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BI-MONTHLY INTERNATIONAL MAGAZINE FOR GLASS MANUFACTURING

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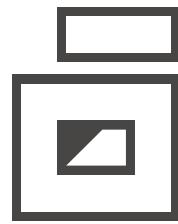
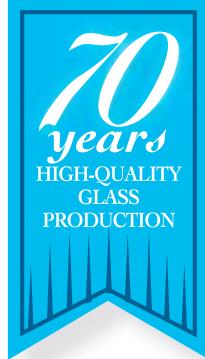
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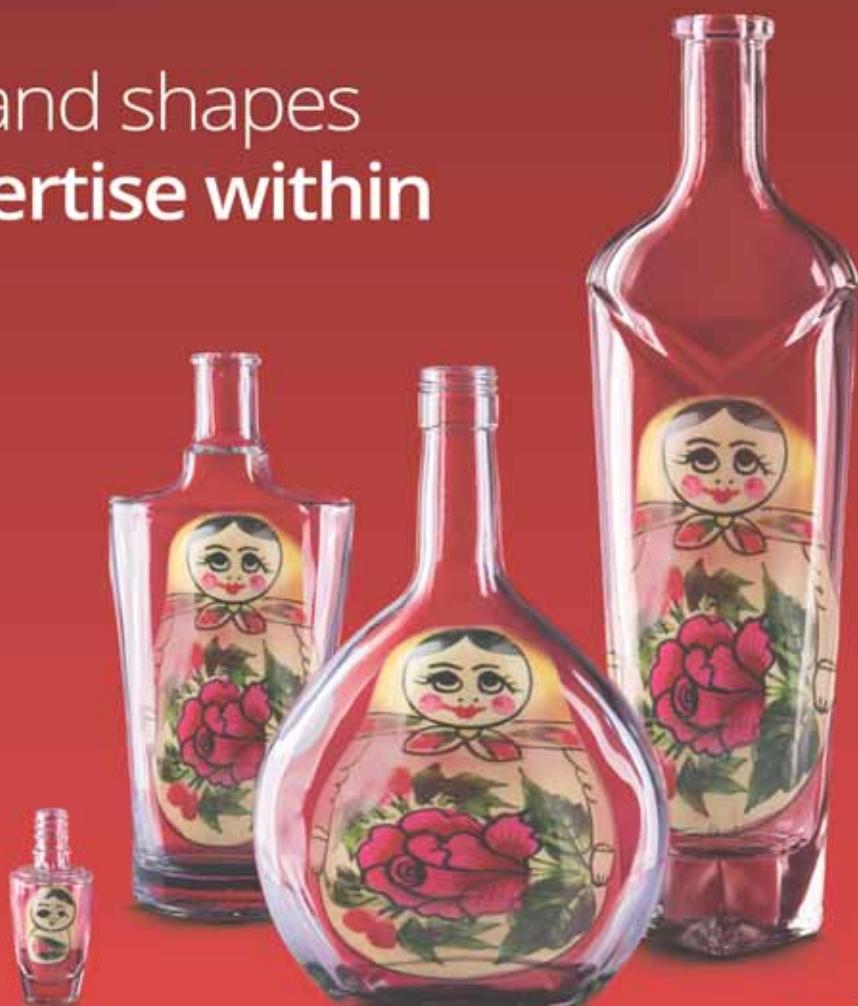
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Belt transfer and spacing devices

