular furnace inspections in glass manufacture.

As the glass industry lives from the fact that all furnaces run reliably and consistently, it is always better to have a regular preventive inspection. It helps to detect damage at an early stage, which is very important to prevent a running system from an unexpected breakdown. Preventive inspection is ideally carried out at regular intervals. But there is also the possibility, of course, of an inspection in case of a current problem.

Both ways serve one purpose: Save money by preventing a complete collapse of the system, or - in ideal cases - by creating the possibility for predictable repairs and maintenance.

Furthermore, endoscopes and cameras can occasionally be used even during repairs in poorly visible areas. After completion of the work, the quality of the repair can be checked and documented.

ULG offers furnace inspections by different means: Control drills; endoscopic camera; and thermographies.

Taking into account customer information regarding the age of the furnace, glass type, eventual description of the problem, ULG inspects the furnace and suggests a maintenance plan or a repair offer accordingly. Repair works can now be planned more accurately.

Regularly carried out recordings (videos, IR pictures) enable the customer to document a plant over its entire lifetime.

There are cracks in every furnace after about four-five years at the flux line, depending on glass type, quality of stones and performance. As there is never any insulation in the upper area, there is a high risk that parts of the layer will loosen. ULG has realised good experiences in installing a grating. It takes the heat off and secures the flux line. But in order to work effectively, it should be raised in the correct place. This means that the brackets must be designed and mounted in a way that allows the user to turn back the screws to easily attach the plating. Attached to the

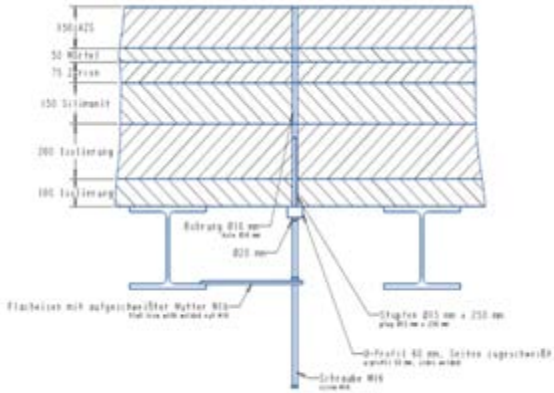
Safe working close to boosting.

Old isolation - new overcoatings.

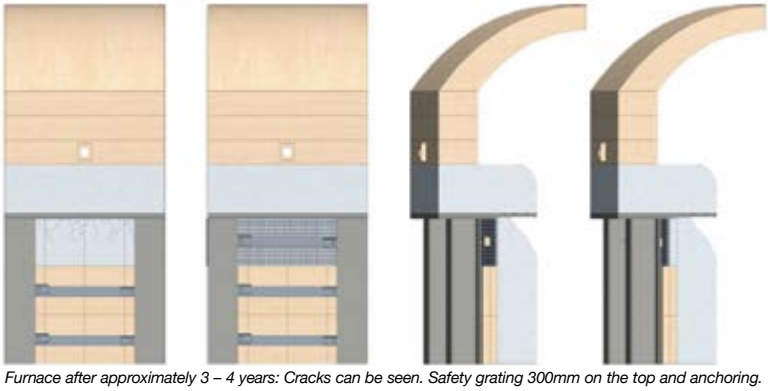
Overcoating.

New overcoating.

After overcoating.



Test drill.



Furnace after approximately 3 – 4 years: Cracks can be seen. Safety grating 300mm on the top and anchoring.

Grating.

Abrasive line check.

Test drill worker.

correct place, the bracket can first be used for the grating, then later for up to two platings.

To place the grating at the correct position and reuse it later is a perfect method to save considerable time and money. Precisely for this reason – always prepared for cracks or breaks - the grating should be installed after about four years. At this point, ULG offers an IR camera measurement by closing the cooling air and measuring the temperature on marked spots. So customers can see exactly what is changing. They can wait with overcoatings until the last moment. With a video inspection/IR thermography, the date can be precisely pinpointed.

Another preventive way of inspection is to install permanent thermocouples in the floor area, without contact to the glass. Drillings with contact to glass are closed by a plug.

ULG has already had extraordinarily good experience with targeted test drillings. Since the company knows the endangered places in certain types of furnaces, it drills there specifically. It always depends on the type of glass and whether with or without bubbling or boosting. ULG has found holes in the past, also with a diameter of about 3-5m², that protected the customer from leakage of the glass by carrying out a hot repair with drain and refill of the furnace.

As a long-term specialist of longstanding, ULG sets high quality standards for its tools and machines. ●

Test drill bottom.

About the author:
Antje Birkenfeld is Management Assistant at ULG

Further information:
ULG GmbH, Karlstadt, Germany
tel: +49 9353 4926
email: antje.b@ulglass.de
web: www.ulglass.de

Taking electro-fused refractories production to the next level

Stefan Bald discusses the future of electro-fused refractories production in the digital era.

The first electro-fused refractory materials for glass melting furnaces were developed in the 1920s. Corhart Refractories Co, a subsidiary of Corning started the production in 1927[1]. This manufacturing process, which was developed almost a hundred years ago, is still used all over the world today. Therefore, without doubt, it can be included in the list of inventions that have changed the history of glass production.

Due to the constant development of chemical compositions and material properties, some glass melting furnaces can now have a lifespan of up to 20 years. However, the manufacturing process is still not fully automated and a lot of manual work is required. Most of the fused-cast blocks are preassembled into a unit and are inspected by a team of specialists in the manufacturing plant before dispatch. These are actually bad conditions to face the challenges of progressive digitalisation and further automation.

Create the preconditions

In order to take the next big step in a digitised production of electro-fused refractory materials, essential preconditions for full digitisation have to be created.

Planning and design of the glass melting furnaces: 2D drawings no longer correspond to the state-of-the-art but are still widely used as an exchange medium. 3D drawings, in a standardised file format are a basic requirement for an efficient and error-free exchange. Intensive co-ordination between designers and refractory manufacturers should also be used to standardise formats and reduce special shapes.

Data acquisition in production: Data acquisition in production is the most important basis for automatic process control. It will be indispensable for refractory manufacturers to create the prerequisites through frequent data acquisition and processing and storage in a sophisticated ERP system.

Research, development and simulation: The geometry of the fused cast blocks has a significant impact on corrosion resistance, production yield, lead time and manufacturing costs. Information of these relationships have to be in the public domain and should be made available through catalogues and publications. After complete digitisation and standardisation, it will be economical to carry out simulations and investigations and thus to increase knowledge about the properties of the fused cast refractory materials.

Artificial intelligence: The best and most uniform production results can be achieved by AI control of non-linear processes. The transition from human-controlled to machine-controlled processes is by far the most important requirement for the production of electro-fused refractory materials on a new level. But also, the biggest challenge.

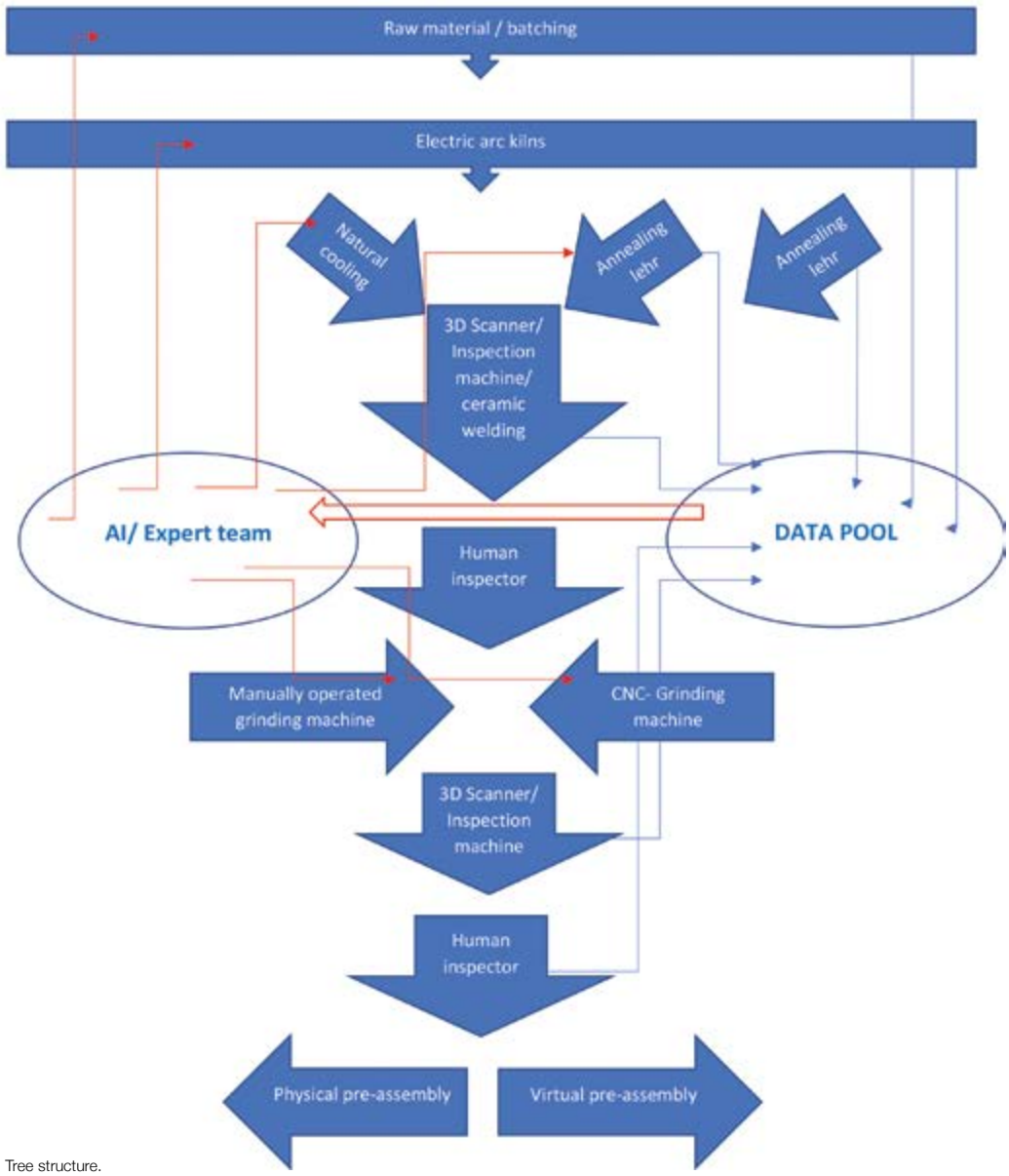
A look into the future

A revolutionary development of production seems improbable and also inappropriate. After all, fused cast refractory materials have to withstand harsh operating conditions for up to 20 years and risk minimisation is the top priority for many decision-makers. Experience has shown that a gradual introduction of the latest technologies entails the least risks.

A tree structure could be used to build a new production line. The tree structure would allow old and new processes to run in parallel and at the same time, measure and save all data centrally. Advanced processes can be added to production in modules.

These advanced processes could include, for example:

- Transfer of all dimensions and geometries in 3D. Allocation of requirement profiles for individual items according to the installation location in the furnace. Definition of fitting pieces.
- Calculation and prediction of the reject rate.
- Transfer of the 3D data to CAM for the production of pattern and sand moulds, verification of the sand moulds by 3D scanner.
- Online analysis of raw materials at production level - control loop with raw material preparation.
- Control of the parameters of the arc furnace by AI and adaptation to weight, geometry and location in the glass melting furnace. Online analysis of the melt at the production level.
- Controlled cooling of the blocks/ cooling boxes after casting in annealing lehrs.
- Inspection of raw blocks after demoulding in inspection machines for geometry, defects and internal structure.
- Ceramic welding of small defects.
- Use of robots for handling the blocks.
- CAM grinding machines for grinding, cutting and drilling.
- Checking the geometry of the processed blocks using 3D scanners.
- Virtual pre-assembly of the processed blocks and



Tree structure.

determination of the required dimensions of the fitting pieces. There is no need for physical pre-assembly.

- Creation of an illustrated quality report for each individual block and for the virtual pre-assembly.

Cost-benefit analysis

The quality and lifespan of fused-cast materials have reached a remarkable level. However, the production techniques and process controls used by the majority of manufacturers are no longer up-to-date. This leads to an unnecessary waste of resources such as material, personnel and above all, time.

The uniformity of the product quality is significantly improved by correctly applied AI control and thus defines the requirement for rapid further development of the production of electro-fused refractory materials.

An increase in costs through the application of modern technologies is to be expected. However, the increase will be less than the expected cost increases for personnel, while maintaining the outdated processes. The benefits for the end customer are obvious. Prevention of errors through the consistent use of 3D bodies, consistent high quality and high reliability of the products, faster availability and future-proof documentation. Most experts, however, will be happy about the time saved and the elimination of the many travelling hours. ●

Reference:
1. Wikipedia.org/wiki/Saint-Gobain SEFPR.

About the author:
Dipl- Ing (FH) Stefan Bald is Managing Shareholder at Intco

Further information:
Intco GmbH, Weiden, Germany
tel: +49 9636 9249907
email: zentrale@intco.de
web: www.intco.de

Finding production flexibility on the blank side

Rogerio Galante discusses recent developments in blank side forming equipment to assist the widemouth press and blow process.

The year 2020 was hailed by many at its start as a year for perfect vision. Linking the newfound symmetry of the calendar date to the clinical measurement for normal visual acuity, 20/20 vision, felt fun and allowed a feeling of hope to suffuse thoughts when looking forward to the new year. What would the roaring 20s decade of the 21st Century have in store? It turns out, something similar to what preceded the roaring 20s decade of the 20th Century… a global pandemic. The Spanish Flu of 1918 impacted society with quarantines and social distancing, very similar to what has occurred in modern society as the world struggles to adjust to life during Covid-19.

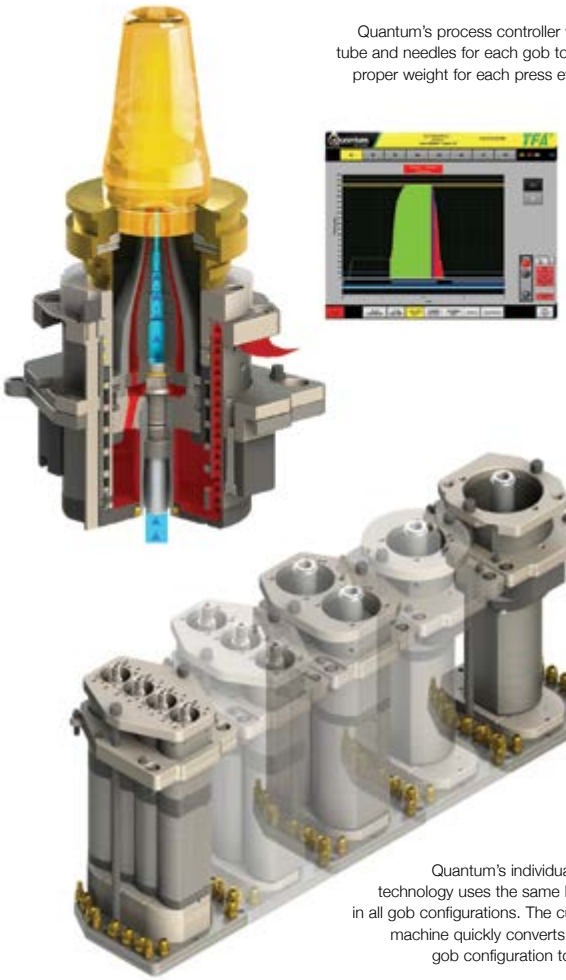
Flexibility crucial

Covid-19 will impact the way glass container producers design new production lines. Now more than ever, it is important to design production lines with flexibility for changes in demand that might be difficult to predict. Demand for glass containers is being impacted from all directions, from sometimes seemingly arbitrary government decisions, to trade wars and just the simple fact that quarantine and social distancing keep people away from the bars and restaurant environments, this industry has long been dedicated to serving.

There are many components in the glass factory that help make production flexible. One key component is the blank side forming equipment. This article focuses on Quantum's benefits and features for the production of the widemouth press and blow process.

Quantum always designs with the operation and durability of its parts in mind. The company manufactures process equipment and plunger mechanisms that are made to last. Design with quality in mind is core to the business values and long-term contribution to the glass container industry. Quantum's patented TWT (Tube-Within-Tube) design separates the plunger up, plunger down and cooling air with no metal-to-metal contact for long durability of all components. This feature, combined with the large 19mm inner diameter of the piston rod, is the ideal cylinder setup for widemouth press and blow jobs.

The company's individual cylinder technology is the key feature for flexible design. Using the individual cylinder concept, it was able to develop a system that uses the same baseplate in all gob configurations. No hose changes or realignment is necessary and machines quickly convert from one gob configuration to another in a fraction of time.



Quantum's process controller will adjust tube and needles for each gob to have the proper weight for each press every time.

Quantum's individual cylinder technology uses the same baseplate in all gob configurations. The customer's machine quickly converts from one gob configuration to another.

Design considerations

When designing the correct process equipment for press and blow operation, the main constraints are the finish size, maximum diameter, the weight and the height of the bottle. With this in mind, the main constraint of the press and blow positioner design is the sleeve. The sleeve diameter will determine the finish size of the article. Quantum designed quick-change positioners by changing the sleeve and keeping the same process equipment.

Quantum's quick-change spacer reduces job change related downtime.

Widemouth press and blow jobs are usually short runs and require a lot more job changes that require a load position and loading spacer change. Quantum's quick-change spacer reduces the downtime to change the spacer as it sits on top of the adapter, therefore not requiring removal of the adapter or the locking stud.

Listening to operator issues

The company's philosophy is always to hear the IS machine operator's problems and to find solutions. When it comes to widemouth press and blow jobs, the main issue has been with the finish. Quantum's TFA (Total Forming Analysis) process controller will adjust tube and needles for each gob to have the proper weight for each press every time.

The company supports glassmaking operations, laying out problematic jobs inside its plunger mechanism to help understand improvements that can be made on the interface between the process equipment and blank side mould parts.

Another important design consideration is the energy savings potential of Quantum's continuous cooling. The Quantum cylinder and process equipment work together to allow the forming plunger to be cooled throughout the entire forming cycle. This reduces plunger up pressure. As a result of lower plunger temperature, it is possible to increase the machine speed.

As society moves past 2020 and into the roaring 20s decade of the 21st Century, perfect vision may not be possible but Quantum can clearly see the need for production flexibility in response to a rapidly changing world. The company's solutions can be an important factor in plans for navigating what the next decade has in store. Keep in mind that OEM lead time to supply a new machine is measured in months, while Quantum can supply a plunger mechanism in weeks. ●

About the author:
Rogerio Galante is Sales and Marketing Director at Quantum Engineered Products

Further information:
Quantum Engineered Products, Saxonburg, PA, USA
tel: +1 724 352 5100
email: rogeriog@quantumforming.com
web: www.quantumforming.com

Designed for quick and easy adhesion

Demand for LED curing printing inks has been increasing continually for some time, which is not surprising as this modern technology offers a range of advantages over conventional UV curing. These include both the saving of time and costs, the option of immediate subsequent processing of the printed material and environmentally relevant advantages such as low energy consumption and the elimination of ozone emissions. Michael Simon reports.

RUCO's LED screen printing ink series 937LED allows users to enjoy all of the advantages described above. Printers save valuable time and benefit from maximum process reliability – and of course, fully in-line with RUCO's own quality label 'Secure in print processing'. And if there are both conventional UV curing systems as well as machines using LED technology available at the printers, they will also benefit from more simplified procedures in stock keeping.

Subsequently, 937UV-LED inks have been very popular among users and are proving their worth in numerous applications worldwide. They are suitable for multi-colour in-line printing and offer good resistance to chemical, alcohol-containing and cosmetic fill products, as well as good dishwasher resistance. The inks cure under standard UV lamps so that a thermal post-treatment using time-consuming and costly oven drying is not required.

It is a universal curing ink system, which is suitable both for use on machines with mercury- or iron-charged standard UV lamps, as well as for curing using UV-LED (wave length 395nm) technology. Thanks to its universal use, the user benefits from more simplified storage. The system ultimately does not care how it was cured. It features

excellent adhesion, as well as very good resistance to chemicals, water and abrasion. Outstanding results are also achieved in terms of dishwasher and frost resistance. Due to their high level of reactivity, they allow for high production speeds. And the special benefit is that in both cases, the ink achieves its adhesion properties immediately after printing, so that the cross-hatch test can be carried out directly afterwards. For the printer, this feature of ink series 937UV-LED means a valuable saving in time with maximum process reliability, fully in the spirit of RUCO's own quality label 'Secure in print processing'.

It goes without saying that these inks are convincing from a visual point of view. In addition to 11 basic colour shades that feature high opacity and colour brilliance, RUCO offers a transparent white, a high opaque white and black and a wide range of special-effect inks for metallic, glitter, hot foil imitation, matt and frost appearances. This selection opens up a broad spectrum of impressive design opportunities.

Series 937UV-LED inks also offer a number of decisive advantages regarding user and environmental-friendliness. In contrast to ceramic and solvent-based inks, the series has a heavy metal-free formulation. The inks comply with the limits specified by European standard EN 71, Part 3 and meet the strict requirements laid down in California Proposition 65.

Pad printing innovation

Also available from RUCO, T28 series pad printing inks were launched in 2015. These glossy, physically drying and chemically reactive two-component inks are suitable for printing onto glass and metal and satisfy demand for excellent mechanical and chemical resistance, as well as for high flexibility. Based on its special formulation, this type of ink cures within 24 hours at room temperature or alternatively, within 20 minutes under heat-assisted treatment.

Separately, the company offers single component baking 110GE inks for screen and pad printing. These high opacity inks are light-fast and weather-resistant and offer good chemical and mechanical resistance, as well as high elasticity. These properties are achieved following a baking process at 180°C for 20 minutes in the oven. ●

About the author:
Michael Simon is Product Manager at A M Ramp/RUCO Druckfarben

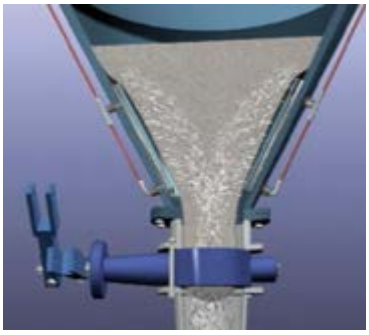
Further information:
A M Ramp & Co GmbH/RUCO Druckfarben, Eppstein, Germany
tel: +49 6198 3040
email: m.simon@ruco-inks.com
web: www.ruco-inks.com

Blending technology replaces mechanical mixer

In the production of reinforcement glass fibre, the raw materials are very fine, dry powders. Therefore, it is possible to introduce a pneumatic blender for homogenous batch mixing, as the following submission by Jarmo Näppi explains.

At the time of a cold tank repair, clients ask for alternative solutions and upgrades for their batch plants. In most cases, batch mixing takes place by a mechanical mixer and transport with a blow tank. Replacement pneumatic blending technology has been available for some time and was developed to achieve the best results in terms of mixing quality, reliability, ease of maintenance and lifetime costs. Pneumatic blenders take the duty of mixing and transport of batch to the furnace bin.

The blender consists of a vertical vessel, designed typically to four bar overpressure. It has a replaceable cone section containing the air burst injection nozzles, operated by quick action pistons. The nozzles have ceramic seats to prevent wearing as low as possible. The nozzles can be removed from outside and each component can be replaced individually. All replacement parts are small and easy to handle.



Fluidisation cone and double dosing valve.

The mixing event is a series of controlled jet pulses of air through the nozzles into the vessel. Opening time can be adjusted as well as order, number of nozzles at a time open and number of cycles. Mixing air forms large, quickly moving bubbles and forces mixing efficiently. At the time of blending, the valve to the chute connected to a large dust filter is open and escape air is filtered before entering to the atmosphere. The technology allows a completely enclosed process, keeping dust emissions inside the plant under close control.

After blending, the unit is pressurised to start the conveying cycle of batch to the furnace bin. In order to keep the segregation low, dense phase pneumatic transport is utilised. This means a high material/air ratio, prone to create blockages in the pipe. To prevent this, the pressure is controlled and assist air is blown from the network via a separate pipeline, if pressure is elevated at the location of the air assist nozzle. These nozzles are typically located from 3m to 6m distance along the transport pipeline.

Blending nozzle and actuator.

Blender installed on load cells for check weighing of batch.

Blending cone assembly of the pneumatic blender.

Customer satisfaction

Lahti Glass Technology has recently completed a project in the Czech Republic, replacing an old mechanical pan-type mixer to the client's complete satisfaction. The latest installations contain a blender. In fact, since developing the pneumatic blender, Lahti has not supplied a single project with a mechanical mixer for reinforcement fibre production. Currently, the company has greenfield projects in hand in Turkey for Besler Tekstil and in Taiwan.

When the blender is combined with Lahti's fluidisation technology, it is possible to design a completely pneumatic batch plant without motors. This technology has already been applied in plaster and mortar production plants and in glass fibre production. Dosing of raw materials is realised by using a fluidisation silo cone, air slides (chutes containing fluidisation elements) and double dosing flaps. The flap has two actuators, one for coarse feed and one for fine feed. Connected to advanced weighing electronics, extremely high dynamic dosing accuracy can be achieved. All with a small quantity of low pressure compressed air!

Lahti Glass Technology is the leading supplier of batch plant technology for glass fibre producers, with origins as old as its parent company. Lahti is an affiliate of ZIPPE Industrieanlagen GmbH, who celebrates its 100th anniversary this year (see the separate ZIPPE anniversary Supplier Focus article on Pages 68-70). ●

About the author:
Jarmo Näppi is Managing Director at Lahti Glass Technology

Further information:
Lahti Glass Technology Oy, Lahti, Finland
tel: +358 400 352605
email: jarmo.nappi@lahti-glass.fi
web: www.lahti-glass.fi

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VSL-A series laminated glass cutting machine.

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tel: +43 7477 4065-0
web: www.lisec.com

LIBS-based batch stream analysis for stable furnace feeding

Amit Ahsan, Lieke de Cock, Alexander Schlemminger, Cassian Gottlieb and Christian Bohling discuss how Laser-Induced Breakdown Spectroscopy (LIBS) can be successfully utilised for the quantitative determination of the elemental composition in different materials such as minerals, metals or glass.

Every efficient production and process performance depends on two major factors. Firstly, proper control of the input feed and secondly, overall energy efficiency which itself largely depends on raw material composition. Looking at the current glassmaking industry where especially recycling materials such as dirty cullet as well as natural batch inputs are sourced from different international sources, ensuring stable batch chemistry is particularly challenging.

In this regard, even with good accuracy, conventional state-of-the-art laboratory technologies such as X-ray fluorescence (XRF), Inductively coupled plasma optical emission spectrometry (ICP-OES), Inductively coupled plasma mass spectrometry (ICP-MS) falls short in terms of monitoring the internal variation, detecting impurities as well as measuring light elements such as B, Li etc. Not to mention additional errors coming from human-influenced sampling, as well as sample preparation which makes these techniques quite unfavourable in terms of capturing the true composition of the raw batch, as shown in figure 1.

On the other hand, Chemical oxygen demand (COD) measurements conducted on cullet are often unable to give good results on critical defects due to insoluble plastics. Therefore, despite the required lead time, high labour and maintenance costs, these offline techniques still struggle to ensure full control over batch and cullet feeding. Moreover, due to lack of reliable input data, process feedback normally comes much later (12-15 hours) and results in scenarios like unintended variations in the furnace, high rejection rates, recrushing of the low quality product, downward drilling or complete flushing in the worst case. Of course, there are many other process parameters (eg furnace design, grain size, carryover, segregation etc) that also have a significant influence on these occurrences.

Thus, these highly fluctuating input materials demand continuous monitoring to ensure consistent target quality in the final product.

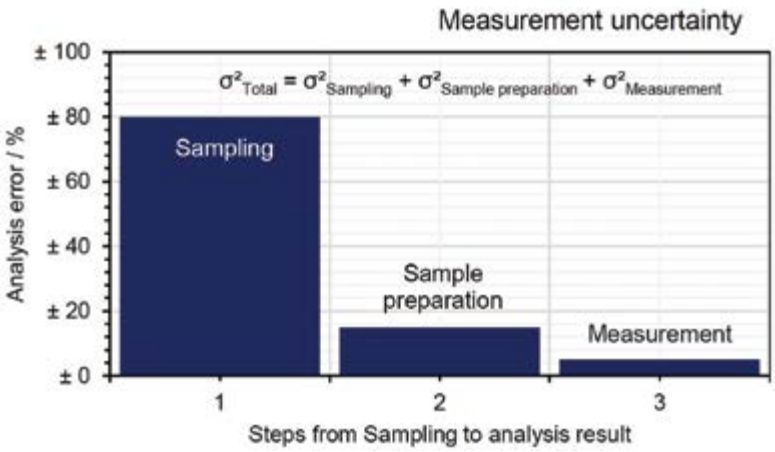


Figure 1: Graph illustrating the statistical estimation of uncertainty in laboratory analysis. Typically, the uncertainty of sampling is much higher than the measurement uncertainty.

X-ray-based inline bulk material analysis

In addition to established sampling and offline laboratory analysis, X-ray based inline monitoring systems had already been assessed in other industries (eg steel and mineral). These systems detected the most important elements for some processes and enabled fewer classical sampling and laboratory analysis effort. However, besides the high investment costs, problems with light elements detection, as well as complex radiation protection, the maintenance and calibration effort required to obtain trustworthy results were considerably higher than the time saved by eliminating laboratory analysis.

Although the result of implementing this inline analysis was not satisfactory for many processes, it had to be accepted since there were no alternative solutions available until a few years ago.

LIBS can be the solution

But what can be the alternative? As seen already in the steel industry, the use of lasers can lead to significant improvements in harsh industrial operations, concurrently overcoming the disadvantages of established technologies. Laser-Induced Breakdown Spectroscopy (LIBS) is

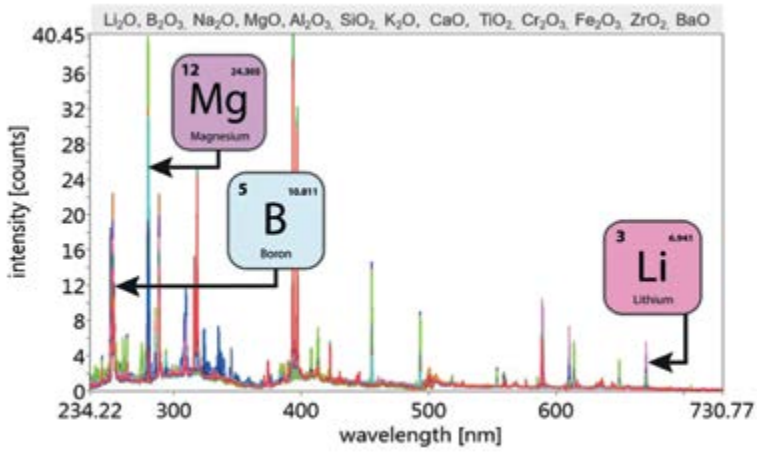


Figure 2: Different elemental lines observed in LIBS analysed glass spectra (source: SECOPTA analytics GmbH).

GlassTrend

This article is based on a paper presented at the GlassTrend spring seminar on raw materials processing and recycling in May 2020. **www.glasstrend.nl**

Glass Worldwide is the preferred journal of GlassTrend

Figure 3: Refractory sorting plant based on the LIBS sensor (source: HORN & Co Group, Germany).

Figure 4: LIBS-based aluminium scrap sorting system (source: STEINERT GmbH, Köln, Germany).

a laser-based measuring method for the quantitative determination of the elemental composition in different materials such as minerals, metals or glass. A pulsed laser is focused on the material surface (eg batch or cullet on a conveyor) and due to high energy density, it creates a plasma by ablating a few µg of the material.

The characteristic light emitted by this plasma represents local elemental composition at the measuring point. This light is then further processed and analysed in spectrometers (figure 2). With each laser shot, simultaneous measurement of all the elements is possible, which makes this technique very fast in delivering results (within ms). In addition to the existing elements being analysed by the XRF, light elements can also be quantified with LIBS. Furthermore, it does not require the homogenisation of samples since averaging of data combined with different chemometric evaluation method is usually sufficient.

The LIBS technique was first explored in the 1960s and has been continuously developed since then. For the past decade, the LIBS-based sensor has been progressively implemented in different industries such as recycling, refractories, steel, mineral etc. The main reasons behind these advancements are firstly due to the recent evolution of lasers with elevated stability and secondly, the drastically reduced price for the necessary system components. As it requires no sample preparation, the LIBS sensor can be installed directly at the measurement location (inline), beside the process (at line) or in the laboratory (offline).

The innovative German company SECOPTA delivers the LIBS sensor with a robust industrial design (IP56) and long operating lifetime (laser lifetime 100,000 hours, with no moving parts). This allow a quasi-continuous measurement. ▸

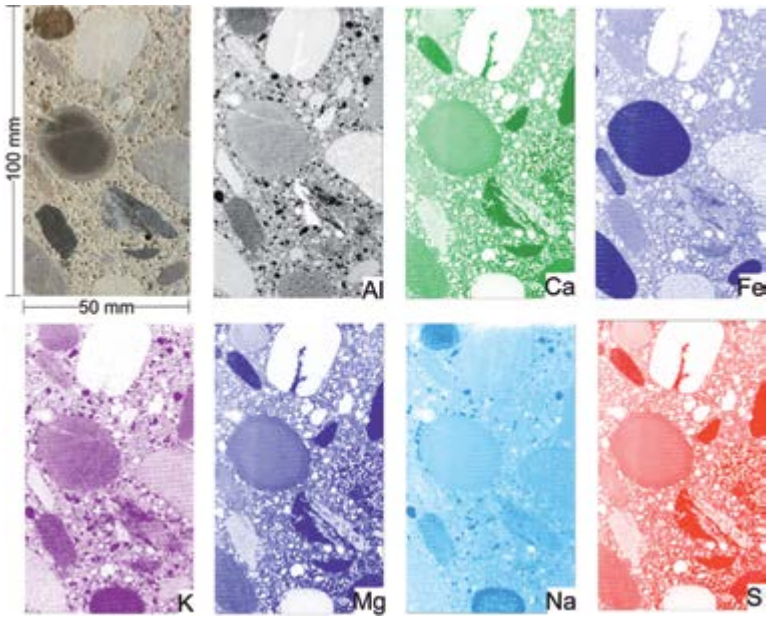


Figure 5: Various element distribution in a concrete core.

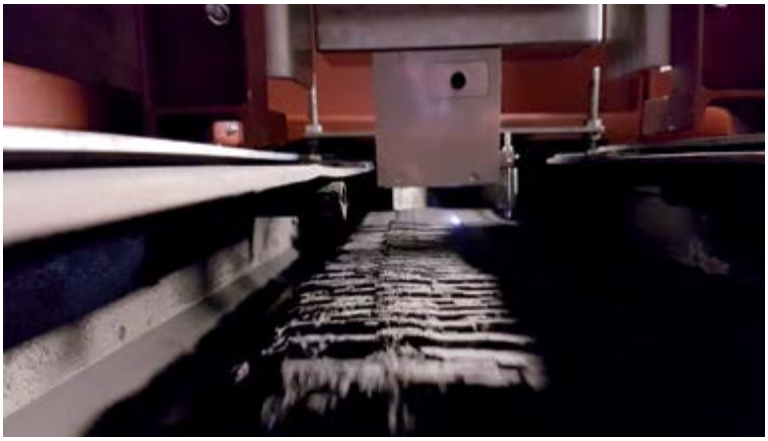


Figure 6: Fast laser-based inline measurement with an industrial LIBS sensor on a slag conveyor belt (source: Treibacher Industrie AG, Austria).

Important process values are determined by statistical evaluation of the collected spectra or individual plasma events (up to 20 kHz).

Non-glass industry applications

Today, the LIBS sensor is used by many different industries such as mining, steel and aluminium making, concrete structure monitoring, glass analysis etc. For example, the company HORN & Co in Siegen (figure 3) is using an LIBS-based sorting unit to separate mixed batches of spent refractories from steel and aluminium as well as glass furnaces.

Among others, the company Steinert in Köln (figure 4) is building high purity sorting systems (speed up to 3m/sec), enabling aluminium makers to produce primary quality aluminium from secondary scrap input. Here especially, the fast analysis of light elements is the key feature of LIBS-based sorting machines.

The application of LIBS for spatially resolved analysis of concrete cores is used by various scientific institutions such as the Bundesanstalt für Materialforschung und -prüfung (BAM), Hafencity University Hamburg (HCU) or commercial companies such as Valtest AG of Switzerland and BARG Betontechnik und -instandsetzungs in Berlin.

For example, BAM in Berlin is using the LIBS technology in the context of condition monitoring of concrete structures. In this instance, spatially resolved LIBS analysis of concrete drill cores is being used to evaluate the chemical matrix of the concrete (Al, Ca, Fe, Na, K, Mg, Si), as well as the penetration depth of harmful elements such as chlorine, carbon or sulphur, without sample preperation and cost consuming wet chemical analysis (figure 5).

Last but not least, this technology is perfectly capable for the analysis of bulk input material for fully automatic inline process monitoring. Treibacher Industrie AG in Althofen, Austria is using a LIBS sensor (installed directly above a conveyor belt) for online quality control of steel mill slags sourced from different suppliers (figure 6). This project was established at a fraction of the cost of an inline XRF instrument and since commissioning in 2018, there has been no failure of the sensor. The maintenance and inspection effort amounts to a few hours per year.

In addition, Treibacher Industrie AG was able to integrate this inline measurement into its central control system via the common PLC and use the analysed information for physical and data-driven process models. Thus, the LIBS sensor from SECOPTA autonomously controls the individual subsystems of Treibacher Industrie AG.

Glass industry benefits

The continuous monitoring of the most important elements is also of crucial importance in the glass industry. The average glass producer loses roughly 10% of production per year due to quality problems. These problems originate among others from bad quality of batch and contamination (organics, metals, glass ceramics) of cullet. Not to mention additional downtime effort due to a lack of control over batch inhomogeneity, as well as batch handling errors (calibration scales, leakages). As a result, out of every 300 production days (approximate), a typical glass producer loses on average close to 30 production days, which constitutes large amounts of energy, as well as resources.

In 2019, together with CelSian Glass BV, the SECOPTA inline sensor has been installed in the glass industry, continuously monitoring the deviation in the chemical composition of a raw batch stream (shown in figure 7). The study conducted proved the feasibility of the LIBS sensor in measuring not only the major elements (eg Si, Na, Ca, Al, K, Mg) but also the light ones (eg B, Li, C). Because of its compact size (figure 8), the sensor head can be easily

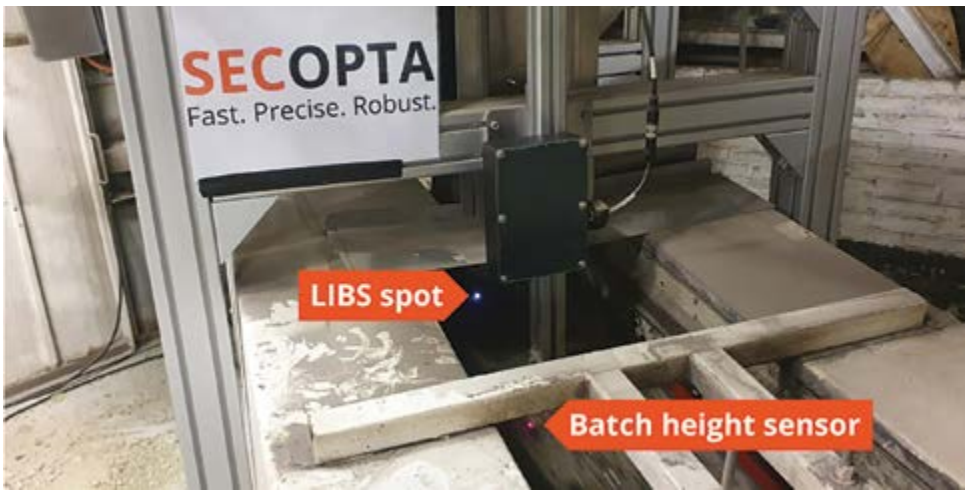


Figure 7: SECOPTA inline sensor continuously measuring raw batch input before the furnace (source: CelSian Glass & Solar BV, the Nederlands).

Figure 8: LIBS sensor head dimension weight x length x height = 270mm x 630mm x 203mm.

integrated into the existing process chain and the control unit can be connected to the level 2 system (PLC/SCADA) via common industrial interfaces.

Therefore, by working directly with the composition programme of the batch house, the LIBS sensor can monitor online whether the batch parameters entered are adhered to in furnace input. It delivers online analysis of the incoming cullet stream, detecting critical defects including carbon on the conveyer belt. Moreover, the risk of a wrong material in the wrong silo, as well as an uncharted malfunction in the weight cell (of the silo) resulting in a wrong batch recipe can be substantially reduced. If any discrepancy is found, corrective measures can be initiated as quickly as possible. Therefore, by measuring online, process engineers can have the option to react on time and adjust the process upfront.

Experiences from other industries, as well as preliminary studies in the glass industry, show that with continuous monitoring of the chemical composition of the input materials, a more stable, refractory-friendly process can be achieved within a narrow process window, close to the process optimum. The LIBS analyser increases control over internal variation that is currently not being analysed. Depending on the specific process, respective plant design and age, an average glass production process can achieve longer refractory lining service life, an approximate 1-2% optimised energy efficiency and at the same time, a reduction in lost production days (approximately 15 days per year).

Based on these three components alone, estimated annual savings of approximately €400,000 up to €700,000 can be achieved and the amortisation of a sensor within 7-14 months after installation can be targeted. Side effects such as lower expenses for CO_2 certificates, validating the certificate of analysis (COA) of suppliers and the potential of sourcing cheaper raw materials or reduced expenditure in the laboratory due to the supply material testing and process sample control are not yet even included in this calculation.

It can provide great support by stabilising the chemical mass balance inside the furnaces, which will result in higher reactivity, faster melting time, low rejection rates and further increases in product quality. Last but not least is the advancement towards Industry 4.0. ●

About the authors:
Amit Ahsan is Sales Engineer, Alexander Schlemminger is Head of Sales, Dr Cassian Gottlieb is Application Engineer and Dr Christian Bohling is General Manager, all at SECOPTA analytics, while Lieke de Cock is Team Lead Furnace Support at CelSian Glass & Solar

Further information:
SECOPTA analytics GmbH, Tetlow, Germany
tel: +49 151 5854 7723
email: amit.ahsan@secopta.de
web: www.secopta.de

CelSian Glass & Solar BV, Eindhoven, the Netherlands
tel: +31 6 317 64580
email: lieke.decock@celsian.nl
web: www.celsian.nl

Revolutionary moil cutting development

After several years of development, based on field experience at Schott-Zwiesel, initially on a traditional cutting process and then on a conventional laser cutting process, IPROTec (the engineering company of ZwieselKristallGlas Group) has launched its latest range of laser crack-off machines. Based on laser filament technology, this equipment is suitable for use with all glass compositions, forming processes, cold and hot area operations to perform top quality moil cutting. According to Paolo Panza, the process has been successfully implemented and proved in Zwiesel, as well as at the premises of other customers.

Conventional technologies for cutting off the moil from stemware can be divided into two main groups, involving either removing the moil from cold glassware after the annealing lehr or from hot glasses before the annealing process.