Orientators for non-round containers

Cullet conveyors

Rubber slat elevators, lowerators, overturners



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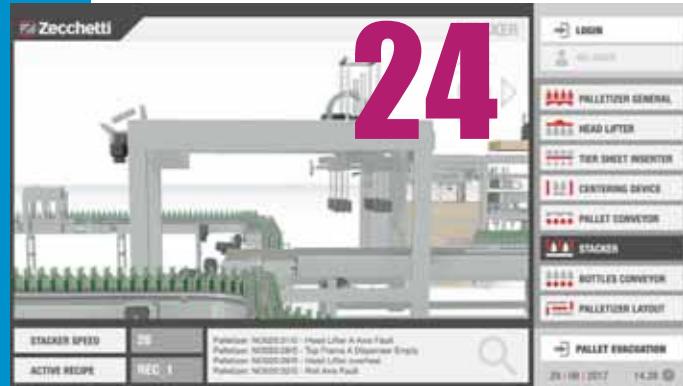
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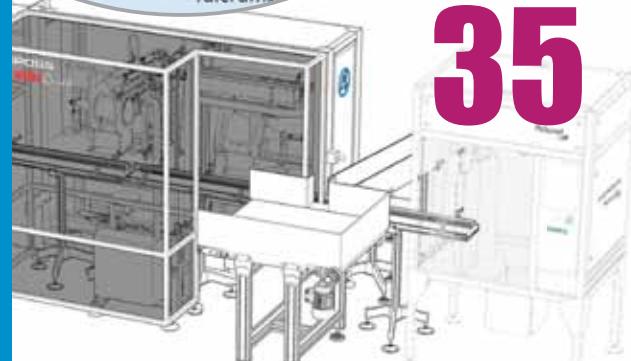
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1 Deadline Adv files: 23-01-2017	GLASSPEX	23-25 February	NEW DELHI (GREATER NOIDA) India
2 Deadline Adv files: 24-03-2017	GLASSMAN SOUTH AMERICA	29-30 March	BUENOS AIRES Argentina
	INTERPACK	4-10 May	DUSSELDORF Germany
3 Deadline Adv files: 21-04-2017	IRAN GLASS	8-9 May	TEHRAN Iran
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4 Deadline Adv files: 21-07-2017	CHINA GLASS	24-27 May	BEIJING China
	MIR STEKLA	5-8 June	MOSCOW Russia
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5 Deadline Adv files: 29-09-2017	GLASSMAN EUROPE	6-7 September	LYON France
	VITRUM	3-6 October	MILAN Italy
6 Deadline Adv files: 13-10-2017	AFGM	9-13 October	DA NANG Vietnam
	COLOMBIA GLASS	24-25 October	BOGOTÁ Colombia
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2017	CONFERENCE ON GLASS PROBLEMS	6-9 November	COLUMBUS (OH) USA
	HOLLOWGLASS ASIA	22-24 November	MARINA BAY SANDS Singapore



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2



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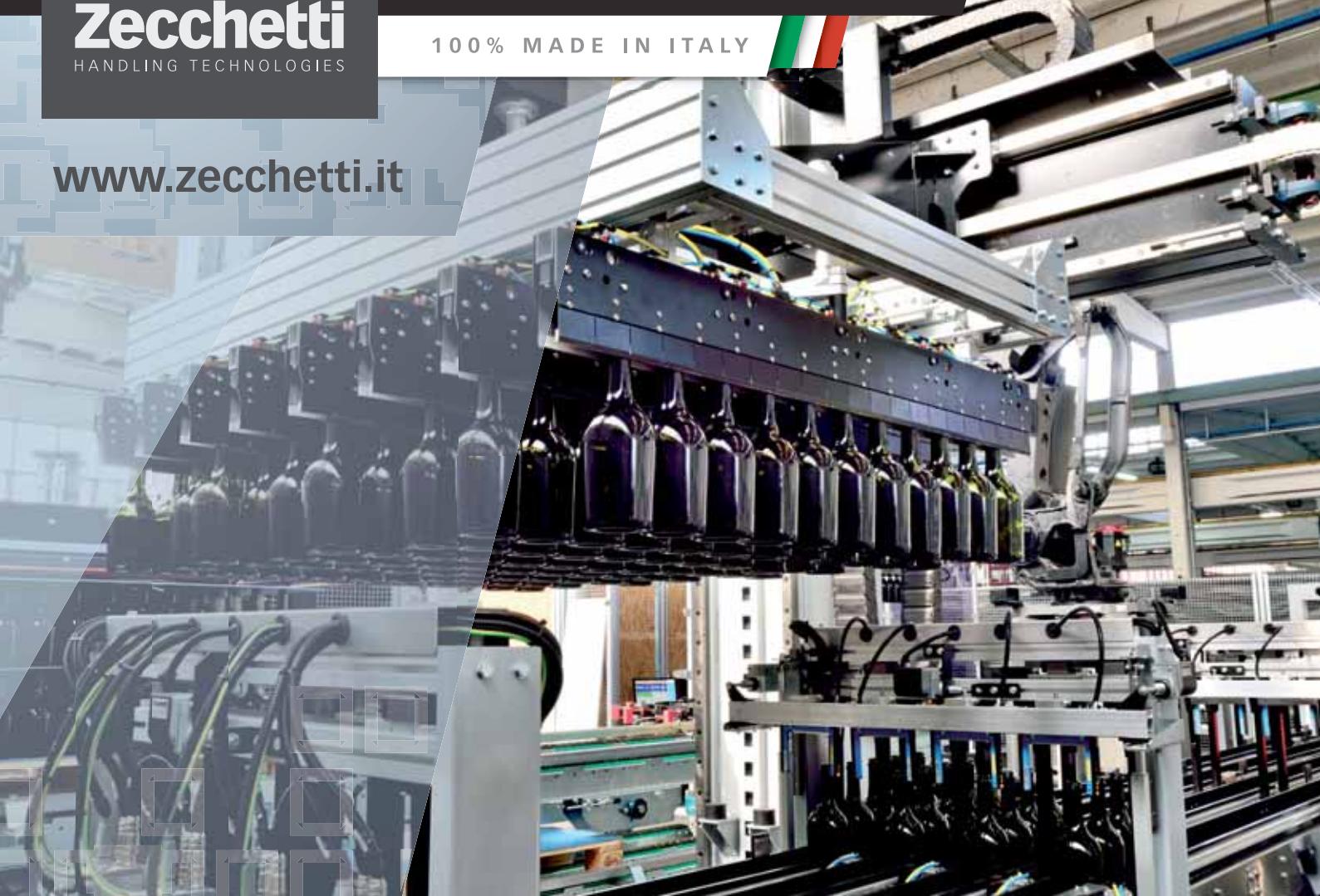
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HEYE INTERNATIONAL

HEYE INNOVATIONS BENEFIT TAIWAN GLASS

Increasingly, Asia's glass container producers are turning to **Heye International** for innovative and reliable solutions for their production lines. Among the company's high profile customers is the Hsinchu factory of *Taiwan Glass*. As a leading supplier of production technology to glass container manufacturers throughout the world, Heye International GmbH has assisted Taiwan Glass with its conversion of four more production lines to Heye technology and the installation of a new Heye IS machine, featuring the company's latest developments in Narrow Neck Press and Blow (NNPB) production. Established in 1994,