When removing the moil from 'cold glasses', typically a mechanical or laser type crack-off machine is employed. The sequence for the necessary process steps is:

- 'Scratching' of the later cutting surface via CO_2 laser or mechanically (scoring wheel).
- 'Cutting off' the moil by thermo-shock.
- Grinding of the cutting surface.
- Washing and drying of the glasses to eliminate grinding residues.
- Melting of the sharp cutting edges to obtain the required mouth rim forming ('rounding').

The biggest disadvantage of this technology after cutting off the moil is the need to grind the surface. Because only grinding wheels can be used, this procedure can be considered as a totally mechanical process. In particular, the grinding of very big glasses with a large stem and a thin wall thickness leads to increased breakage. In order to obtain clean glasses, a washing process is needed to eliminate residues after grinding. The use of abrasive and water, as well as the additional water treatment required, lead to greater expenditure of work and hence, to higher production costs.

The conventional alternative involves cutting off the moil of 'hot glasses' before the annealing lehr. This process is typically performed with a burn-off machine or is sometimes attempted with a CO_2 laser cutting machine. The process steps required for burn-off cutting include the following:

- Preparation, moving the article into the correct position.
- Heat up, whereby a narrow zone is warmed up by the burner.
- Cutting the remaining thin glass film by burner.
- Cut edge melting.
- Cooling.

This thermal process leads to an unstable cutting process that is influenced by the burners' design quality and maintenance, gas/oxygen pressure and flow regulation, as well as the type of manifold used for fluid distribution. The need to control so many parameters creates an unstable process that only skilled operators and accurate maintenance can partially compensate. Furthermore, the resulting rim is quite thick and sometime varies from one side to the other. At the moment the moil is separated from the glass article, there is always a 'lip' that remains following separation. This is very difficult to eliminate.

Gas and oxygen consumption, as well as the number of burners and their maintenance, are also expensive compared to a laser crack-off machine.

In the case of CO_2 laser cutting, the sequence of necessary process steps involves:

- Preheating of the subsequent parting line via a burner.
- Heating of the parting line via CO_2 laser until the 'plastic' range of the material is reached.
- 'Pull-off' of the moil via an external force until the moil and the glass are separated.
- Melting of the mouth rim in order to obtain the required contour ('rounding').

This thermal process leads to many significant disadvantages. The basic prerequisites to pull off the moil as equally as possible in order to obtain an exact moulded parting plane are on the one hand the uniform viscosity distribution of the material and on the other hand, a constant wall thickness distribution in the cutting area. Good quality and a minimum deviation of tolerances concerning the wall thickness distribution, as well as geometric tolerances (concentricity, ovality etc) must be secured in the manufacturing process by the previous forming process (blowing or press-blow machine). However, the manufacturing processes often cannot consistently provide the required high product quality and accuracy needed. As a consequence, this leads to bad quality and a lower production yield.

IPROTec's LFC machine, used for moil cutting.

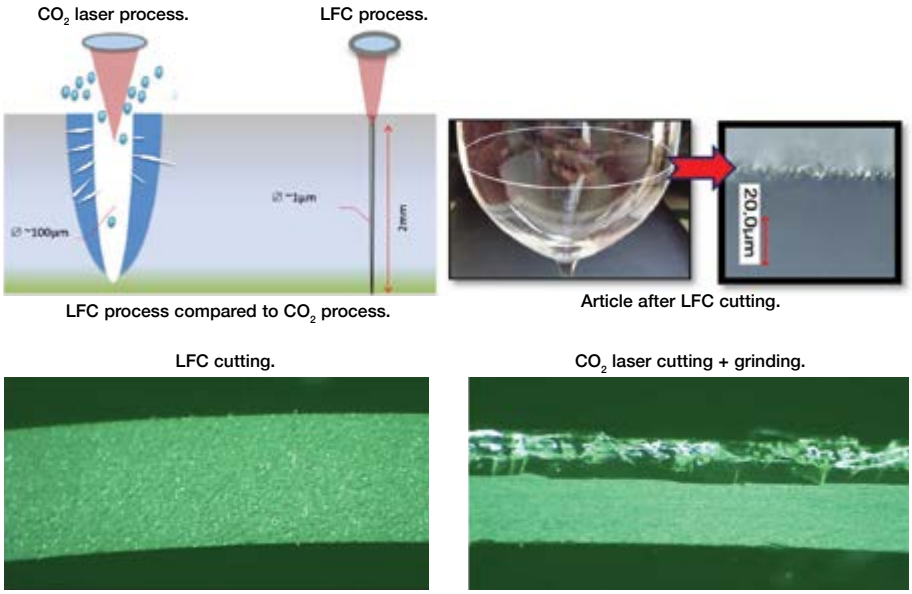
By using the CO_2 laser, problems often appear with evaporation from the glass. The evaporation then leads to the deposition of condensation on the surface of the glass. For this reason, the glasses in such machines are mostly handled with the moil on the top.

Another disadvantage is the grabbing of the moil for separating the glass. Grabbing of the moil can lead to small pieces of broken glass that fall into the bowl and can lead to defective products.

A further essential disadvantage is the limitation of the attainable mouth rim quality. It is very challenging for this technology to create very fine and delicate mouth rim contours. The final result of this thermal process is often a thick and bulged mouth rim.

Laser filament process

The previously described disadvantages of conventional process technologies can be eliminated/avoided with the iPROTec LFC machine for cutting off the moil of transparent ▸



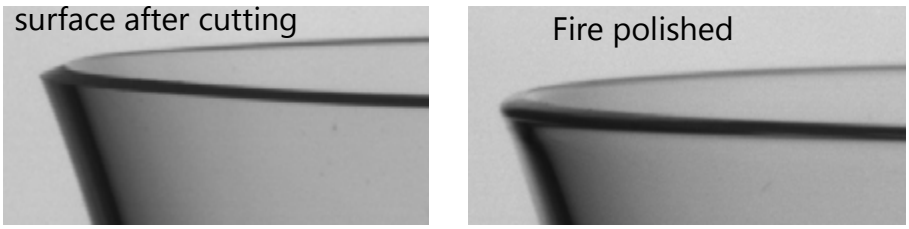
Microscope picture after cutting surface.

tumblers or stemware. The machine, which makes use of a special laser, can be located at the cold or hot end of the production line according to the configuration selected.

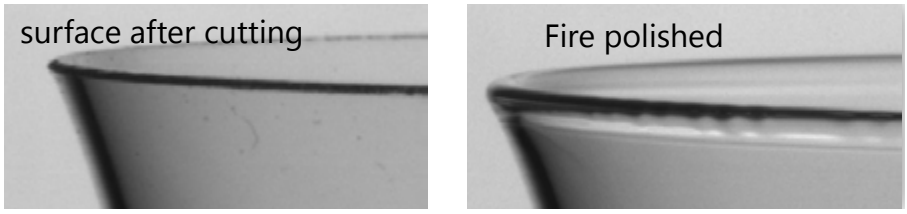
The main advantage of the LFC technology is the contactless cutting off of the moil. Because the cutting method used is a 'cold' and contactless process, neither mechanical nor thermal stress influences the glass material.

The equipment works with a special laser technology. During the laser process, thousands of small holes (diameter of one hole ≈ 2 µm), the so-called filaments are placed at equal distances in a line of 360° at the height of the later rim (perforation). This means that the moil and the rest of the glass are connected via small sections between the filaments. If the moil has to be cut off from the goblet, for example, some energy in the form of heat is needed. The short heating time of the perforated area leads to a dilation of the glass diameter, the demolishing of the little sections between the holes and subsequently to the cutting off of the moil.

The existing cutting surface after separating the moil from the glass in the LFC is very fine, plain and free from breakouts. Depending on individual requirements, the precise quality of the cutting surface allows the customer to create a very fine or a stronger formed mouth rim. Furthermore, a reduction of the mouth rim faults leads to a higher production yield.



Premium quality rim finishing is possible via LFC cutting.



Usual crack-off rim finishing results.

Usual burn-off rim finishing result.

Hot and cold end configurations

Such a process can be applied at the cold or hot end of the line. In case of the cold end solution, the machine has eight or nine sections and a rim polisher is positioned after the LFC for the fine glazing of the rim.

In case of hot end installation, the machine is equipped with 10 sections to perform final rim polishing in the machine itself.

Process advantages

The main quality advantages of using the LFC machine can be seen in the accompanying image, as described below:

- High rim quality (no chipping/micro cracks).
- No grinding nor water usage needed.
- Minimal rim glazing required after cutting.
- Better cutting quality compared to traditional mechanical or laser cutting machines.
- Much improved rim quality compared to a burn-off machine.
- Reduced operating and maintenance costs compared to a CO_2 laser machine or burn-off machine.
- Contactless process (no thermal/ mechanical stress).
- Possibility of use at both the cold and hot ends.
- Possibility to use with any type of glass composition.
- Possibility to use with any forming process (press-blow or blow-blow).
- Non-sensitive regarding wall thickness distribution.
- Non-sensitive regarding ovality.
- Non-sensitive regarding bent glass.
- No condensation (no thermal cutting process).
- No additional tempering for process required.
- Maximum process stability and repeatability. ●

About the author:
Paulo Panza is Business Development Manager at IPROTec

Further information:
IPROTec GmbH, Zwiesel, Germany
tel: +49 992 298633
email: paulo.panza.pp@iprotec-gmbh.com
web: www.iprotec-gmbh.com

Overcoming ware handling issues in challenging times

As the international glass container industry begins to stabilise during the ongoing Covid-19 crisis, a more settled picture emerges in the marketplace. Glassmakers are coming to terms with the reality that they may be unable to depend exclusively on previous market strengths and need to consider alternative opportunities to sustain growth. This may require unfamiliar production practices to be adopted, especially in terms of accurate ware handling, for example, as Roy Clarkson explains.

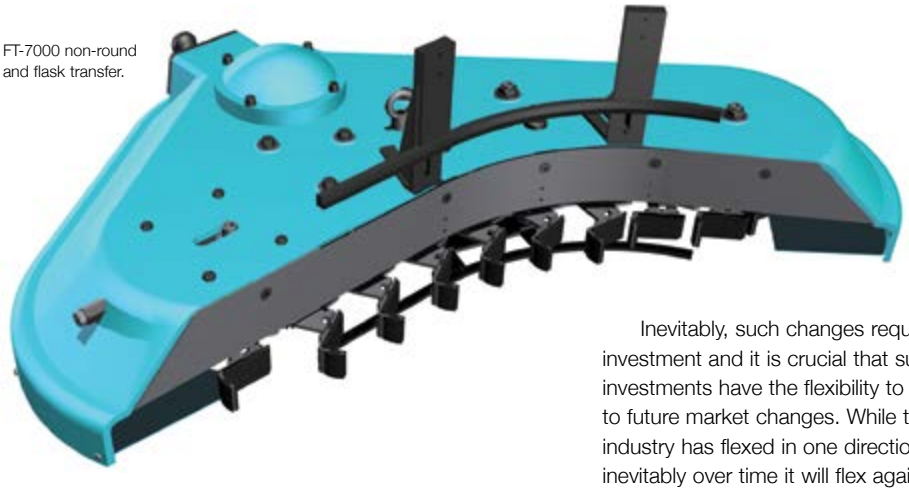
The Covid-19 crisis has taken a global toll on markets in various and unparalleled ways, including the growth and decline of many sectors. As a result, glassmakers are having to adapt quickly to manufacturing containers that they have not produced previously and more importantly, do not have the correct equipment or experience to maintain the level of profitability that is essential during these challenging times.

Historically, Sheppee has worked closely with customers during its own periods of change and learning. These projects have proved to be a springboard for many of the varied products Sheppee offers the international market today and feature among the core strengths that define the company's unparalleled position within the industry.

For any glass manufacturer who is facing the prospect of embracing an unfamiliar ware range, there will be many learning processes to overcome and invariably, ware handling can prove to be one of the greatest challenges in ensuring good quality containers are not needlessly wasted due to inexperience or using the incorrect equipment.

From a ware handling perspective, such a shift in production highlights the following key areas:

- Responding to the limitations of the container and its handling capabilities.
- Identifying the correct equipment and set up for that product and ware range.
- Having the necessary skills, training and support available to achieve success.



FT-7000 non-round and flask transfer.

At this crucial time, therefore, it is important for glass manufacturers to seize this moment to ensure that they are fully equipped and thoughtfully implement any necessary changes, be it technology or learning.

Adaptation is crucial

Combined with Sheppee's bottle trial service, 24 hour remote technical support and training programme, all designed to enrich customers' understanding of ware handling and the ability to achieve their goals, the varied portfolio of products within the company's catalogue provide the opportunity for customers to adapt to changing market conditions seamlessly.

Inevitably, such changes require investment and it is crucial that such investments have the flexibility to adapt to future market changes. While the industry has flexed in one direction, inevitably over time it will flex again.

The Sheppee product range has been designed to cover every aspect of glass container manufacture. From pharmaceutical to cosmetic, tall ware to non-round and lightweight high speed NNPB to tableware, the portfolio has the diversity to meet these changing times.

The glass container industry has endured many setbacks over recent decades but its resilience has always prevailed. A resurgence in glass packaging demand and the industry's continued willingness to adapt to change proves it is a key industry by many national governments around the world. This latest crisis is just another opportunity for the industry to embrace change, grow both personally and as organisations and ultimately, learn from this moment and be stronger going forward. ●

AWT-2200 high ware transfer.

About the author:
Roy Clarkson is Regional Sales Director at Sheppee

Further information:
Sheppee International Limited, York, UK
tel: +44 1904 608999
email: rclarkson@sheppee.com
web: www.sheppee.com

Flexible all-electric furnace design

Brian Naveken emphasises the importance of bottom electrodes in the design of all-electric melting systems.

Figure 1: Production proven all-electric furnace.

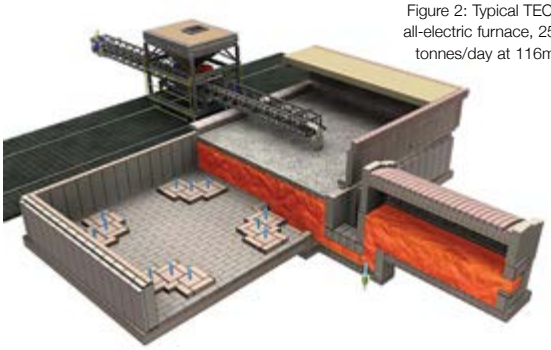


Figure 2: Typical TECO all-electric furnace, 255 tonnes/day at 116m².

With sustainability in the glass business, there has been a heavy emphasis on all-electric furnaces (AEF) and flexible (or hybrid) furnaces. With these concepts come changes in furnace designs and associated electric melting systems. So the question becomes, whether to design the furnace around the electrical melting system or design the electrical system around the optimal furnace design? Hopefully everyone answered the latter.

With a properly designed and optimised AEF, one would also expect to have the electrical melting system design optimised. When using through the sidewall or top entry electrodes, this is not possible. The use of bottom electrodes gives this flexibility. Bottom electrodes and consequently the phasing and transformer types are not limited by the geometry of the furnace.

This has been the TECO Group's AEF engineering design philosophy and technologies, built on the technologies of TECO, KTG Engineering and Elemelt. This is backed by production proven experience for over 60 years in top entry, side wall and bottom electrodes. A typical TECO AEF with a maximum melting capacity of 275 tonnes/day is shown in figures 1 and 2.

Optimal Joulean heat release

Joule heating is defined as the process by which the passage of an electric current through a conductor produces heat and is governed by Joules' Law and Ohm's Law, which relates power, voltage, current and resistance. When electrically melting glass, the molten glass acts as the resistor and adjusting the spacing of the electrodes, without changing power, will increase or decrease the resistance affecting the Joulean heat release into the glass. Depending on glass compositions, spacing electrodes too far apart can result in unwanted currents and voltages, as well as phase imbalances, which can have detrimental effects.

To illustrate the concept of Joulean heat release, a series of models of a square AEF were developed with varying electrode spacing and arrangements, with the power remaining constant. Model 1 is with electrodes at the sidewalls, Model 2 is with electrodes spaced in thirds and Model 3 is a standard TECO Scott-T design. The results can be seen visually in figure 3.

Figure 4 contains the Joulean heat release values, measured at the centre of the glass melt.

Figure 3 also shows that a good portion of the heating effect is done in close proximity of the electrodes and causes the heat release not to be uniform between the electrodes. This results in convection flows and is a mechanism of melting, mixing and fining of the glass. Figure 5 shows an example of this and the optimisation afforded by bottom electrode design. Table 1 contains the results of these parameters. As can be seen, electrode position significantly affects convective flows and an optimal design can only be achieved with the flexibility offered by bottom electrodes.

Safety, operation and maintenance

One of the benefits, often overlooked, is that a furnace with bottom electrodes can easily employ fenced off containment. Enabling state-of-the-art safety cannot be understated. The complete area underneath the furnace around all of the electrodes can be enclosed with redundant access point gates that contain a shut off switch if not properly accessed by ▸

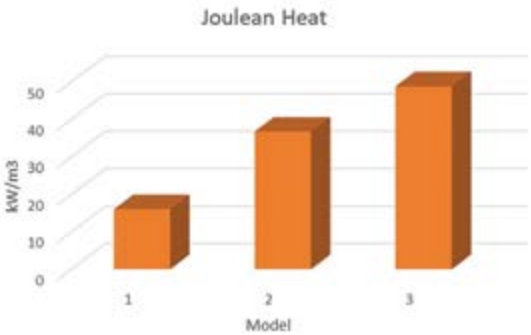


Figure 4: Joulean heat release in kW/m³.

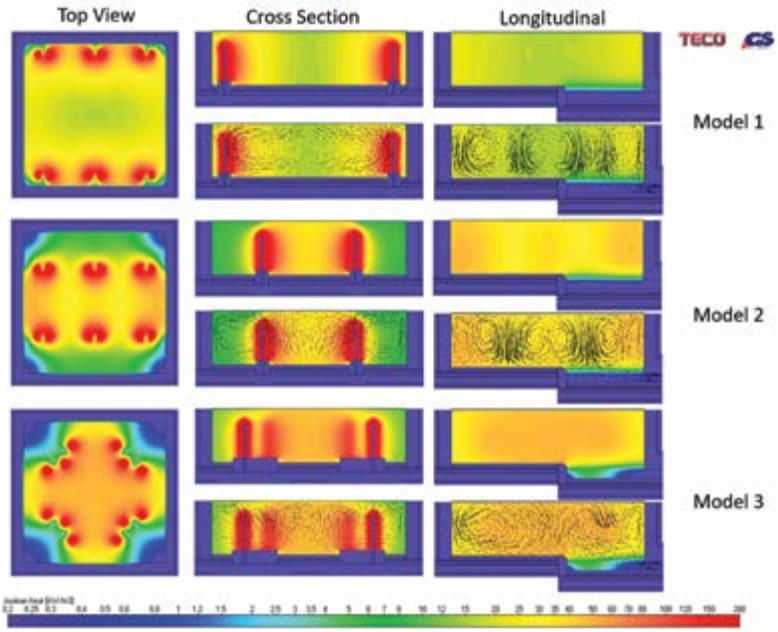
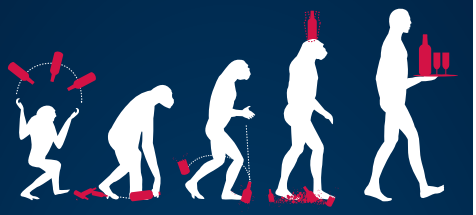


Figure 3: Joulean heat release and convective flows.

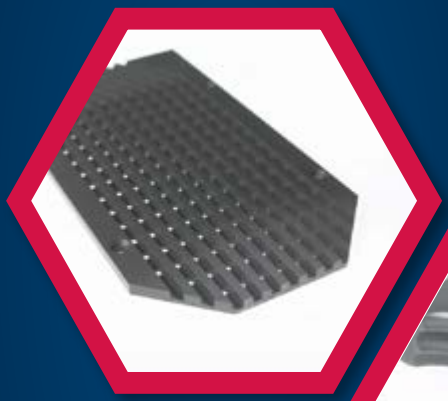
Hot glass handling is evolving



The PROTATHERM® range is trusted by some of the world's premier glass container manufacturers.

They trust **PROTATHERM®** to meet their need for highly durable yet sympathetic contact materials and parts.

Our aim is simple, increase our customers' productivity, through reducing down time due to excessive wear or breakages of contact parts, and increase pack rates by helping to reduce checks and cracks in the glass



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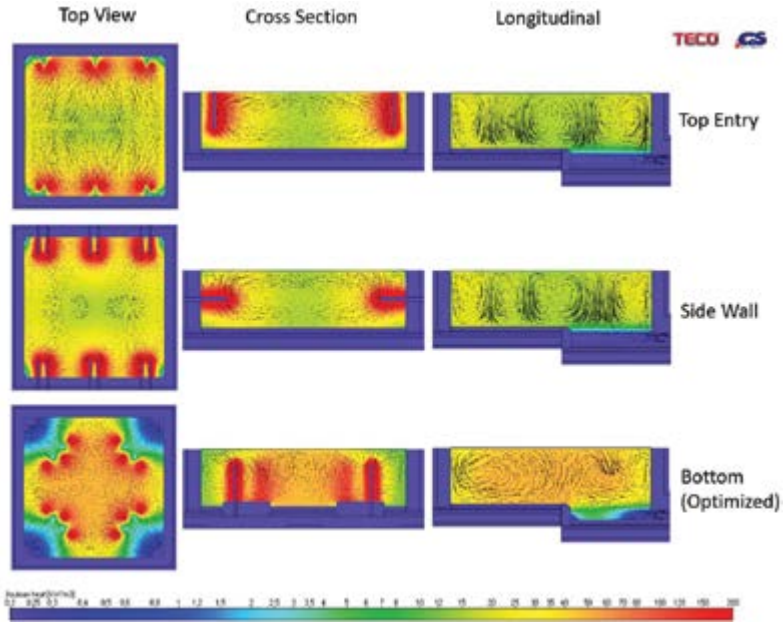


Figure 5: Optimisation of electrical melting system.

limited qualified personnel. Additionally, with all of the electrode access being underneath, it allows for accessibility and far less clutter around the remainder of the furnace.

Sidewall electrodes have to be rotated periodically to prevent them drooping under their own weight. Plus, the refractory block is a maintenance wear issue.

Top entry electrodes have additional operational issues not found with bottom electrodes, which are batch charging and accurate electrode positioning. Top entry electrodes impede batch chargers, since the common method of charging is from the top using a rotational spreader, resulting in uneven batch coverage. If molybdenum electrodes are exposed to the atmosphere, they will oxidise quickly and fall off into the glass.

Not all top entry electrodes are located along the sidewalls but can move within the glass area. For example, in the case of a delta or double delta (star) phasing arrangement, getting these triangular arrangements accurate is often tricky and non-symmetrical power results. Also, with electrode position, in relationship to sidewalls, comes design limitations of AEF lengths and widths. Too large an electrode spacing and improper phasing results in higher operating costs.

Economics

Plant utility costs are affected by inefficiencies of design. The correct and efficient application of electrical energy through the Joulean heating process is a combined product of plant power service, distribution, Joulean connectivity, electrode placement, electrode quantity and power quality factors such as phase current and voltage imbalances. Inefficient application of power to the process, by usual means cited above, can cause demand factor or transformer power factor issues, increasing electrical consumption per ton melted by up to 20%.

Misconceptions

One of the biggest arguments against bottom electrodes is interaction with metal contaminates. If this is truly an issue, would it not be seen more often in boosted fuel-fired furnaces? There are considerably more fuel-fired boosted furnaces in the world than AEFs.

Another concern is a glass leak at the electrode and electrode holder. Advances in electrode designs, such as the KTG Engineering SX holder (figure 6) and a raised electrode block have eliminated such problems.

Conclusion

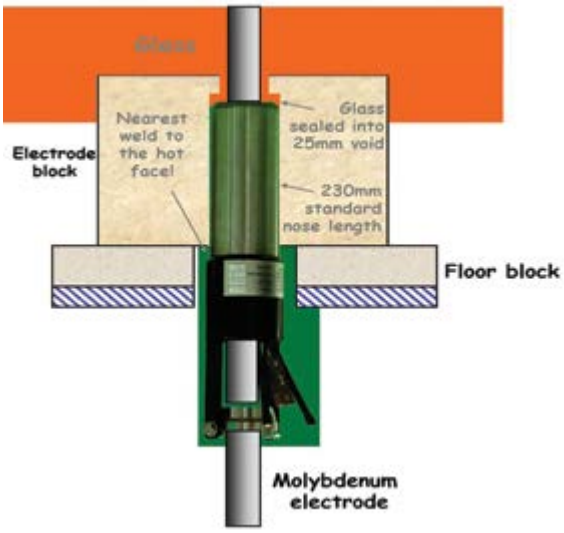
Bottom electrodes allow for flexible AEF and electrical melting system design. Electrode locations are not restricted, which allows for varying or multiple phase and transformer configurations. The bottom of the furnace access can easily be restricted for safety, allowing for ease of accessibility and maintenance.

The TECO Group's AEFs are optimally designed, first without the restrictions created by top entry and sidewall electrodes. Then, TECO designs the optimal electrical melting system to provide the lowest energy consumption, lowest emissions, extended life and high glass quality, resulting in production proven customer satisfaction. In order to optimally design an AEF complete solution, the benefits of flexible bottom electrode design is undeniable. ●

Model	Description	Residence Time (hrs)	Mixing Index	Melting Index	Fining Index
1	Top Entry	1.00	1.00	1.00	1.00
2	Sidewall	1.27	0.99	1.04	1.78
3	Bottom	1.64	1.80	1.16	1.82

Table 1: Normalised quality indices of modelling results.

Figure 6: KTG Engineering's production proven electrode holder.



About the author:
Brian Naveken is responsible for new projects and business development at the TECO Group

Further information:
Toledo Engineering Co Inc (TECO), Toledo, Ohio, USA
tel: +1 419 537 9711
email: sales@teco.com
web: www.teco.com

Laser cladding benefits heat transfer during glass production

F Bourahima et al compare two different kinds of cladding (PTA and laser) for the treatment of grey cast iron glass bottle moulds.

The glass bottle manufacturing process consists in injecting a viscous glass (700°C-1200°C) within a grey cast iron mould, knowing that they are used as heat exchangers during the production cycle. During moulding, abrasion and corrosion occur on sensitive parts of the mould, as well as thermal fatigue associated with the moulding cycle.

The moulds must undergo a specific treatment, therefore. To do this, Ni powder deposition was carried out by laser cladding, especially at the neck of the glass mould, on a curved area. This method (powder fusion by projection), well known in additive manufacturing represents a real technological leap for the glass industry. In fact, compared to other surfacing techniques (plasma transferred arc or blowtorch), laser cladding of Ni-based powder allows the heat affected zone (HAZ) to be limited. The HAZ can create a structural stress linked to the development of a martensitic structure in the ferritic matrix of the lamellar graphite cast iron.

The aim of this work is to observe the impact of laser cladding (without substrate preheating, usually used to limit cracking) on the coating behaviour but also on flake-graphite cast iron substrates. A presentation of the required section geometry is given to ensure perfect bonding but also to limit the HAZ. The microstructure was studied by scanning electron microscopy (SEM) around the interface cladding/substrate. The purpose is to obtain a homogenous heat transfer during the glass/metal contact. A comparison between PTA and laser cladding is presented. Also, their impact on the mould's thermal behaviour during contact with the viscous glass is considered.

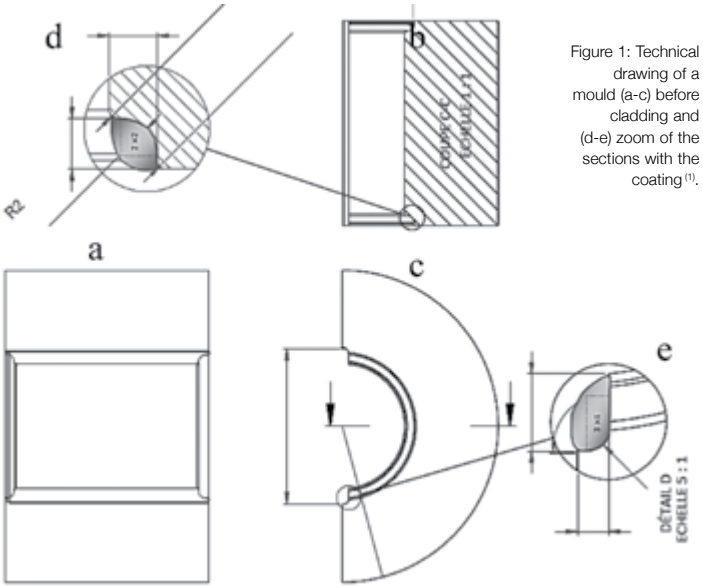


Figure 1: Technical drawing of a mould (a-c) before cladding and (d-e) zoom of the sections with the coating [1].

Elements	C	Si	Mn	S	P	Fe
% wt	2.5-4	1-3	0.2-1	0.02-0.25	0.02-1	Base

Table 1: Grey cast iron mould.

Elements	Ni	Si	B	Cr	C	Mn	Fe
% wt	Base	2.5	1.3-1.7	< 0.3	< 0.5	< 0.1	< 1.0

Table 2: Ni powder.

Figure 2: Half of the cast iron mould (above) before and (below) after Ni-laser cladding.

Materials, experimental protocol and results

Laser cladding consists in melting an injected powder on a cast iron substrate by a 4kW laser beam (wavelength 1030 nm) to produce a metallurgical bonding. The materials used are given in table 1 and 2. A technical drawing of the mould geometry is presented in figure 1.

A thin coating of nickel is necessary on the cast iron mould. In fact, due to its low conductivity (91 W/m/K), the Ni coating also plays the role of thermal barrier. Because of this, the thickness is about 2 x 2mm for the match (discontinuous lines, figure 1d) and 3 x 1mm for the neck (figure 1e). One half of the mould is shown in figure 2.

An observation of two compared sections after PTA and laser cladding is presented in figure 3. From figure 3a, it is obvious that after PTA cladding, a diffused interface is observed. Meanwhile, after laser cladding, the interface is straight (figure 3b). This difference can be explained by a high mixture in the melting pool for the PTA,

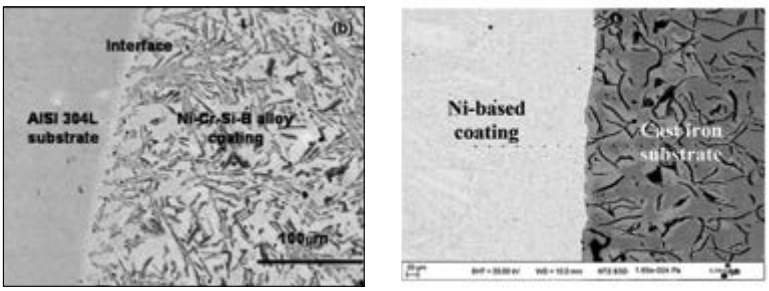


Figure 3: SEM micrographs of a section after (left) PTA cladding [2] and (right) laser cladding.

which can induce a high dilution in the interface (750 µm of minimum dilution during PTA cladding of Ni-based powder on steel 304L substrate) [2]. The high dilution changes the coating thermomechanical properties. Therefore, during PTA, the coating thickness is about 4mm to make sure to be in contact only with the Ni. The minimum dilution during laser cladding of Ni powder on cast iron can reach 23 µm [3]. This low dilution is induced by a Marangoni convection [4] and will lead to a low modification of the coating properties and a low HAZ but also a homogeneous heat transfer of the viscous glass.

A comparison of the thermal behaviour for classic and laser surfacing is described in figure 4. In figure 4a, a heterogeneous heat transfer during contact with the viscous glass at 1100°C can be observed. It is assumed that with PTA, the diffused interface, the high HAZ and the high coating thickness emphasise this heterogeneity. Because of this, during production, the thermal behaviour will not be the same from one PTA-clad mould to the other.

Conclusion

In the work presented here, a comparison of two different kinds of cladding (PTA and laser) is proposed. The SEM analysis of the two different sections has shown that laser cladding allows users to limit the coating thickness and the HAZ, which can permit a homogeneous heat transfer during glass bottle production.

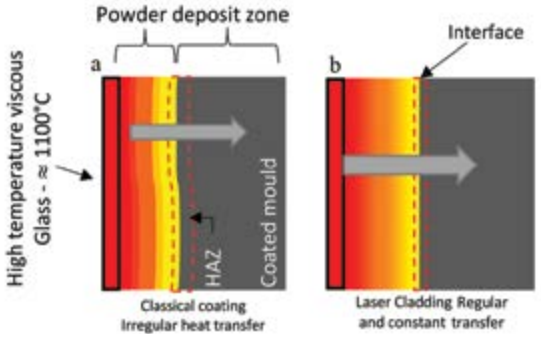


Figure 4: Drawing of the mould thermal behaviour due to the viscous glass pouring [1].

References:

1. 1. M Rege, C Lafarge, C Aboud, F Bourahima and Y Veillot, CHPOLANSKY processing training, Marcoussis, 2016.
2. C Sudha, P Shankar, R V Subba Rao, R Thirumurugesan, M Vijayalakshmi and B Raj, Microchemical and microstructural studies in a PTA weld overlay of Ni-Cr-Si-B alloy on AISI 304L stainless steel, Surf Coatings Technol 202 (2008) 2103–2112.
3. F Bourahima, Évolutions microstructurales et défauts générés par laser cladding lors du dépôt de Ni sur des moules de verrerie en alliage de Cu-Ni-Al et en fonte GL, Université Paris-Saclay, 2019.
4. P Peyre and V Vignal, Traitements de surface par laser et tenue à la corrosion aqueuse, Tech l'ingénieur, COR1580 (2012) 1–12.

About the authors:

Fazati Bourahima, Michel Rege, Anne-Isabelle Amaral and Abderezak Khenafi are Researcher, Manager, Commercial Assistant and R&D Engineer respectively at CHPOLANSKY

Further information:

CHPOLANSKY, Marcoussis, France
tel: +33 169801527
email: fazati.bourahima@chpolansky.fr
web: www.chpolansky.fr

Meeting volume measurement needs in a production environment

David Dineff discusses a more efficient way to manage volume and fill height requirements during glass bottle production.

Volume measurement on a meaningful representation of production continues to be a challenge for many bottle manufacturers. Measuring fill point and overflow to verify fill level requirements can be tedious, time-consuming and occupy limited manpower resources that could be more effectively utilised in other ways within the plant. Costly and tedious as this testing may be, diligent sampling and volume measurement of bottle production is a necessity.

With the recent market introduction of the SPT2-Volume system from Agr International, sampling and testing for volume can now be performed on a regular and scheduled basis. Furthermore, this system operates hands-free and can be positioned on the plant floor or in the laboratory, providing automated volume measurement and offering a cost-effective alternative to the hand measurement of bottles.

According to Agr, this system was developed to meet the needs of glass container producers and brand owners that need fast and precise volume measurement but do not require pressure testing. This product is particularly applicable to producers of non-pressurised ware, including spirit, olive oil and specialty beverage and food containers, where volume measurement is critical.

The SPT2-Volume is an extension of the industry leading Agr SPT2 product line. Built upon the same testing platform, this system shares many of the popular features, including a rugged stainless steel framework, no job change bottle handling system and a Linux operating system.

The equipment can perform fill height and volume measurement with laboratory accuracy and offers a level of repeatability that is only achieved with automation. Furthermore, it can provide the continuous sampling and fast throughput necessary for effective process management.

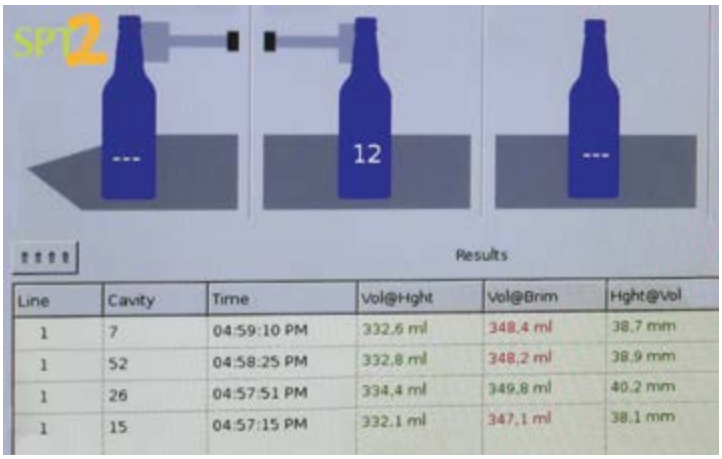
System handling and operational components can be configured to operate autonomously, in conjunction with a sampling line, where it can provide round-the-clock volume measurement without additional labour requirements typically required for testing, sample collection and documentation.

Volume measurement with precision

The SPT2-Volume system utilises positive displacement as its core technology. A known volume of fluid is transferred from a temperature compensated, calibrated cylinder into the test container. At the same time, the fill level is dynamically monitored as the container is filled to overflow.

The positive displacement method offers a number of advantages over traditional laboratory methods. Most significant is the accuracy and speed. This filling technique, in tandem with a high precision fill height sensor, makes it possible to deliver defined volume and fill measurements at any point within the process, to an accuracy of + 0.5ml. Repeatability on the system is + 0.4 at a 99% confidence level. Measurements can be performed at a rate of up to 120 bottles per hour (350ml bottle).

Other advantages include little or no effect on measurement precision due to water quality, container shape or rate of fill, regardless of the size and volume of the container. Furthermore, the volume measurement system on the SPT2-Volume is self-contained, requires no delicate scales and is not affected by water density, flow rate, vibrations or issues that commonly plague other methods. Final test data can be reported as volume at defined fill point, fill height at defined volume, brimful volume or any combination of these.



Line	Cavity	Time	Vol@Hght	Vol@Brim	Hght@Vol
1	7	04:59:10 PM	332,6 ml	348,4 ml	38,7 mm
1	52	04:58:25 PM	332,8 ml	348,2 ml	38,9 mm
1	26	04:57:51 PM	334,4 ml	349,8 ml	40,2 mm
1	15	04:57:15 PM	332,1 ml	347,1 ml	38,1 mm

Test results are captured automatically and include volume at a specified height, height at a specified volume and overflow and brimful.

Agr SPT2-Volume automated testing system.

Since the SPT2-Volume can perform in-process job changes, it is possible to test bottles from different manufacturing lines, or hand-feed a set of bottles as required, with testing protocols unique to that specific bottle type, without the need to stop and reconfigure the system, maximising testing efficiency. It can handle bottles with a capacity of up to 2 litres and finishes ranging from 15mm ID to 48mm OD.

Combining volume and pressure testing

For operations producing pressure ware, Agr offers the SPT2-Pressure/Volume. This version performs both pressure and volume in the same unit. When integrated into the production line, the system can automatically test and collect pressure and volume data on bottles selected for sampling, without operator intervention, on a 24/7 basis, at a rate of up to 270 bottles per hour.

The SPT2 Volume system can provide accurate volume measurement on a wide range of bottle shapes and sizes.

Either system can be configured as a stand-alone testing station, integrated into a sampling line in conjunction with a plant-wide process management system or combined with Agr's OmniLab automated laboratory system. ●

About the author:
David Dineff is Director of Marketing at Agr International

Further information:
Agr International Inc, Butler, PA, USA
tel: +1 724 482 2163
email: ddineff@agrintl.com
web: www.agrintl.com

Innovative Wobbe index stabiliser solution

Fulvio Puccioni discusses the development of an innovative solution to stabilise the Wobbe index when mixed air and natural gas is fed into the melting furnace, forehearth and distributor.

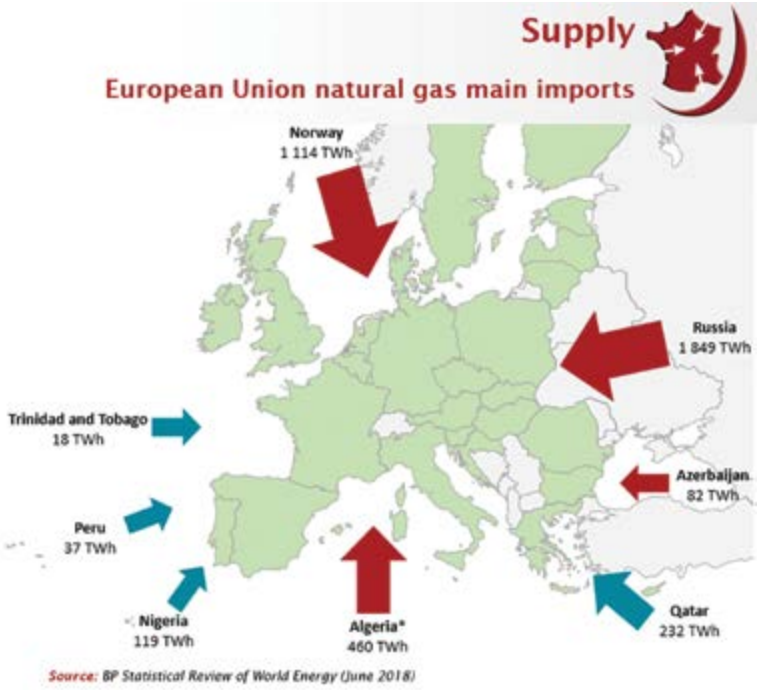


Figure 1: Supply of natural gas in Europe.

In the natural gas market, there are many different sources with different chemical compositions, calorific power energy and consequently, Wobbe index. In addition, the sources of natural gas have also been increased by the development of liquefied natural gas (see figure 1).

The 'Wobbe index' or 'Wobbe number' is an indicator of the interchangeability of fuel gases such as natural gas. If Vc is the higher heating value or higher calorific value and Gs is the specific gravity, the Wobbe index (Iw) is defined as:

$$I_W = \frac{V_C}{\sqrt{G_S}}.$$

Two different gases with the same Wobbe index can be interchanged without any modification of combustion parameters, eg combustion ratio, burner pressure and energy power emitted.

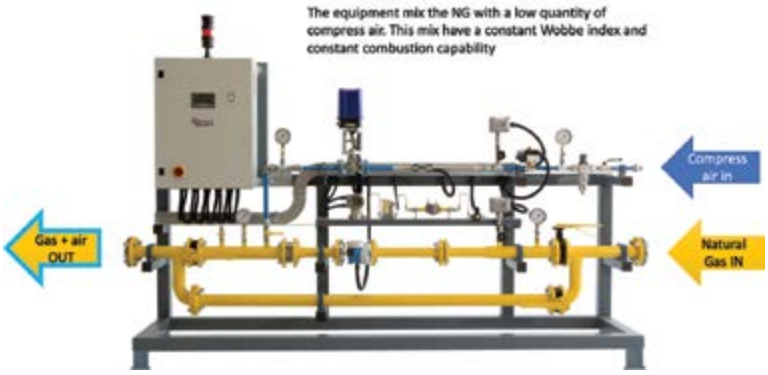


Figure 3: Wobbe index stabiliser.

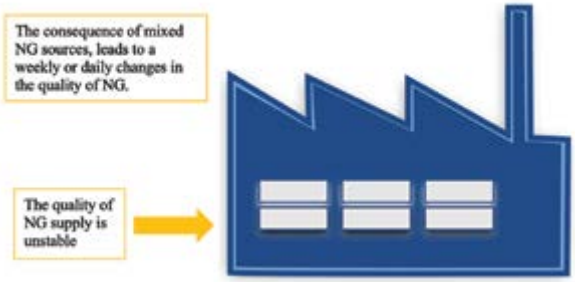


Figure 2: Natural gas supply.