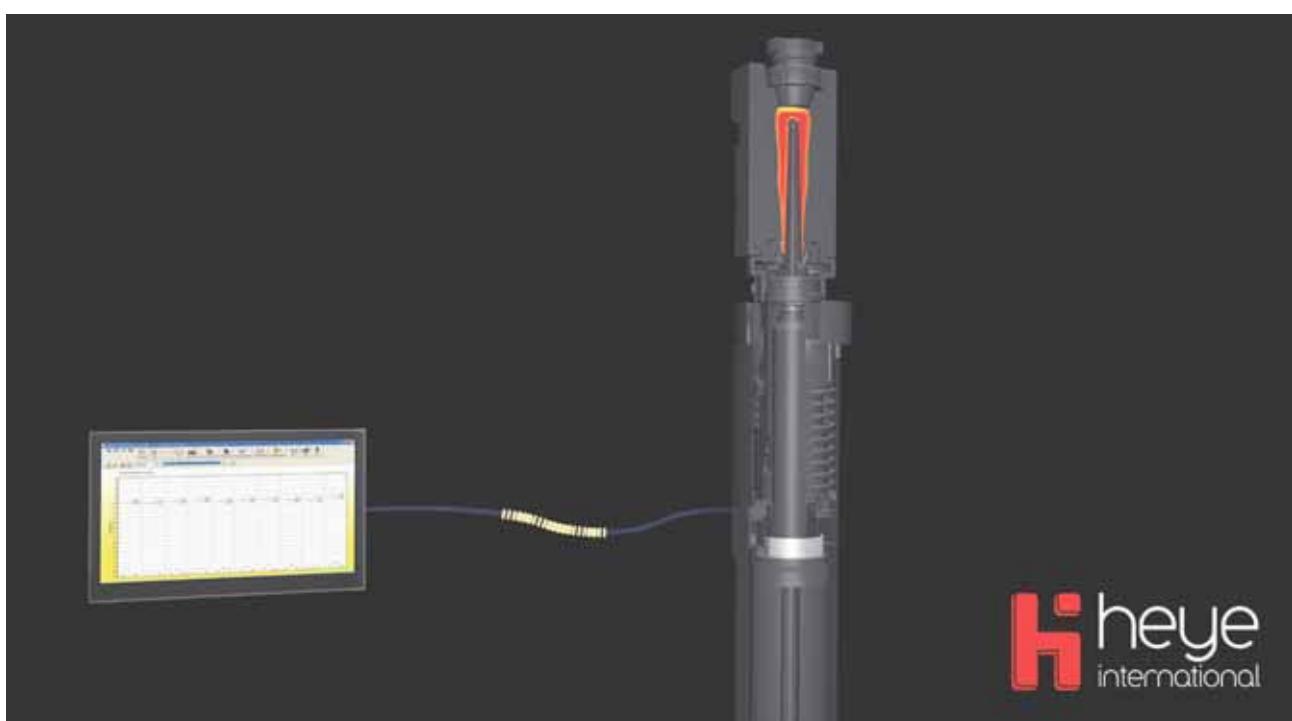
family-owned Taiwan Glass is Taiwan's leading glass producer, with diversified business interests associated with the manufacture of glass packaging, flat glass, solar glass and glassfibre. A technical assistance agreement was signed with Heye International in 1983 and subsequently, the company has pioneered the NNPB process in Taiwan and the region. In total, 11 Heye production lines are now operated at Hsinchu glassworks, a positive relationship having developed between the experts of both companies over the past two decades. With a high proportion of output destined for export, Taiwan Glass manufactures an extensive series of products, including very

small items and with frequent job changes. The factory operates a wide range of Heye production machines, including all of the German company's latest innovations. This includes Heye's Press Duration Control to minimize hot end defects, to provide reproducible wall thicknesses and to ensure high quality production.

Based at Obernkirchen, Germany, Heye International GmbH is one of the international glass container industry's foremost suppliers of production technology, high performance equipment and production knowhow. Its mechanical engineering has set industry standards for more than five decades. Extensive industry expertise, combined with the positive attitude and enthusiasm of Heye International employees is mirrored by the company



motto 'We are Glass People'. Its three sub-brands *HiPERFORM*, *HiSHIELD* and *HiTRUST* form the Heye International equipment portfolio, addressing the glass industry's hot end, cold end and service requirements respectively.



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Modern machines are crucial to efficient production operations in the container glass industry. Container glass companies have a strong partner in **GPS - Glas Produktion-Service**, one of the world's leading developers and manufacturers of IS machines and modules. GPS recently combined technical excellence and innovation in an attractive new financing model for IS machines and modules. This service allows the German specialist's customers to have their products configured and financed in one single process. International customers, in particular, benefit from this more cost-efficient and less complex way of doing business. GPS is a full-service provider with a premium product portfolio offering comprehensive lifecycle management for installed machines, parts and Control & Drive extending from advice and problem-solving, through planning and installation, to maintenance, upgrades and training. The new financing model has been supplementing the GPS range of product-related services with additional central and customer-centric components since August 2017. It offers all partners in the container glass industry a secure and dependable source of financing for their investments in new IS machines or machine components. With its network of reputable banks the IS