Problem

Nowadays, natural gas suppliers do not guarantee the constant quality of their product. Variations in chemical composition are usually weekly and sometimes even daily (figure 2).

The variability of the chemical composition of natural gas leads to a variety of technological problems in the glass melting furnace and forehearths (table 1). In this article, an item of equipment developed by Glass Service is introduced that is necessary to stabilise the Wobbe index (figure 3).

Solution

Italy's Glass Service has developed an innovative solution to stabilise the Wobbe index when mixed air/natural gas is fed into the forehearth and distributor; as previously stated, two different gases with the same Wobbe index can be interchangeable. This item of equipment is necessary to stabilise the Wobbe index (figure 3). This equipment mixes some compressed air to natural gas and reduces the Wobbe index to the minimum value of natural gas available from the gas company. The output is a mixture of natural gas plus air, with a stable Wobbe index value. The quantity of air in the mix changes automatically through air and gas flow measurements and compressed air ▸

Problem	Solution	Area of use
Unstable chemical composition of natural gas Unstable value of calorific value Unstable combustion redox index Unstable combustion ratio required Forehearth and distributor combustion system	Stabiliser equipment for the Wobbe index	Premixing of air/natural gas in the combustion area.

Table 1: Technological problems in the glass melting furnace and forehearths.

Problem	Solution
Explosion risk of air/ natural gas mix	Flow control of natural gas Flow control of compressed air
EU standard rules for safety	SIL2 flow control device SIL2 safety parts (pressure switch, flow transmitter, safety shut off valve etc) SIL2 control system by Honeywell SIL2 HC900 DCS controller

Table 2: Explosion risks and solutions

Natural gas density	0.717 kg/Nm3
Natural gas Vc , higher calorific value, maximum value	38.9 MJ/Nm3
Natural gas Vc , higher calorific value, minimum value	33 MJ/Nm3
WI, Wobbe index, maximum value	52.22 MJ/Nm3
WI, Wobbe index, minimum value	44.39 MJ/Nm3

Table 3: Explosion point.

M A K I N G

GLASS HISTORY

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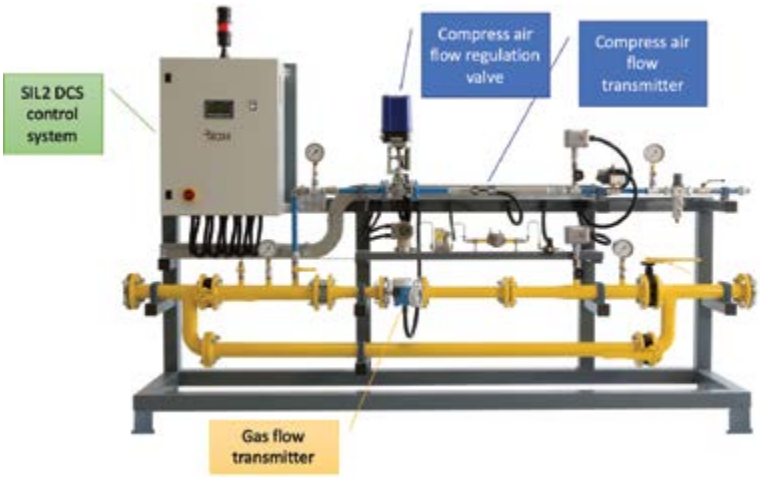


Figure 4: Regulation through the Wobbe index stabiliser.

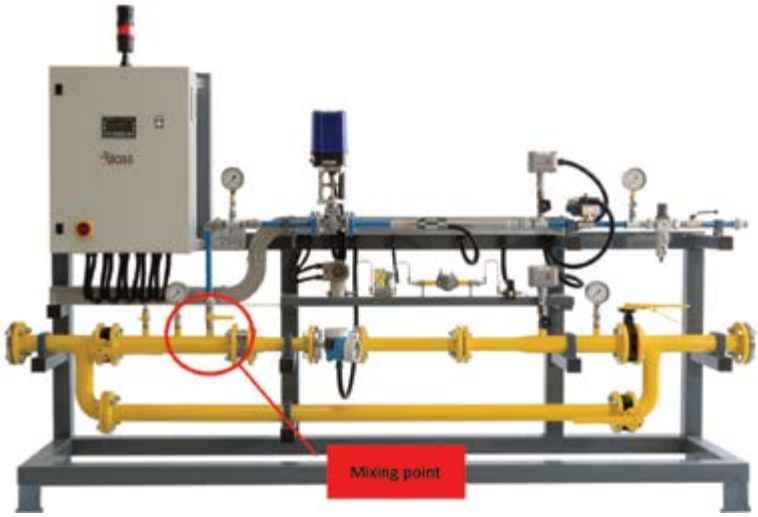


Figure 5: Mixing through the Wobbe index stabiliser.

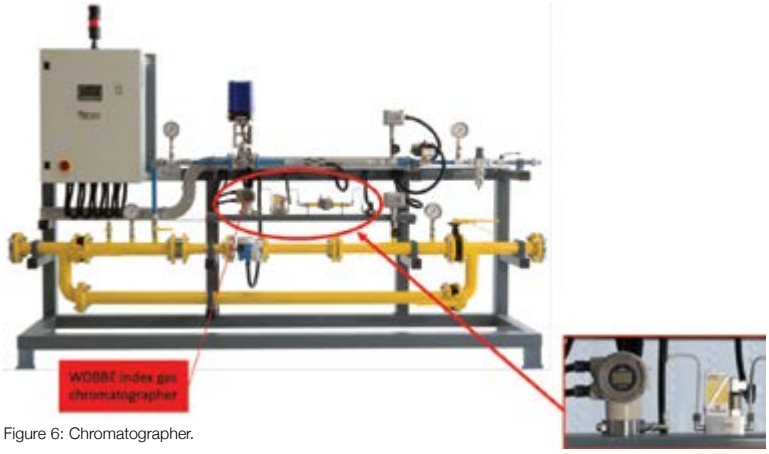


Figure 6: Chromatographer.

Figure 7: Upper explosion limit.

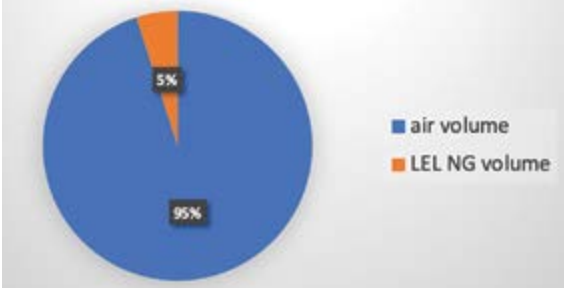


Figure 8: Lower explosion limit.

Figure 9: Maximum air value.

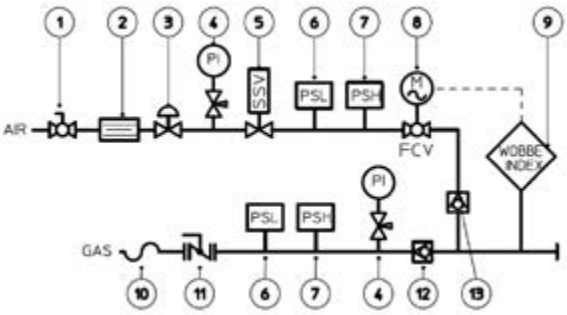


Figure 10: Process flow diagram.

flow automatic regulation (see figure 4).

The compressed air is introduced into the gas stream (figure 5). Down flow from the mixing point, a gas chromatographer controls the mix ratio and transmits the Wobbe index to the control device (figure 6).

Issues and solution

The risk is that the mix of air and natural gas can be explosive (see table 2). The air and natural gas mixture can be explosive only in a short range; with a value of natural gas/air of 5%-15%. The lower explosion limit is called LEL, while the upper explosion limit is UEL (see figures 7 and 8).

Over or under this value range, the mix is not explosive, as indicated in table 3. In this case, the Glass Service equipment will stabilise the Wobbe index to 44 MJ/ Nm^3, introducing 13.8% of compressed air (% by volume) in the stream. This value is much lower than the explosion point.

The system is equipped with many safety devices in order to eliminate the explosion risk. The main concept is to guarantee that the mixed air/gas level is lower than the minimum injection point value (figure 9).

European safety standards require that the safety equipment must be SIL2. The unit is designed for a natural gas maximum flow according to plant requirements (figure 10), as well as minimum/maximum natural gas input pressure according to plant requirement.●

About the author:
Fulvio Puccioni is Chief Engineer – Manager at Glass Service Italy

Further information:
Glass Service Italy, San Miniato (Pi), Italy
tel: +39 0571 4442
email: glass-service@glassservice.it
web: www.glassservice.it

A 25% improvement is possible!

Twenty years ago, Netherlands-based XPAR Vision made its first steps into the global glass container industry, the first to introduce infrared sensor technology for hot end inspection and process monitoring. Subsequently, the company has become a specialist and market leader for hot end sensor and robot technology, with the overall ambition of assisting the global glass container industry to make its bottles and jars lighter and stronger, produced with zero defects and at higher speed. Paul Schreuders reports.

Paul Schreuders, Chief Executive Officer at XPAR Vision.

During the last few years, XPAR Vision's ambition has become increasingly relevant for glass container producers, as they are confronted with the following challenges:

- Competition against other packaging materials and requests from major fillers to reduce the carbon footprint, thus driving productivity improvement and weight reduction.
- Legal requirements from (national) governments regarding health and safety.
- Attractiveness for younger generations, knowing existing working conditions and ambitions from the millennials, in other words how to maintain a good workforce.
- Changing customer requirements that put pressure on becoming more flexible, while dealing with more complexity.

Figure 1: Glass wall thickness variation.

The answer to all these questions is to change traditional ways of operating IS machines: From mainly manual interpretation and control by humans to mainly machine interpretation and control by sensors, robots, data, artificial intelligence and automation. By doing so, a step-wise change in the level of forming process control will become feasible, while giving an answer to all challenges mentioned above.

The level of forming process control

Looking at a forming process today, many disturbances are affecting the glassmaking process. Think about cullet quality, viscosity, temperature, glass homogeneity, ambient temperature, deterioration and wear of material and even swabbing, job change, stop/start sections or bottle design.

In the world of glass container forming with mainly manual interpretation and control, these disturbances lead to relatively high variations in the glass forming process. These high variations in the glass forming process result in bottles with variations in glass distribution or glass wall thickness, both vertically and laterally, of more than 50%. In the meantime, efficiency levels (pack-to-melt) are in the range of 85%-90%, which basically means that 10-15 of 100 gobs cut do not result in a good bottle or jar (defects produced are 10%-15%). In the knowledge that the majority of defects produced originate in the variation of the glass forming process, variations in glass distribution or glass wall thickness also produced defects (figure 1). They are a main indicator for variations in the glass forming process and thus, for the level of forming process control.

A step-wise change but not overnight

With mainly machine interpretation and control by sensors, robots, data, artificial intelligence and automation, a step-wise change in the level of forming process control will become feasible.

Simply think of differences between the two worlds of glass container forming; the old world with mainly manual interpretation and control by humans or the new world with mainly machine interpretation and control by sensors, robots, data, artificial intelligence and automation. This means, for example:

- Humans have different eyes and experiences, thus see things differently and certainly not consistently.
- Humans due to other tasks to execute can only review and check about 100 bottles in one hour, whereas production speeds nowadays are up to 40,000 bottles in one hour. Sensors can see every single bottle.
- Humans cannot be as accurate and consistent as sensors or robots. They cannot discriminate mm length differences of falling gobs (7m / second), while these differences have an effect on the quality of bottles and swabbing by humans in comparison to swabbing by robots is much less consistent and leads to much more forming process disturbances and thus variations, thus defects.
- Issues on any IS machine can be many and cavity-related, machine-related, section-related or related to only front or only back gobs. How can any human continuously and accurately review 48 (12 x 4 or 16 x 3) cavities?

Knowing these differences, it is not difficult to understand that in the new world, one is able to create a step-wise change in the level of forming process control. Of course, this step-wise change will not happen overnight.

Step-by-step, one moves from a more experienced base to a more science-based solution and from more manual control to more automatic control. And yes, this new environment is more attractive for millennials and due to a higher level of automation, health and safety is becoming less of a burden, while flexibility and complexity are better taken care of. But most importantly, this 'new' forming process creates bottles and jars with much less glass wall thickness variations

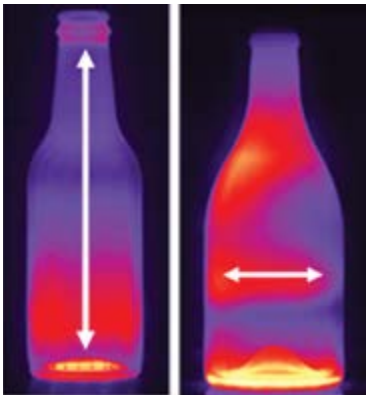


Figure 2: Infrared images measuring both vertical as well as lateral glass distribution.

and much higher efficiency levels. Lighter and stronger containers, produced with much less defects at higher speed and less human dependency is the result.

A 25% improvement is possible

Knowing the values of the indicators for the variations in the glass forming process, namely variations in glass wall thickness of more than 50% and defects produced of between 10% and 15%, there is a lot of room for improvement. Based on 20+ years of experience in the field of forming process and based on an unlimited number of good examples, the author dares to state that in the new world of glass container forming, with the correct tools, focus and ambition, the glass container industry is able to do 25% better than today!

This 25% comes mainly from efficiency increases, weight reduction and speed increases and equalises a value of between Euro 3.5 million and 7 million per production line per year. And due to the origin (energy, materials, capacities), everybody benefits: Glass container manufacturers, users and last but not least, the planet.

A recipe for change

Within this chapter, a recipe for change will be provided.

Hot end forming: Quality focus: For a long time, hot end forming was steered towards putting as many bottles into the lehr as possible, without too much attention paid to their quality. Quality was a concern for the cold end. Hot end and cold end, naturally divided by the lehr and the lehr time, were like two different worlds. Consequently and in the case of quality issues, there was hardly any communication or feedback from cold end to hot end. And if there was any communication or feedback, the time delay due to lehr time made it ineffective. Due to this fact and in order to ensure good quality output to be sent to fillers, in any cold end area or warehouse, one finds a lot of pallets to be resorted.

In order to create the new world of glass forming, it is necessary to admit that quality is made at the hot end and organise accordingly. Tools are available to support a proper quality focus at the hot end.

Use of IR sensors: The glass forming process is determined mainly by temperatures and exchange of heat. The result is a bottle or jar with a certain glass distribution. As infrared (IR) measures the thermal properties and the glass distribution of the newly formed container, IR is the best sensor for hot end bottle inspection.

By applying IR sensors, critical defects can be eliminated at the hot end (figure 2). Logically, implementing these devices is of help in improving the quality delivered to customers. Nevertheless, hot end sensors for bottle monitoring should not be used for inspection only. The reasons are obvious. First, these sensors are able to inspect many but not all types of defects. Moreover, like any inspection machine (at the hot end or cold end), no sensor will be able to be 100% effective for inspection. And last but not least, as every rejected bottle or jar is a direct loss of production time and energy, the focus should be on preventing defects to be produced.

Reviewing all bottles produced allows for collecting signals. Besides defects, one can see shifts in glass distribution, both vertically and laterally, changes in verticality and shape of bottles etc. As these signals can be related to the cavity of origin, analyses can be converted in indications for cavity, section, front or back gob or machine performance. These indications allow for effective root cause analyses (learning, preventing) and fast remedial action in case of problems. Fast remedial action at the hot end on the basis of real-time information leads directly to an improvement of efficiency and is the starting point for improving the level of forming process control. An example is given in figure 3.

Controlling glass distribution is the key to lighter and stronger bottles and jars, produced with (almost) zero defects at higher speed. Logically, controlling glass distribution requires continuous ▸

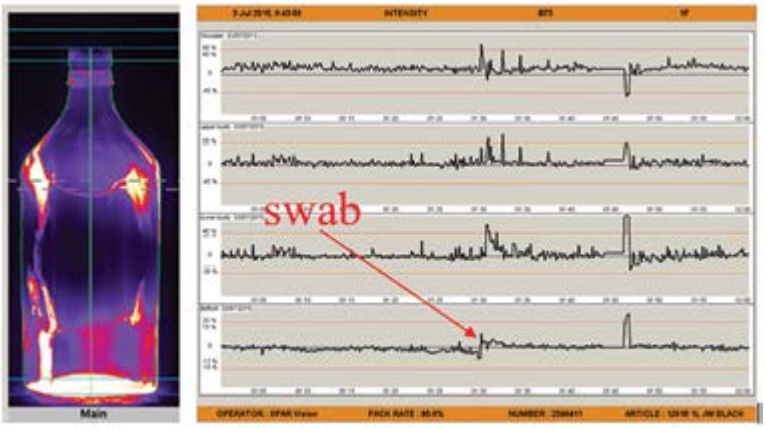


Figure 3: Birdswing detected and rejected. Root cause in swabbing. Improving swabbing leads to preventing this defect from being produced.

monitoring of bottles and jars produced and evaluating every action on the IS machine against changes in glass distribution. In order to effectively manage the forming process, glass distribution is the reference.

Lowering disturbances: Apply robots for swabbing: Disturbances, as mentioned previously, are root causes for forming process variations (glass wall thickness variations and defects). It speaks for itself that lowering the level and frequency of disturbances will be of great help in realising the ambition of lighter and stronger bottles, produced with zero defects and higher speed.

For example, currently there is a lot of emphasis on swabbing. It is true that swabbing is one of the main disturbances in the glassmaking process. An example is given in figure 4. As such, swabbing is more an enemy than a remedy. Robot swabbing will reduce forming process variations and is of great help to an operator. The BlankRobot from XPAR Vision swabs moulds and neck rings in a very consistent way. Therefore, the variation in glass distribution (glass wall thickness) will be lower and critical defects due to swabbing will be zero. And thanks to automatic swabbing, the operator has more time to concentrate on the quality of the bottle or jar.

Use of other sensors: Besides IR for bottle inspection and monitoring, other sensors are also available today to be applied in the forming process. There are sensors that monitor the status of gob condition (weight, temperature, shape) at the area of gob cut, the status of gob loading (speed, length, time of arrival, position) just before the gob enters the mould and the temperatures of parison, moulds, plunger and neck ring. All data collected somehow relates to the quality of the bottle or jar produced. The more one knows about these relationships, the higher the level of forming process control.

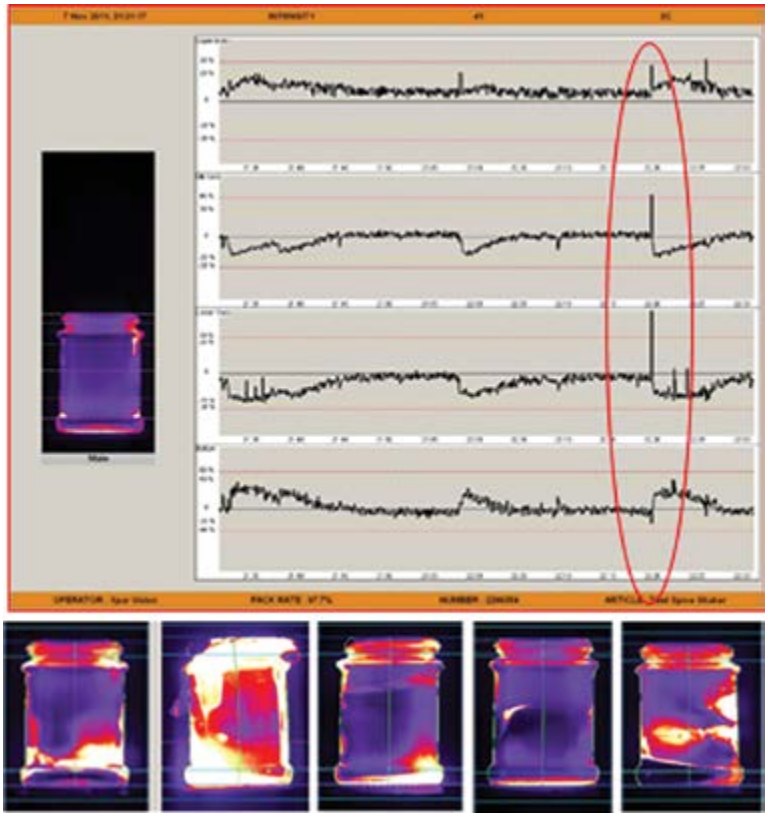


Figure 4: Swabbing is a main disturbance in the glassmaking process and creates defects.

How to effectively lower glass wall thickness variations?: With the sensors mentioned above, the glass forming process is completely observed. One has enough information (data) relating to the forming process to be in control and to reduce glass wall thickness variation. On most IS machines, the operator is responsible for the quality of glass. All data given by all sensors must be processed by the operator and he must make the interpretation and conclusion. Is the forming process still ok or is any remedial action needed? This is not an easy job. Moreover, this is because the operator is already fully occupied with swabbing machine parts (50% of his time), conducting regular quality checks and changing worn parts. Even for skilled personnel, interpretation of all sensor data is difficult.

For example, the operator looks at the IR charts and sees that the IR intensities for a certain cavity have been changed. In case he is well trained and experienced, the operator might conclude that the vertical glass distribution has been changed; the lower parts of the bottle are thicker and the neck/shoulder areas are thinner. This conclusion is correct but which remedial action should he take? Change the blank mould cooling? Change the contact time? Luckily, he has a sensor that measures parison temperature. From here, he sees the parison temperature is increasing. But if he looks at the other cavities in the section, he sees normal parison temperatures. As a result, he knows that mould cooling and contact time changes will not be an effective remedial action. So maybe gob loading? From the sensor measuring loading parameters, he looks at the length of the gobs and sees a decreasing length of the gob in time. At the hit point of the deflector, the coating is worn and the friction is too high, which reduces the length of the gob. His conclusion now is to replace the deflector as the effective remedial action. And indeed, after changing the deflector, the IR charts show that glass distribution is restored and the variation in the glass wall thickness reduced. But only for one cavity. Now, the operator must look at and deal with the other 35/47 cavities…. due to his many other tasks, he will not have enough time for this.