GPS - GLAS PRODUKTION-SERVICE NEW FINANCING OPTION FOR CUSTOMERS

machine specialist is now a strong financing partner that is able to offer attractive financing deals to customers. One major advantage is that the GPS partner banks and leasing companies can now be involved right at the outset of the customer project - in the planning and quotation phase. GPS now provides a one-stop service including IS machine configuration, life cycle management and financing to customers who are interested in taking advantage of this all-inclusive arrangement that sets the German IS expert apart from the other market players. "We've noticed over the years that financing processes can be extremely complex and protracted. The sooner the issue of financing is clarified, the sooner the customer can make its investment decision. "We're the only company in our industry offering customers this combination of an IS machine price quote and a financing commitment," said Christian Maehler, CFO at GPS.

All customers – both new and existing ones – have access to this attractive financing option that allows them to conserve their liquid funds or invest them in other projects. It offers a range of benefits to GPS

customers, one of which is longer-term planning security as a result of the financing commitment being integrated in the quote. Also, the time-consuming process of funding applications and negotiations with banks and leasing companies is no longer necessary. "The one-stop provider principle makes the total investment in a new GPS machine considerably lower than it is if several parties are involved," added Maehler. The new financing option for GPS machines is available to customers anywhere in the world. They simply have to satisfy the criteria set out by GPS partner banks



and have an appropriate credit rating. GPS is a leading German-based developer and supplier of IS machines catering to the needs of the international container glass manufacturing industry. The full-service provider's product portfolio includes IS machines and components, servo mechanisms, feeders and conveyors as well as control and drive systems for various applications. It also provides consultancy and training services to customers in the container glass manufacturing industry. GPS develops customised and standard solutions for individual projects, regular customers and companies of all sizes, including financing if required.

STÖLZLE GLASS GROUP

LAUNCH OF NEW WEBSITE

Stölzle has announced the launch of its new website. The new site includes changes to the style layout for navigation, and has been adapted for both mobile and desktop versions. An embedded video in the header of the website's main page titled The Art of Making Glass offers a fascinating glimpse into the process to manufacture high-end packaging glass. The company has also improved the structure of the content so site visitors can get more from a quick read. The navigation menu includes all relevant sections for products, decoration, career and job opportunities, quality management, sustainability, purchasing and logistics. The main page provides quick access to all business units, decoration, news and up-and-coming trade shows. Product information can be obtained by downloading the catalogues through their respective product pages. Contact options are available for all fields of interest throughout the website.

VERALLIA

COGNAC GLASS PLANT CELEBRATES THE RESTARTING OF FURNACE

The teams at Verallia's Cognac plant celebrated the restarting of one of the factory's three furnaces, the unit specialized in producing high quality extra-flint glass.

This EUR 12 million investment further strengthens the Verallia group's territorial anchoring in Charente, France, and its leadership as the reference glassmaker on the dynamic Cognac market. Work on modernizing the cognac's extra-flint producing furnace lasted less than two months and mobilized around 50 business partners. The furnace and its four production lines were refurbished to increase the facility's extra-flint output and flexibility. The result of a long industrial history initiated in 1878 by Claude Boucher, inventor of the first glass-blowing machine, Verallia's cognac plant today serves three main markets: still wines, sparkling wines, and cognac and spirits. Most cognac producers, regardless of their size and their positioning opt for extra-flint glass, a colour unrivalled in terms of transparency and shine. With this investment, Verallia, a manufacturing corporation wholly dedicated to glass packaging, continues to

implement its operational excellence strategy and further strengthens its foothold in the Charente region of France where it employs 430 people on 4 manufacturing sites. (glassmaking plant, Everglass household glass treatment site, René Salomon facilities, with Société Charentaise de décor only recently acquired in April 2017)