This example illustrates two important bottlenecks for reducing glass variation:

- Operator skills and experience.
- Operator time spending limit.

To give the operator more time to spend on the quality of the bottle and to reduce the variation, a swabbing robot is a great help for the operator (quite apart from his health and safety!).

The other bottleneck is associated with the skills and experience of the operators. It takes a lot of training time and practice to utilise the potential benefit of the sensors. Also, nowadays experienced operators are retiring and valuable knowhow is leaving the shop floor with them. In order to effectively reduce glass variation, glassmakers should adapt to process artificial intelligence.

Process artificial intelligence (AI): In the last decade, artificial intelligence has grown into a mature technology. The breakthrough of AI is caused by new algorithms

(methods) and increased computer power. The process AI uses all available sensor information and by means of the methods of AI, the interpretation of all this sensor information is performed automatically. The process AI informs the operator that the glass forming process needs attention and provides the operator directly with the correct remedial action. If the operator performs this remedial action, the glass variation will be quickly restored. Returning to the example of the worn-out deflector with process AI, instead of performing the described interpretation steps, the operator directly receives the following message: 'Please, change the deflector of cavity 11 M'.

In this way, glass forming will be stable (more output) and the glass distribution variations will be much lower (more quality). Because the process AI continuously monitors all sensor information, the detection of an anomaly in the glass forming process is much faster than with an operator. As such, process AI is a necessity for making a step-wise change in the level of forming process control.

Automation: Another contribution is coming from automated control loops that compensate the drifting parameters of the glass forming process. A control loop uses the sensor data to see if the process variables are still at the setpoint values. The sensor observes, analyses and through feedback to the IS timing, the necessary adjustments are made. As the feedback is computer feedback, adjustments can be made within milliseconds. Even the very best operator/specialist will never be able to do this.

Within the past few years, (hot end) automated control loops have become available for controlling gob weight, ware spacing, mould temperature, plunger process and vertical glass distribution. It is to be expected that in the near future, more control loops will become available.

Experience shows that all different control loops once applied basically have the same positive effect; the process variation is reduced and the bottles show less shift in glass distribution and have less defects. These control loops help the operator. But do not forget that these automated control loops are not effective if the parts wear out. In this case, the operator must notice in time and replace the worn out parts.

Conclusion

A recipe for change has been provided, in order to create a new world of glass container forming. In this new world with mainly machine interpretation and control by sensors, robots, data, artificial intelligence and automation, a step-wise change in the level of forming process control will become feasible.

This step-wise change in the level of forming process control pays off: With the correct tools, focus and ambition, the glass container industry is able to do 25% better than today! Of course, this step-wise change will not happen overnight. Step-by-step, one moves from more experienced-based to more science-based and from more manual control to more automatic control.

And yes, this new environment is more attractive for millennials and due to a higher level of automation, health and safety is becoming less of a burden, while flexibility and complexity are better taken care of. But most importantly, this 'new' forming process creates bottles and jars with much less glass wall thickness variations and much higher efficiency levels. Lighter and stronger containers, produced with much less defects at higher speed and less human dependency are the result. ●

About the author:
Paul Schreuders is Chief Executive Officer at XPAR Vision

Further information:
XPAR Vision BV, Groningen, the Netherlands
tel: +31 50 316 2888
email: contact@xparvision.com
web: www.xparvision.com

Speaking the same language is the key

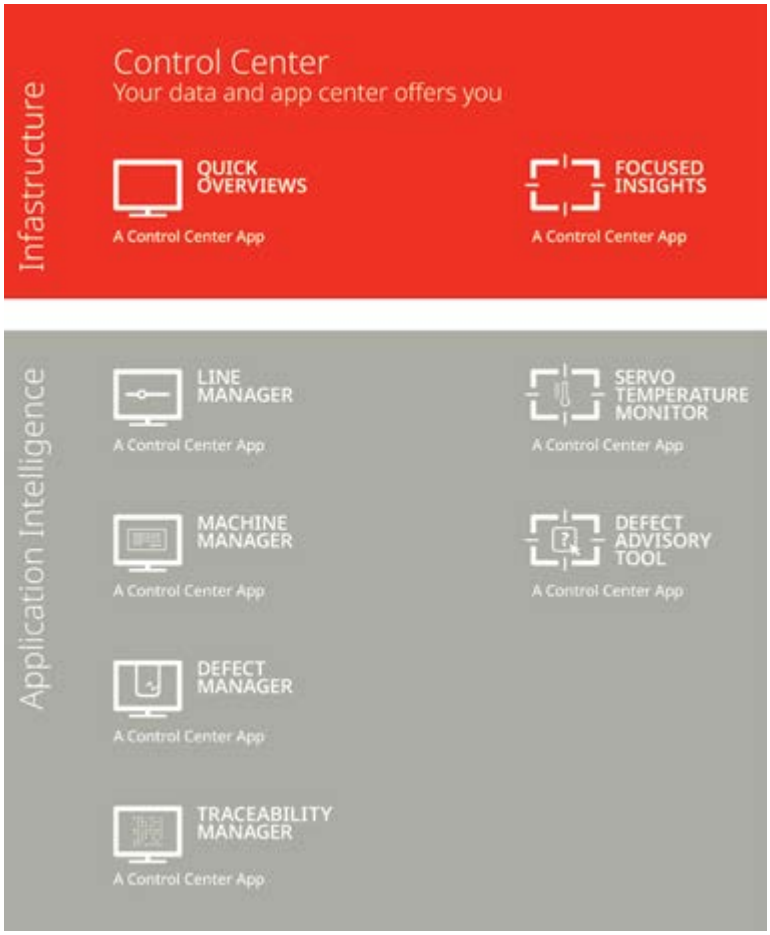
Hollow glass production lines are equipped with increasingly sophisticated sensor systems. This opens the door to thorough process understanding. Before applying any data analysis tool or closed loop, however, a much more basic functionality has to be ensured: The different systems that collect data have to speak the same language or the different data has to be translated so the systems understand each other. Although this sounds simple and straightforward on paper, in practice it is not. In the first of a series of articles, Thomas Bewer sheds light on the importance of data and language for process automation and stabilisation.

One major benefit of the sensor systems is that control system parameters can be automatically adjusted based on measurement results. These so-called closed loop systems help to stabilise the process and speed up job change times.

In a closed loop system, a measurement value has to 'talk' to an actuator. Within Emhart, all the elements are able to communicate with each other – in the case of a closed loop, the interpreter is the FlexTernal software on the FlexIS. The FlexTernal furthermore makes sure that the data is cleaned from outliers and misreadings. Figure 1 summarises the available closed loops from Emhart and the involved systems.

Communication between the different systems becomes even more important when multiple sensors are involved to run a closed loop. This will be the case with the second generation of closed loops currently under development. One of these next closed loops is the smart feeder, where information about the gob falling into the blank is combined with information about the cut gob. Another example is the Vertical Glass distribution closed loop that uses the parison temperature reading with the intensity distribution of the bottle to stabilise glass distribution.

Also, swabbing robots like the Emhart Flex Robot have to communicate with the sensor and the control systems to avoid collisions and to take over further tasks besides process adjustments in the future. For example, information about the gob falling into the blank will indicate a need for deflector swabbing, exchange or adjustment and will trigger an action by the robot.



Applications on the Emhart Control Center.

Data translation

When combining different time series of different systems, the next challenge arises: The correct data for the right time frame needs to be picked and correlated. This task is fulfilled by the Control Center, which stores the data of measurement systems and the change log of the timing system. Based on this data, the Control Center translates the data for the user into tailored data analysis and aggregated views. The different applications on the Control Center offer information for different needs of all the hierarchy levels and advise what actions the users should take to successfully fulfil their tasks.

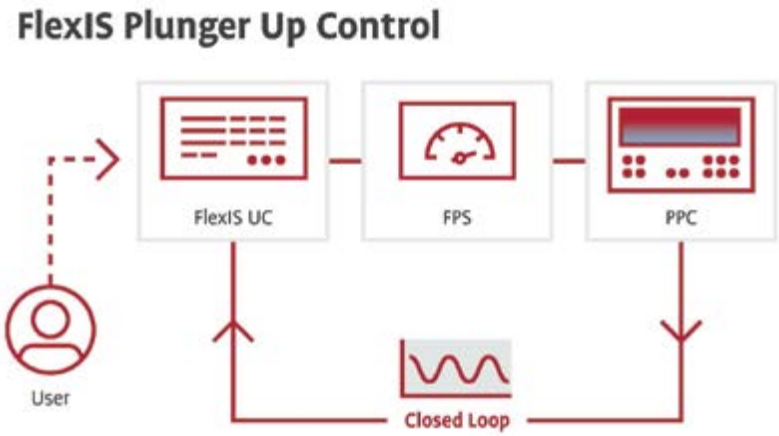
One very good example for such an application is the defect advisory tool, which displays the aggregated view of the currently detected defects to the hot end operator. But it is not just statistics - they get translated into the operator's

	System 1	System 2	Interpreter
Plunger up closed loop	Plunger process control measurements	FPS pressures in the FlexIS control system	FlexTernal
Mould temperature closed loop	Mould temperature measurement by TCS or Blank Radar	Mould cooling timing in the FlexIS control system	FlexTernal
Plunger temperature closed loop	Plunger temperature measurement by TCS or Blank Radar	Plunger cooling timing in the FlexIS control system	FlexTernal
Bottle spacing closed loop	FlexRadar measurements	Pushout timing in the FlexIS control system	FlexTernal
Smart feeder	Gob weight and shape measured by the Gob Radar. Gob length at section level measured by the BlankRadar	Feeder multi gob timing in the FlexIS control system	FlexTernal

Figure 1: Summary of the currently available closed loops from Emhart and the involved systems.

language. The hot end operator is empowered to identify the defect and its cause as pictures of the inspection machines are displayed and he receives advice how to remedy the defect. This is achieved by matching the classification in the inspection machine with the defect language at the hot end.

For the correlation of the inspection results to the forming setting and measurement results on the hot end, a further 'interpreter' is needed – the data matrix code. This code is laser marked by the Emhart ID Mark on the conveyor at the hot end. This code includes a unique number for each individual bottle. In the Control Center, all gathered forming information is related to this number. This code is then read in the inspection machine and all inspection results are attached to the number as well. Now, forming settings and measurements can be correlated to occurring defects.



Plunger Up Control closed loop schematic.

A vital role

For artificial intelligence or machine learning projects, the data cleaning and translation into a consistent data model is vital. According to data science companies, data cleaning and data modelling take about 80% of the time (and cost) of data science-related projects. Therefore, Emhart offers data access via an 'advanced data interface' to allow the access of measurements and machine settings via one single interface.

This short overview shows how important the communication of all different subsystems is to guarantee optimised production and seamless integration. Bucher Emhart Glass offers all the necessary components out of one hand and with this, ensures that all partners speak the same language: The FlexIS control system, the involved Radar family measurement systems, the FlexRobot, the FleXinspect and the Symplex B or C inspection machines.

More details on the above described aspects will be given in future articles to be published in *Glass Worldwide.*

About the author:
Thomas Bewer is Senior Project Manager at Emhart Glass

Further information:
Emhart Glass SA, Steinhausen, Switzerland
tel: +41 41 749 4200
email: webmaster@emhartglass.com
web: www.bucheremhartglass.com

System innovation for post-consumer recycled cullet

Tomasz Adamiecki and Jan Golda discuss the recent development of specialist low dust crushing technology and its benefits in the processing of post-consumer recycled cullet.

Despite strong competition from plastics, glass packaging has long been and will continue to be an irreplaceable fixture in everyone's life. Because glass does not lose its properties in repeated recycling, it is very beneficial from both an economic and ecological point of view.

The use of cullet in the process of melting glass is of great economic importance, resulting primarily from reduced consumption of raw materials and energy. The addition of cullet to the raw material mixture means that less heat is needed to melt the glass. There are also ecological benefits of using post-consumer recycled (PCR) cullet, as the amounts of emissions of harmful compounds in the melting process are reduced.

Glass cullet can be divided into the following categories:

- In-house, eg arising from a glass producer's normal production processes.
- Foreign – delivered to the glassworks from outside sources, ie from glassworks serving other industries or from large users of glass products (beverage bottling plants, lighting equipment manufacturers, construction etc).
- Post-consumer recycled (PCR) packaging and glass products, collected through recycling programmes.

Constant improvements and automation of glass container production processes mean that less waste material is generated. This lower volume does not meet the needs of glass producers and forces them to use cullet from secondary circulation, ie foreign and PCR cullet.

In particular, PCR cullet introduces impurities to the batch that can disturb the melting process, causing glass defects. Colour requirements for glass packaging further narrow the acceptable parameters for glass cullet obtained from recycling. For this reason, any external cullet must be subjected to cleaning and processing prior to melting. Technological processes developed for this purpose have now achieved a high degree of automation, allowing technology suppliers like Forglass to meet the most stringent requirements of their clients.

Low dust Atlas crusher from Forglass.

Latest technology

The latest technology in cullet management is the Forglass PCR cullet system, which offers the following benefits:

- Quality control of external cullet.
- Active management of magnetic and non-magnetic impurities.
- Recovery of contaminated cullet.
- High separation efficiency = minimal cullet waste.

The end result is:

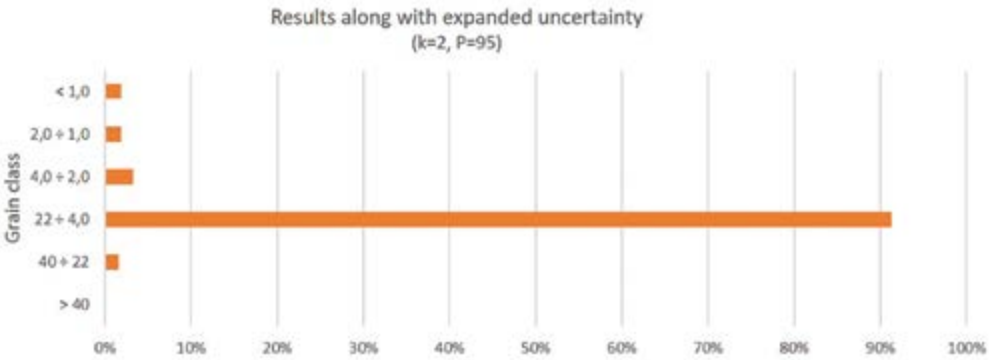
- Improved glass quality.
- Verification of external cullet sources.
- Elimination of magnetic and non-magnetic impurities in the furnace.
- Cost reduction.

The system comprises feeders and chutes, connecting individual storage silos. The technology line is equipped with an array of sensors to detect metallic and non-metallic impurities. Contaminated cullet is directed through automatic gates onto the appropriate path and is subjected to subsequent stages of segregation or purification. The entire system is tailored to the customer's needs and has a broad range of adjustment, allowing the factory to adapt to fluctuating market demands easily.

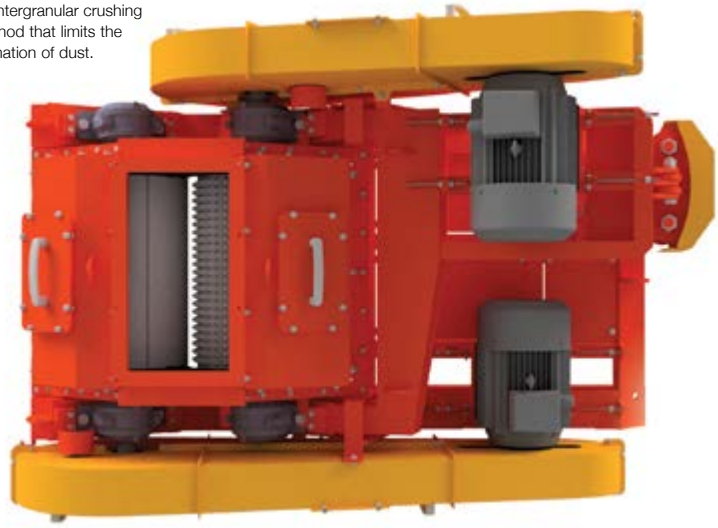
System installation

A good example of implementing the Forglass PCR cullet system involves the Stoelzle Glass Group factory in Koeflach, Austria, known for its excellence in producing the highest quality extra-flint glass for the pharmaceutical, spirits, food, perfumery and cosmetics industries. Engineers from Forglass and Stoelzle worked closely together to develop an external cullet preparation line that would optimally fit the demands of the glassworks.

One of the main components of the line is a dedicated crusher with a special ability for cullet gradation



Extremely high crushing precision is provided, with over 92% of output in the range of the desired fraction.



The Atlas crusher uses an intergranular crushing method that limits the formation of dust.

adjustment. This significantly reduces the formation of dust and also allows granulation control of crushed cullet.

The low dust Atlas crusher, designed and manufactured by Forglass, is a double-roll crusher (KDW type) with rollers driven by two separate electric motors. It uses an intergranular crushing method that significantly limits the formation of dust during crushing. Using two independent drives, the design allows foreign material to leave the crushing chamber without damaging the rollers. Additionally, the rollers are equipped with linings that can be replaced without removing the rollers from the crusher. This significantly shortens maintenance time.

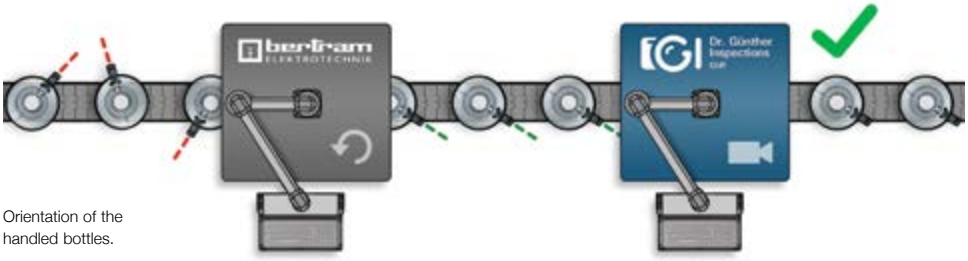
The crusher's design was extensively tested by the Main Mining Institute in Katowice, Poland. The results show extremely high crushing precision, with over 92% of the output in the range of the desired fraction.

The line is equipped with three silos totalling 300m^3 in volume and is future-proofed with the option to add another 150m^3 silo, without interfering with the building's structure. The weighing and dosing system is based on three compact weighing belt conveyors. It allows the dosing of several types of cullet at the same time, with smooth feed regulation from the control room or from the device's panel. Weighing belt conveyors take up less space than traditional scales and do not require an additional pre-feeder, which allows additional savings of both space and finance.

The Forglass PCR cullet system is fully integrated with the existing batch plant, including the control system. The line allows Stoelzle Koeflach to store an additional 300m^3 of cullet and to dose it at a rate of up to 75 tonnes/h, with the possibility of increasing both storage and dosing capacity in the future. Furthermore, the entire system occupies only 110m^2 of space.●

About the authors:
Tomasz Adamiecki is Vice President of the Board of Forglass and Jan Gołda is Project Manager – Batch Plants at Forglass

Further information:
Forglass Sp zoo, Krakow, Poland
tel: +48 12 352 4222
email: office@forglass.eu
web: www.forglass.eu



Orientation of the handled bottles.

The Dr Guenther HIM – handle inspection machine.

Precision for variety - Inspection beyond standards

Mark Ziegler discusses a solution for handling bottles, realised for O-I in Germany by Dr Günther Inspections and Bertram Elektrotechnik.

Variety and design are key competitive advantages for glass compared to other packaging materials. Dr Günther Inspections has formed an alliance with Bertram Electrical Engineering to design a special solution for a striking handled bottle, produced by O-I in Germany.

The family-owned company Dr Günther Inspections sets a clear strategic focus in two areas, the first being high precision in camera inspection to increase on one hand pack-to-melt rates and on the other, to reduce the number of customer reclamations.

Bertram Elektrotechnik's Orientator.

The O-I team at the Holzminden plant in Germany.

Customer-centricity is the other strategic direction, involving special solutions for dark glass, non-round bottles, embossings or in this case, a camera solution for handled bottles are proving the benefits of this approach.

Bottle orientation procedure

The handle bottle first needs to be orientated into the correct position. This process is carried out by the Orientator from Bertram Elektrotechnik GmbH in three steps: After creating a gap between the products, the bottle enters the second step with a camera system.

This system is flexible to correspond to the product, recognising the current container orientation. The image processing system uses the relevant characteristics of the container. It can range from the shape of the container to embossing, the thread on the bottle mouth - or in this case the handle - to recognise the current position of the product. In the third step, the container is rotated in the product flow, into the target position according to the relevant characteristic.

Handle inspection machine

The inspection machine for handles was originally designed for the tableware industry, eg for cups, carafes or sundae glasses. As part of an ongoing development of the test spectrum, this was also extended to containers. Different types of defects can be detected at speeds of up to 450 articles per minute:

- Defects in the handle (inclusions, checks, flaking).
- Defects at the handle (over pressed seam, glass fin).
- Thickness of the handle in different positions.
- Deformed bottle neck (offset between body and neck).

The machine from Dr Günther Inspections has a small footprint of just 550mm x 670mm and can be easily integrated into existing lines. A relocation from one line to another can be conducted in short time, as the unit can be simply positioned onto an existing transport belt.

Maximum flexibility for all colours and sizes

The inspection unit is extremely flexible, allowing article sizes from 20mm to 420mm height in all colours. A job change can be performed in three minutes, as a result of the easy-to-use interface, design of camera and light source.

With regard to the modular software design, specific customer requirements can be integrated without complicated programming. The open interface concept permits a connection to all available line information management systems.

Customer feedback

Reiner Zinnecker, Performance Improvement Manager at O-I in Germany, points out the excellent teamwork with its suppliers and the positive result for the inspection process. The online inspection solution was easy to integrate into the existing line, as set up was easy to adapt for shop floor personnel.

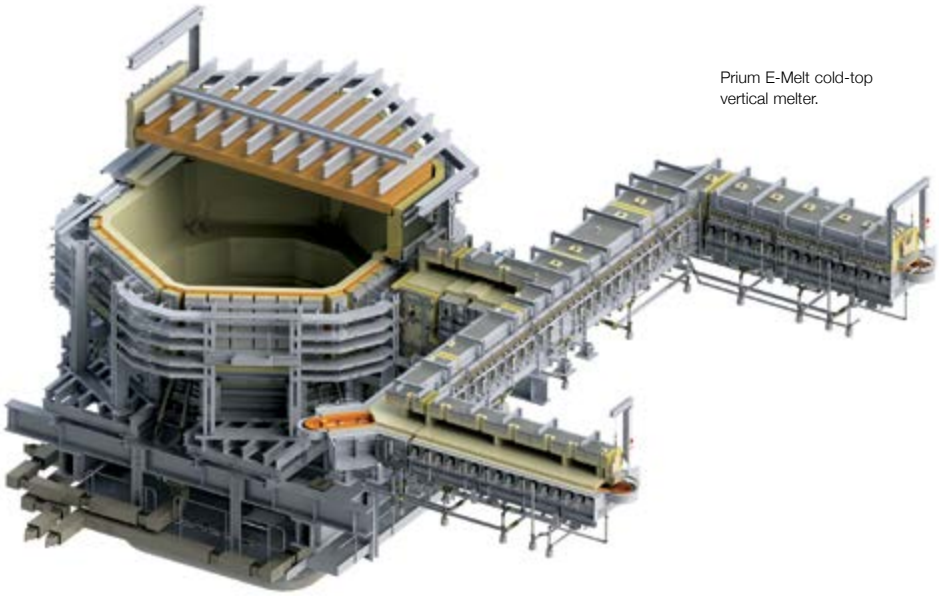
The delivery of quality improvements for customers is an important driver. This technology creates a substantial benefit. High levels of flexibility and reliability of the entire equipment creates value for customers to select glass packaging materials. ●

About the author:
Mark Ziegler is a representative for Dr Günther Inspections

Further information:
Dr Günther Inspections GbR, Meerane, Germany
tel: +49 3764 7791870
email: info@optical-inspections.com
web: www.optical-inspections.com

Innovating greener glass manufacturing technologies

Glass manufacturers have historically been concerned mainly about product quality, plant reliability, cost and energy efficiency. Today, they add to this the pressure to reduce emissions and increase sustainability. Fives, an international engineering group, has always been committed to an environmentally-friendly process. From fully electric furnaces to advanced forehearth design, pioneering glass melting and conditioning technologies have been developed for maximum thermal efficiency with minimum energy consumption. Alexandre Brusset and Andrew Reynolds report.



Prium E-Melt cold-top vertical melter.

Electric furnaces are a green alternative to traditional technologies based on combustion of fossil fuels and offer better thermal efficiency, lower emissions and the potential for advanced automation. The life of the furnace may be less than for gas furnaces but this offers the possibility of greater innovation. CAPEX can be lower once the costs of emission control are accounted for. With a reliable supply of renewable energy, electric furnaces have the potential to lower operating cost, while reducing emissions.

Cold-top all-electric furnaces are especially suited to manufacturing lines melting one glass type under a relatively stable load. Capacities as little as five tons/day and as much as 150 tons/day are currently in operation and there is no technical reason why this rate could not be increased to 300 tons/day or more. Example applications include:

- Pharmaceutical (ampoules and tubing).
- Container (bottles and container ware).
- Tableware.
- Perfumery and cosmetics.
- Borosilicate glasses.
- Opal glass.
- Fibre and insulation products.
- HV insulators.
- Flat glass products.

A straightforward layout for simple operation

In all-electric melting, the raw materials are distributed evenly over the surface to form an insulating batch layer in a cold or semi-hot top vertical process. The materials are melted and refined as they are drawn down through a deep melting tank to exit at the throat. This process ensures minimal heat loss. In fact, electric furnaces can reach very high thermal efficiencies. This high thermal efficiency and the system's energy efficiency and low emissions are the main reasons why glass manufacturers choose electric furnaces.

Furnace control is achieved through only a single main input parameter, power and leads to a process that can be readily automated.

Cost-effective option

Fives offers cold-top and mixed melt electric furnaces, as well as electric boosting, in its Prium E-Melt range:

- Prium E-Melt cold-top vertical melter (CTVM) offers a cost-effective option for the production of a wide range of glass types. The deep-CTVM format will produce exceptional quality glass with low fault concentration and high homogeneity.
- Prium E-Melt mixed-melt (or warm-top) furnaces offer an alternative for situations in which cold-top operation is not possible due to high gassing of melting reactions (eg carbon-sulphur amber) or when greater output flexibility is required. They use a low power combustion system to heat the crown. Warm-top formats extend the applications of an electric furnace to situations in which electric melting would not previously have been feasible.

Create the ideal furnace with electric boosting

Increasing efficiency and reducing the furnace's environmental impact are two of the key concerns for glass manufacturers. Electric boosters can improve melting efficiency and reduce fuel consumption, enabling glassmakers to design the optimum melting process for specific applications and increase output without adding to the furnace footprint.

Electric boosting is especially valuable when melting difficult glasses including ECR glass fibre and coloured glass but is applicable to all glass types. Fives uses numerical modelling to design the best electrode layout to optimise and control convection currents within the tank.

Ultimate control, optimum results

The strategic placement of electrodes, tailored to the design of the furnace, enables the group to achieve the best

power distribution for individual applications. Fives uses advanced modelling techniques to plan not only the electrode array but also the burner configuration, the batch distribution/cover and the geometry of the melting tank. All this insight is combined to deliver:

- Increased output, without increasing the footprint.
- Improved flexibility of furnace operations.
- Reduced emissions and less gas usage/waste.
- Improvement in overall energy efficiency.
- Reduction in crown temperature and therefore, increased furnace life.

High power capacity boosting

Most are familiar with the application of electric 'boosting' as a means of increasing output without necessarily enlarging furnace footprint. However, it is becoming more common that fuel-fired furnaces are conceived at the outset with high capacity electrical heating systems ('super-boosting') as an integral part of the design. These boosters, often with a large array of electrodes and multiple control zones, not only increase melt rate and improve glass quality but offer the possibility to steer furnace conditions in order to maximise fuel efficiency over a broad range of conditions.

E-boosting takes advantage of what is known about the behaviour of melting glass and the heating effect. With most heat released near electrodes, a hot spot can be created that drives useful currents and opposes unwanted ones. Both the power profile and the furnace's melting characteristics can be tailored to the application and can even overcome the limitations of the furnace geometry.

Although this technology is applicable to any type of furnace, to date Fives has focused its development efforts on fibre and float sectors. In E-glass fibre the results are particularly significant, since these furnaces typically use oxy-fuel in the melting process. The integration of oxy-fuel combustion and electric boosting is a particularly good combination for minimising gas consumption and reducing emissions.

Oxy-fuel combustion

Oxy-fuel combustion increases furnace efficiency, reduces emissions and improves glass quality by creating a more stable process. The addition of oxygen to the fuel almost eliminates nitrogen from the oxidiser, which greatly reduces the mass flow rate of flue gas leaving the furnace. Oxy-fuel technology is also a good option to limit the furnace footprint due to the absence of regenerators.

Fives has more than 25 years' experience in applying oxy-fuel combustion technologies to glass melting furnaces of all kinds, on greenfield projects as well as major rebuilds.

Combustion design and heat recovery

The design of oxy-fuel combustion space is different and more flexible than conventional air-fuel furnaces. A vast range of oxygen and fuel injector solutions are integrated to suit each application and furnace size. The combustion space is designed to prevent hot spots, minimise the evaporation of volatile compounds, limit batch carryover and maximise heat transfer efficiency.

The Heat Recovery Area (HRA) is a patented energy saving solution that optimises the use of combustion heat for maximum thermal efficiency. The HRA's clever layout forces flue gases to sweep above the batch blanket, transferring most of their usable heat and lowering their exit temperature. The design also limits the energy-consuming ingress of cold gases into the high temperature combustion space.

The Heat Recovery Area superstructure includes a lowered crown, which can be suspended or arched and flue exhausts that are specially designed to prevent batch carryover. The design is adaptable to all oxy-fuel furnace sizes and glass types. ▸

Prium Oxy-Melt.

Combustion reactant preheating

Fives is the first independent engineering company to integrate combustion reactant preheating in glass furnaces, in partnership with Air Liquide, to improve combustion efficiency. Oxygen and natural gas preheating is achieved by recuperating the residual heat contained in fumes using metallic heat exchangers.

Oxy-fuel combustion for glass conditioning

In collaboration with Linde and Corning Inc, Fives developed the oxy-gas firing system to provide highly controllable heating of the side glass in a forehearth. The result is a more responsive forehearth, enabling users to achieve:

- Increased glass throughput.
- Improved thermal homogeneity.
- Improved glass quality.
- Longer refractory life with volatile glasses.

Flexible hybrid furnace

Fossil-fuel driven furnaces are emissions-intensive. Electric boosting can help reduce the furnace's carbon footprint but the balance of energy efficiency has typically been lost at around 30-50% electrical input – until now. Fives has designed a type of hybrid furnace - Prium Eco-Flex, incorporating its Heat Recovery Area (HRA) technology - to achieve up to 80% electric boosting, which could reduce emissions by up to 60%.

Prium Eco-Flex addresses the disadvantages of gas combustion, while mitigating the limitations of all-electric furnaces. By replacing up to 80% of the natural gas with green electricity, furnace emissions are dramatically reduced but the additional benefit of this system is the ability to use high rates of recycled glass (up to 80%). For every 10% of cullet added to the mix, CO_2 emissions are reduced by 5% and energy consumption falls by 3%. These savings are not possible with electric furnaces, which cannot use large quantities of cullet.

Design for all types of glass container production

Previously, hybrid furnaces were limited by three things:

- High electrical energy ratios require a lower temperature above the batch layer.
- Separation of melting and refining and effective degassing of the melt, require higher temperature above the fining section (with free glass surface).
- High boosting input increases need for a strong thermal barrier (division between melting and refining).

This implies the need for a temperature gradient within the combustion chamber, which is difficult to achieve in a single combustion zone, especially with the burner/combustion configuration in an air-gas end-fired port furnace. Low temperature regions of the crown are prone to volatile attack and it can be difficult to control temperatures in an optimal way.

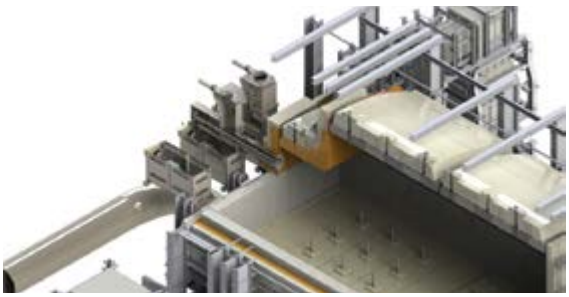
The hybrid furnace is designed to operate with the same quality level, from 15% to 80% electric boosting. It is not simply a case of fixing on a number and continuously operating at, say, 50% electric boosting – users can change the boosting ratio on the fly, without a production stop, down to a minimum of 15%.

Prium E-Boost.

The Prium Eco-Flex uses the proprietary HRA principle to overcome these limitations. HRA technology lowers the crown height over the pre-heat zone to maximise the heat transfer between waste gas and the batch surface. In a conventional oxy-fuel furnace, this creates an energy saving of 8%-10% and reduces waste gas temperatures, benefitting secondary heat recovery and simplifying exhaust handling.

The HRA zone length can be adapted to suit individual needs and the whole system can be scaled to suit any capacity and container glass type/cullet ratios. Combustion can be adapted to either oxy-fuel or air-gas. ●

Prium and HRA are registered trademarks of Fives.



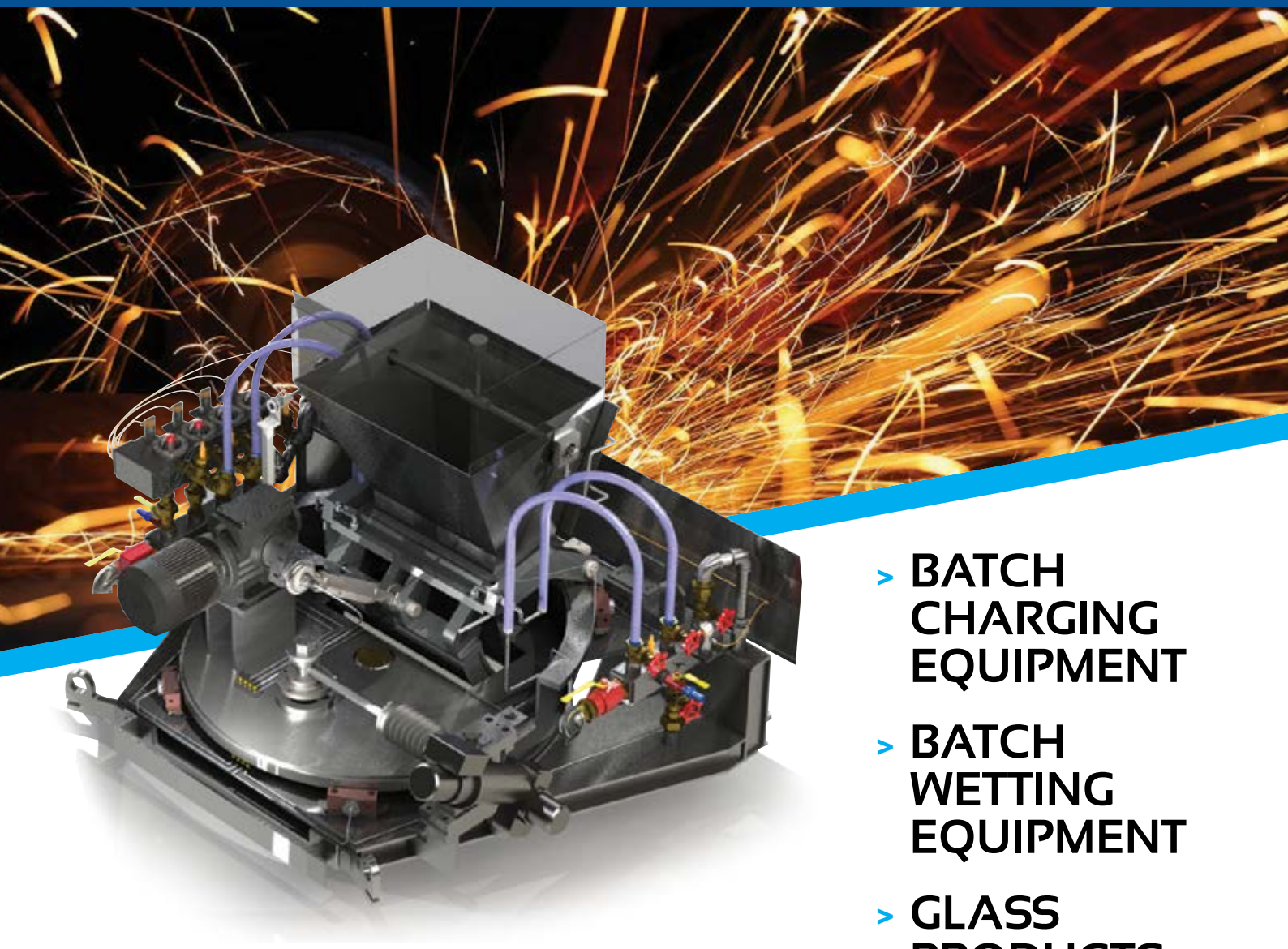
Prium Eco-Flex with HRA technology.

About the authors:
Alexandre Brusset is Vice President – Glass and Andrew Reynolds is Business Development Director – Glass, both at Fives Stein, Fives Group

Further information:
Fives Stein, Fives Group, Maisons-Alfort, France
tel: +31 1 45 18 65 00
email: alexandre.brusset@fivesgroup.com
web: www.fivesgroup.com

Fives Stein Ltd, Fives Group, Didcot, Oxfordshire, UK
tel: +44 1 235 811 111
email: andy.reynolds@fivesgroup.com
web: www.fivesgroup.com

> DEPENDABILITY > FLEXIBILITY > DURABILITY



> BATCH CHARGING EQUIPMENT

> BATCH WETTING EQUIPMENT

> GLASS PRODUCTS

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We make new, we make spares, we refurbish and we advise. We have a tradition that dates back to our foundation in 1877 and we adhere to core values that have stood the test of time. How well our products work and how long they last drive our commitment to quality, allowing us to remain a leading manufacturer.

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Challenging year for Society of Glass Technology

Society of Glass Technology President Stuart Hakes reviews the key projects initiated by the organisation within the past year, as well as highlighting some of the ongoing challenges created by the Covid-19 pandemic.

Stuart Hakes.

Arun Varshneya PhD.

The Society of Glass Technology held its Annual General Meeting via the internet for the first time due to the global Covid-19 pandemic. It was interesting that more people participated on this basis than usual, with overseas members able to join in. The majority of people are learning that the business world and indeed, individual lives will change as a result of this pandemic.

USA events participation

The past 12 months can be described as 'a most interesting year'. The SGT President and the Events and Finance Manager, together with other UK domiciled Fellows attended the ICG Conference in Boston in 2019 and met many of the SGT's overseas Fellows. This has become something of a tradition, with as many North American Fellows as possible meeting at the annual Glass Problems Conference. This conference is attended mainly by industrial members, whereas the ICG Conference is attended by those both in industry and academia. A large proportion of SGT Fellows are in academia. There are nine USA Fellows, eight of whom were at the conference. Also in attendance were four European Fellows, as well as the UK ones.

While at the Boston conference, the opportunity was taken to learn from the American Ceramic Society's membership system. Council decided to purchase the same system for the SGT. This has now been fully implemented, with a lot of hard work from Christine Brown and others in the office and is now up-and-running. It is a much more effective method of communication with members and eliminates many of the deficiencies of the old methodology.

It is hoped to use the website as the primary means of communication. The SGT is able to circulate all members or different groups of members individually by email but is also posting information on an ongoing basis in the 'my profile' page. If any member of the SGT is experiencing difficulties logging in, please contact christine@sgt.org.

The website is open to non-members and features useful information about glass in general, which is posted frequently.

Alongside this development, it is the intention of the Council to make further efforts to recruit both younger members and more people from industry. The SGT needs to reinvent itself for the 21st Century.

Covid-19 implications

Subsequent to this good work, the global Covid-19 pandemic has created its own challenges. This has necessitated the furloughing of all office staff, with the exception of Christine Brown, Finance and Events Manager, who has been doing fantastic work for the Society working from home. The support of all staff during this difficult time is greatly appreciated.

As a consequence of the pandemic, it has been necessary to cancel this year's Furnace Solutions Conference and Training Day. This is rescheduled for 9 and 10 June 2021.

This year's annual meeting in Cambridge has also been cancelled. No decision has been made whether to hold this meeting in Cambridge in 2021, with the SGT also staging the Physics of Non-Crystalline Solids in Canterbury from 4 to 10 August next year.

The UK Government's Covid-19 assistance programme has been a lifeline for the Society, as well as for many in the glass industry. A low interest loan has been obtained as a buffer, repayable over five years. More importantly,

This year's Furnace Solutions Conference and Training day have been cancelled.

the Society has been assisted by its Fellows. An appeal was made to all Fellows for donations of assistance and this has resulted in more than £10,000, half of which has come from North American members. In particular, an exceptionally generous offer has been received from Arun Varshneya and his wife Dashana through their Saxon Technologies company. They have come forward with a special advertisement feature in the journals *Glass Technology* and *Physics and Chemistry of Glasses.* This will be an ongoing programme looking forward and is a remarkable lifeline for which the Society is exceptionally grateful.

The Society of Glass Technology (SGT) exhibited at the 80th Conference on Glass Problems in November 2019 to promote to an American audience its objectives of encouraging and advancing the study of the history, art, science, design, manufacture, after treatment, distribution and end use of glass.

In short, it has been a challenging year but a year in which a hard look has been taken at the Society, before putting in place strategies to set it up for the future. This could not have been achieved without the tireless support of Council and other Committee members but more particularly, with the support of the office staff.

It is with regret that two very significant Fellows have been lost this year; Rosemary Sales (see the July/August 2020 issue of *Glass Worldwide* for her obituary) and past President David Martlew.

Although I am known as an optimist, I firmly believe that the Society is at a crossroads and is well placed to move forward into the future with confidence. ●

About the author:
Stuart Hakes is President of the Society of Glass Technology

Further information:
Society of Glass Technology, Chapeltown, Sheffield, UK
tel: +44 114 2634455
email: christine@sgt.org
web: www.sgt.org

Virtual Conference on Glass Problems

Robert Lipetz previews this year's Conference on Glass Problems for *Glass Worldwide,* exclusive official journal. The event will combine an extensive technical programme with short courses, a symposium and an exhibition, all on a virtual platform.

STOP PRESS
82nd Conference on Glass Problems will take place on 1-4 November 2021 at the Greater Columbus Convention Center and the Hilton Columbus Downtown in Columbus, Ohio, USA.

glass WORLDWIDE *Official journal of Glass Problems Conference*

Due to limitations caused by the global Covid-19 pandemic, the 81st Conference on Glass Problems, which had been scheduled to take place on 26-29 October in Columbus, Ohio, USA, has been replaced with a virtual conference. The Virtual Conference on Glass Problems (VGPC) will take place online on 26-30 October.

For decades, the Conference on Glass Problems has been the leading forum in North America for technical education and the exchange of ideas for glass manufacturing professionals. With the virtual format, the VGPC can allow a larger audience to reach the world's leading technical experts, addressing current problems in manufacturing, while citing real world examples. The VGPC will also provide an exhibiting platform for solutions providers to share their innovations.

Chris Bloom, Senior Engineer at Owens Corning, provides this assessment: "Working in the glass industry, it is easy to become too focused on the segment of the industry where I work. The Glass Problems Conference gives me insight to how other glass industry segments have solved issues that might apply to my process."

The Virtual Conference on Glass Problems is organised by the Glass Manufacturing Industry Council (GMIC), which is the American trade association bridging all segments of glass manufacturing and Alfred University, the USA's leading glass research institution. The American Ceramic Society endorses it, with *Glass Worldwide* as the official journal.

The GPC programme content is directed by an industry advisory board and is composed of invited papers and submitted abstracts, with the proceedings manuscripts distributed to attendees and also published by John Wiley & Sons. Preference is given to lectures providing practical, take-home information. To accommodate the online format, the technical programme, which had traditionally been two days, now expands to three days, 26-28 October.

Short courses

Two excellent technical short courses are offered virtually on 23 October: 'Fundamentals of Batch and Furnace Operations' taught by C Philip Ross and 'Introduction to Redox and Sulfur Chemistry' taught by Corinne Claireaux, Glass Scientist and Oscar Verheijen, Senior Consultant at CelSian Glass & Solar BV. ▸

Bob Lipetz is GPC's Conference Director and Executive Director of the GMIC.

Seen here with Bob Lipetz, Phil Tucker will present 'Extending Campaign Life in an All-Electric Melter Using High Levels of Commercial Bottle Cullet, with Johns Manville colleague Donn Sederstrom.

Programme Chair of GMIC's Future of Glass Manufacturing symposium, Keith Bagarus (left) is seen here at a past GPC with fellow former GMIC President Brian Naveken, Danny Dylong, Group Manager at RoviSys and Donna Banks, GMIC Executive Assistant.


Erik Muijsenberg, Vice President, Glass Service Inc, will present 'Industry 4.0 and Beyond' and 'How Surrogate Models Can Help us to Make Design and Operation Decisions'.

GPC virtual exhibitors

The Virtual Conference on Glass Problems will allow delegates to visit an online exhibition of leading suppliers of glassmaking plant, equipment and services. In addition, delegates can communicate directly with exhibitors and exhibitors will be providing additional satellite education events. At the time of going to press, exhibitors include:

Advanced Control Solutions Inc
Integrator of advanced control system solutions.
www.acsitoledo.com

Airpro Fan & Blower Co
Manufacturer of centrifugal fans for process air requirements.
www.airprofan.com

Air Products
Innovative melting technologies for better glass.
www.airproducts.com/glass

American Ceramic Society
The professional society for ceramic/glass scientists, engineers and manufacturers, with over 10,000 members worldwide.
www.ceramics.org

AMETEK Land
Infrared non-contact temperature measurement.
www.ametek-land.com

ATS Applied Tech Systems
Quality, MES and manufacturing 4.0 system provider.
www.ats-global.com/us

Batch House LLC
Batch plant and cullet handling systems provider.
www.batchhouse.com

Borton-Lawson
Digital-technology-forward licensed engineers with deep experience in glass manufacturing.
www.borton-lawson.com

C B Mechanical LLC and Part for Lehrs LLC
Companies dedicated to installing, starting up and servicing lehrs.
www.partforlehrs.com

CelSian Glass & Solar
Partner for optimising the glass melting process.
www.celsian.nl

Cemtek Instruments Inc
A leading supplier of analysers for continuous emissions monitoring.
www.cemtekinstruments.com

Chiz Bros, Refractory and Insulation Specialists
Refractory and high temperature insulation supplier.
www.chizbros.com

Clean Air Technology Ltd
Offering the filtration performance of DeSOX, DeNOx and Dioxin resolve.
www.cat-filter.com

DSF Refractories & Minerals Ltd
UK's largest shaped refractory manufacturer and specialist in glass industry applications.
www.dsf.co.uk

Edward Orton Jr Ceramic Foundation, The
Validating thermal processing for over 100 years.
www.ortonceramic.com

FIC (UK) Ltd
A world leader in innovative electrical heating technologies for melting and conditioning of all glass types.
www.fic-uk.com

Fives In Glass
A leading supplier in high quality glass melting and conditioning.
www.glass.fivesgroup.com

FlammaTec
Supplier of advanced burner technology for glass furnaces.
www.flammatec.com

Glass Manufacturing Industry Council (GMIC)
Glass industry trade association representing all four glass sectors.
www.gmic.org

Glass Service
Consultant for glass melting/conditioning, furnace control, operation and furnace modelling.
www.gsl.cz

Glass Worldwide
Official journal of GPC, preferred journal of GMIC and the leading title for all sectors and regions of the glass industry.
www.glassworldwide.co.uk

Haldor Topsoe
Offering NOx, SOx, PM and VOC removal through catalytic filtration.
www.topsoe.com

HarbisonWalker International
Engineers, manufactures and supplies quality refractories for glassmaking.
www.thinkHWI.com

Henry F Teichmann Inc
Engineering, construction services and lehrs.
www.hft.com

Holland Manufacturing Corp
High quality refractory shapes for glass applications.
www.hollandmanufacturing.com

Hotwork-USA
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www.hotwork.com

Jenike & Johanson
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www.jenike.com

Johnson Matthey
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www.noble.matthey.com/markets/glass

LDX Solutions f.n.a. Dustex
Global supplier of clean air technologies.
www.LDXsolutions.com

Lhoist North America
Calcium for batch and air pollution control.
www.lhoist.com

Lilja Corp
A leader in industrial and glass furnace construction.
www.liljacorp.com

Linde
A leader in oxy-fuel and combustion technologies.
www.praxair.com/glass

LMI Corp
Measurement solutions for the glass industry.
www.lmicorporation.com

Magneco/Metrel Inc
Colloidal silica bonded monolithic refractory.
www.magneco-metrel.com

McGill AirClean LLC
Providing air pollution control systems worldwide for over 50 years.
www.mcgillairclean.com

Mixer Systems Inc
American manufacturer of four types of mechanical glass batch mixers.
www.mixersystems.com

Optris Infrared Sensing LLC
A world leader in IR temperature measurement.
www.optris.com

Parkinson-Spencer Refractories Ltd
Manufactures and supplies refractories and engineered products for the glass industry.
www.parkinson-spencer.co.uk

Pyrotek
Engineering solutions for container glass, flat glass, glass bending and tempering and specialty glass applications.
www.pyrotek.com/glass

RHI Magnesita
A global leader in refractories.
www.rhimagnesita.com

RoviSys
Glass industry process and information solutions.
www.rovisys.com

SEFPRO
Refractory products and services.
www.sefpro.com

SGT (Society of Glass Technology)
Serves people interested in the production, properties or uses of glass.
www.sgt.org

S.I.G.MA. srl
Refractories for furnaces and forehearths.
www.sigmaref.it

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www.pem.umicore.com

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A long-term supporter of GPC, Air Products will be present this year with a virtual exhibit.

C Philip Ross, President of Glass Industry Consulting International (GICI) provides an introduction to the principles of commercial glass production employed in batch and furnace operations by US glass producers. Raw materials, glass technology and properties, melting furnaces and environmental issues will all be touched upon. Suggested attendees could be suppliers or newer individuals to glass manufacturing seeking an introduction to the issues faced in glass production.

The separate 'Introduction to Redox and Sulfur Chemistry' short course, taught by Corinne Claireaux and Oscar Verheijen, provides a general description of the redox concept and the relevant sulphur chemistry for soda-lime-silicate glasses.

Oscar Verheijen, Senior Consultant at CelSian Glass & Solar BV (left), will be an instructor in the Introduction to Redox and Sulfur Chemistry short course and will present 'Carbon Reduction Mandates' in the virtual symposium. CelSian will also exhibit in the virtual exhibition.

Virtual Glass Problems Conference programme

To be presented as a virtual conference, the conference programme at the time of going to press includes the following plenary session presentations on 26 October: Erik Muijsenberg, Vice President, Glass Service Inc – 'Industry 4.0 and Beyond'; Daniel Swiler, Glass Scientist, O-I Inc – 'Surface Viscosity and the Melting of Glass'; Lance Lemings, Senior Director Operations, Gallo Glass Co – 'Hot Bottom Repair on a 10 Year Old Furnace'; John Mauro, Professor, Pennsylvania State University – 'Machine Learning and Glass Formation'; Marty Curran, Innovation Officer, Corning Inc – 'Glass Industry Today: Challenges & Opportunities'; and Frank O'Brien-Bernini, VP and Chief Sustainability Officer, Owens Corning – 'Sustainability – Creating Enterprise Value'.

A technical session devoted to Construction/Repair has been organised for 27 October. The following speakers are scheduled participate: Neil Simpson, Independent Consultant to AMETEK Land – 'Supporting Hot and Cold Furnace Repairs'; Christopher Hetro, Glass Service Leader, Borton-Lawson – 'Infrastructure and Process Considerations when Increasing the Size of Your Furnace'; Jalil Abraham Kuri, Furnace Design, Construction and Maintenance, Libbey Inc – 'Experienced Analysis in Furnace Construction Recurrent Projects'; Stephane Schaller, SEFPRO Refractory Solution Engineer, SEFPRO – 'Improved Glass Homogeneity and Higher Sustainability through Textured Expendable Tubes in Container Glass Furnaces'; Phil Tucker, Principal Materials Engineer, Johns Manville and Donn Sederstrom, Senior Research Engineer, Johns Manville – 'Extending Campaign Life in an All-Electric Melter Using High Levels of Commercial Bottle Cullet'; Stanley Rutkowski III, Senior Applications Engineer, RoMan Manufacturing – 'New Power System Technology for More Electrically Efficient Melting, Booting and Forming Processes'; and Cheng-Hung Hung, Senior Research Associate, Vitro Architectural Glass – 'Combustion in Regenerative Air-Fuel Glass Furnaces'.

On 28 October, Quality Controls and Sensors is the theme adopted for a third technical session. The following speakers and presentations have been lined up: Andries Habraken, Glass Melting Expert, CelSian – 'Glass Melt Quality Optimisation by Mathematical Modeling of Redox ▸

A traditional GPC exhibitor, Hotwork USA will have a presence in the virtual exhibition.

Bryn Snow, Director Application Technology at HarbisonWalker International, will present 'Future of Refractories and the Impact on the Glass Industry'.

Neil Simpson, Independent Consultant to AMETEK Land, will present 'Supporting Hot and Cold Furnace Repairs'.

The Society of Glass Technology will have a virtual presence at this year's GPC.

and Bubbles in the Glass Melt'; Scott Cooper, Global Glass & Materials Science Leader, O-I – 'Glass, The Detection and Root Causes of Cord in Glass'; Joseph LaPlante, Business Unit Glass Market Manager, ISRA Vision – 'Float Glass Flatness Process Consequences and How to Improve Control'; Tod Canty Jr, Engineer, JM Canty – 'Dynamic Imaging as a Tool to Increase Yield and Reduce Production Costs'; Shrikar Chakravarti, Associate Director, Technology Commercialisation – Glass, Praxair Inc – 'Waste Heat Recovery in Oxy-Fuel Glass Furnaces – A Path to Sustainability and Lower CO_2 Emissions'; Scott DeFife, President, Glass Packaging Institute – 'Glass Recycling – A Regional Approach to Dedicated Glass Collection'; and Ravindra Aglave, Director, Energy & Process, Siemens Digital Industries Software – 'Multiphysics Simulation to Solve Energy and Pollution Challenges in the Glass Industry'.

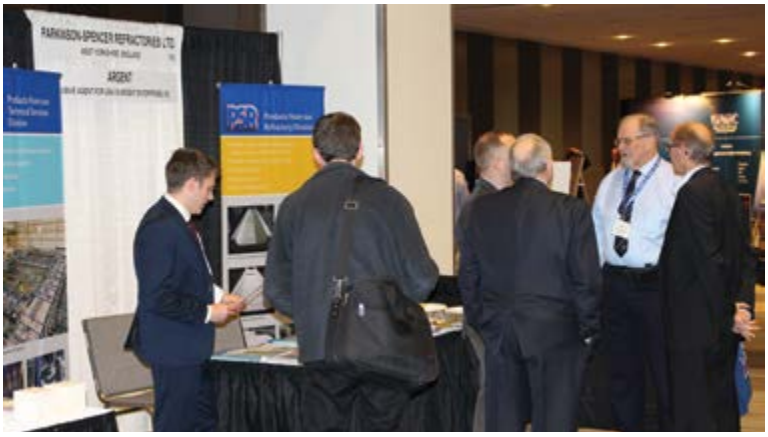
The Future of Glass Manufacturing symposium

At the GMIC-organised virtual symposium entitled 'The Future of Glass Manufacturing' on 29-30 October, the world's leading experts provide a deep dive into the technologies and trends that shape the future of glass manufacturing. Today's glass manufacturers need to look to the future to sustain their competitive advantage. From batch materials and recycling, to process improvements, digitisation, energy and the environment, the glass industry must take advantage of the latest innovations. Add in a focus on overall business economics and participants will be among the leaders taking glass into the next millennium.

The symposium will have three sessions, namely Digital Transformation, Resources and Furnace Design. The Digital Transformation session on 29 October will include the following presentations and speakers: 'Introduction' – Bob Lipetz, Executive Director, Glass Manufacturing Industry Council and Keith Bagarus, Director, Global Automation, RoviSys; 'Process Automation and Big Data' – Tolga Uysal, Project Engineer, Sisecam; 'Energy Balance Modeling as Soft-Sensor for Furnace Design and Operation' – Lieke de Cock, Team Lead Furnace Support, CelSian Glass & Solar BV; 'Setting a Vision for Digitalization Success' – John Vargo, Director, MES and Digital Supply Chain, RoviSys; 'Furnace Controls' – Glenn Neff, Vice President, Glass Service – USA; 'Sensors and the Edge' – Jon Strong, Business Development Executive, Insight LLC; and 'End to End - Forming to Inspection – An Example of Industry 4.0 in the Glass Container Industry' – Kenneth Bratton, Manager of Research and Development, Bucher Emhart Glass.

One of two sessions organised for 30 October, Session II – Resources involves the following presentations and speakers: 'Introduction' – Udaya Vempati PhD, Analytics and Automation Discipline Leader Global Technology – O-I; 'Carbon Reduction Mandates' – Oscar Verheijen, Glass Expert, CelSian Glass & Solar BV; and 'Future of Refractories and the Impact on the Glass Industry' – Bryn Snow, Director Application Technology, HarbisonWalker International.

Finally, Session III – Furnace Design brings together these presentations and speakers: 'Float Glass Furnaces Without Fossil Fuels? (Hybrid Furnace Design Considerations)' - Wolf Kuhn PhD, Senior Process Development Expert, Fives Stein Ltd by Fives in Glass; 'Oxy-fuel Furnace Future Drivers and Future Designs and Challenges' – Ruediger Nebel, Sales Director, SORG; 'How Surrogate Models Can Help us to Make Design and Operation Decisions' – Erik Muijsenberg, Glass Service Inc; 'HeatOx Preheating System' – Ken Kaiser, International Expert Process Engineering and Combustion, Air Liquide; and 'Concluding Remarks' - Keith Bagarus, Director Global Automation, RoviSys. ●



Virtual exhibitors include Parkinson-Spencer Refractories.

Further information:

Conference Director: Bob Lipetz, Glass Manufacturing Industry Council, Westerville, Ohio, USA
tel: +1 614 818 9423
email: rwlipetz@gmic.org
web: www.glassproblemsconference.org

Programme Director: S K Sundaram, Alfred University, Alfred, NY, USA
tel: +1 607 871 2789
email: sundaram@alfred.edu

Exhibition management: Mona Thiel
tel: +1 614 794 5826
email: mthiel@ceramics.org

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Forthcoming events 2021

Information correct at time of going to press. For up to date events listings alongside Hot Topics news, highlights from this issue and the Virtual Marketplace digital showcase, visit www.glassworldwide.co.uk

FEBRUARY 2021

18-19 February: Glassman Asia (Seoul, South Korea)

25 February – 3 March: interpack 2021 (Düsseldorf, Germany)

MARCH 2021

9-11 March: InPrint (Munich, Germany)

9-12 March: FESPA Global Print Expo (Amsterdam, the Netherlands)

24-25 March: GPD South America 2020 (Sao Paolo, Brazil)

24-27 March: Glass South America (Sao Paulo, Brazil)

APRIL 2021

17-19 April: Deco '21 (Pittsburgh, USA)

MAY 2021

6 -9 May: China Glass 2021 (Shanghai, China)

12-14 May: ATIV International Conference (Parma, Italy)

JUNE 2021

7-10 June: Mir Stekla 2021 (Moscow, Russia)

9-10 June: Furnace Solutions Conference 15 and Training Day (Stoke-on-Trent, UK)

9-11 June: Intersolar 2021 (Munich, Germany)

15-18 June: glasstec 2021 (Düsseldorf, Germany)

JULY 2021

4-9 July: 16th International Conference on the Physics of Non-Crystalline Solids (Canterbury, UK)

AUGUST 2021

22-25 August: ICG Annual Meeting (Incheon, Republic of Korea)

SEPTEMBER 2021

8-9 September: Glassman Latin America (Monterrey, Mexico)

13-15 September: GlassBuild America 2021 (Georgia, USA)

21-23 September: Gulf Glass 2021 (Dubai, United Arab Emirates)

23-25 September: glasspex INDIA 2021 (Mumbai, India)

OCTOBER 2021

5-8 October: Vitrum 2021 (Milan, Italy)

6-8 October: PRINTING United Expo (Orlando, USA)

NOVEMBER 2021

1-4 November: 82nd Conference on Glass Problems (Columbus, Ohio)

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Glass set for a rebound in North America

glass WORLDWIDE Preferred journal of Glass Packaging Institute

The glass container manufacturing industry is seizing an opportunity to recapture packaging market share in North American markets, with a focus on key policy and market initiatives. A re-energised Glass Packaging Institute (GPI) has expanded its membership base and continues to explore new programmes to mobilise the industry around growing markets for glass packaging. Scott DeFife reports.

GPI is emphasising the circularity of glass containers for meeting consumer goods companies' sustainability goals, as well as addressing structural issues in the North American solid waste and recycling system. The current structure often inhibits collection of in-demand quality recycled glass and has challenged manufacturing supply chains.

Glass starts with a strong base of consumer trust. Generations of consumers know glass and well-respected brands around the world have used glass packaging for generations. Glass bottles and jars are trusted for their package integrity, aesthetics and numerous other qualities provided to the food and beverages that they hold.

When local government managers are pinched by their waste management providers and budgets into cutting back on recycling programmes, time after time their constituents continue to demand glass recycling options. If residents find out that their 'recycling' service providers have been landfilling glass, they respond strongly – the consumer base regarding glass purchasing and recycling remains strong.

The challenges for the glass industry over the past decade are most evidenced by misleading information provided by some large waste management companies, who have made internal business decisions in response to China's National Sword policy. These companies mislabel glass as non-recyclable, rather than acknowledge that they lack the tools to properly recycle it. Instead of bolstering their recycling infrastructure for a material that often makes up a quarter of the recycling stream, glass is pointed to as a contaminant. Rather than talk about the quality of their recycled material output, they refer to glass markets as "not being present". GPI and the glass industry are taking these issues on directly and are making inroads to clarifying the reality of end market desire for more high quality recycled glass.

While alcoholic beverage consumption trends are changing, resulting in a slight decline for beer sales, other categories for glass continue to expand, highlighting a path for stronger growth in the food, organic, health and functional beverages, wine and spirits categories. The societal and economic response to the Covid-19 crisis has accelerated in-store grocery purchasing and has given the industry an opportunity to remind consumers about the long-term stability of glass packaging for food and beverages, as well as medicine and pharmaceuticals.

Redoubled recycling efforts

At the same time, the economic impact of the pandemic has exposed the need to redouble efforts to collect more post-consumer glass for recycling and reuse. Prior to Covid-19, the industry was already exploring ways to boost recycled content to meet brand customer sustainability goals and industry environmental objectives.

North America's recycling system is not nearly as robust as the European system. With more space to cover and distance between markets, state and local governments have built a greater reliance on landfilling at lower cost, creating an over-reliance on single stream systems.

In 40 states and Washington DC, slightly more than a third of the glass goes directly to landfill. For glass, this means quality is at the mercy of the materials recovery facilities (MRF) in most of the country. Therefore, a majority of the quality recycled glass for container manufacturing originates from the 10 bottle deposit states. The Covid-19 retail response – limiting consumer bottle returns – set back many redemption programmes in those states, further demonstrating the need to build greater resilience in the glass recycling system.

Scott DeFife, President, Glass Packaging Institute.

Engaging with government leaders

Every challenge is an opportunity and the Covid-19 pandemic has given the industry a chance to engage with local government leaders about the benefits of glass and the creativity that can be employed to recover it. GPI and other industry stakeholders have engaged in dozens of conversations with local government leaders on this issue and have proposed possible solutions.

The response has been particularly encouraging because of the underlying support that exists for glass as a packaging material. In the coming months, GPI will revisit this topic to give *Glass Worldwide* readers updates on the industry's collective progress, pulling apart these issues and exploring them more fully in a larger series.

Companies that have business in the North American glass market can be a part of these efforts by engaging with GPI – join its forums and committees – network with the organisation on solutions and goals to take advantage of the opportunities to grow glass markets, so more glass can be captured and diverted from landfills, so it can fulfill its most sustainable beneficial use in an emerging circular economy. ●

About the author:
Scott DeFife is President at the Glass Packaging Institute

Further information:
Glass Packaging Institute,
Arlington, VA, USA
tel: +1 703 684 6359
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