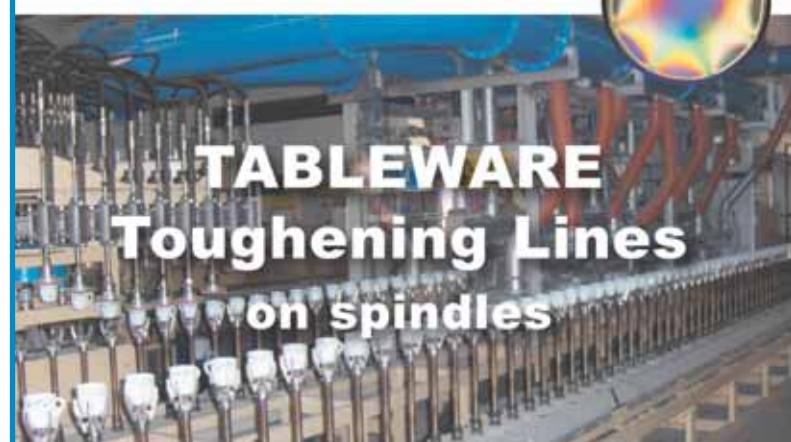
"With this new installation, we are increasing our capacity, our flexibility – notably for the production of large containers up to 4.5l, and our quality control. We have also taken care of the working conditions for our teams: the lines are now equipped with hoists to reduce load-carrying, the site's ventilation has been enhanced and we have refurbished the furnace control cabin at the hot end," stated Christian Garnaud, Verallia Cognac's plant manager.

During the traditional furnace lighting ceremony, the furnace was symbolically relit by Véronique Martial, PA at the plant, and Patrick Bernardet, furnace rebuild project leader at Verallia, who are now respectively the furnace's godmother and godfather.



TEMPERING LINES on belt

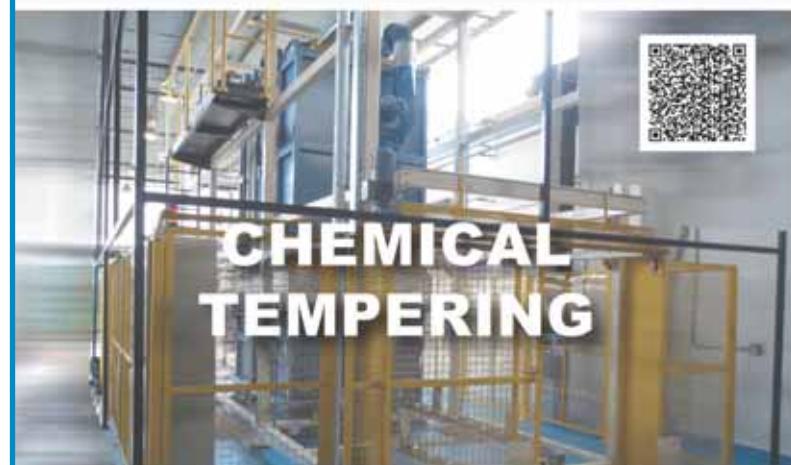
Opal - Borosilicate - Soda-lime glass



TABLEWARE Toughening Lines on spindles



RIM TEMPERING



CHEMICAL TEMPERING



- Annealing lehrs • Decorating Lehrs • Hot&Cold-end coating
- Mold pre-heating kilns • Stackers • Scraper conveyors
- Cullet crushers • Thermal shock test systems

The **Encirc** brand was created in 2014 following the appointment of a share receiver to the Quinn group of businesses in 2011. Within the re-brand, Encirc Managing Director Adrian Curry and his team of directors established the Encirc 360 sustainability model – whereby the company produces 2.7 billion bottles per year between Derrylin and Cheshire; fills bottles with up to 200 million litres of wine, beer or soft drink; and takes care of warehousing and logistics.

The 360 model is “the only one of its kind in the world” and it makes Encirc more sustainable, which is of great importance when attracting customers. Encirc made a pre-tax profit of GBP 33 million last year; a 17% increase from 2015. In order to sustain that performance, it “has to invest heavily to stay at the forefront in terms of technology, quality and service.”

ENCIRC

INVESTMENTS IN NEW FURNACES

Vidrala has agreed to invest GBP 50 million over the next four years in upgrading the plant and rebuilding the furnaces to accept natural gas which will be piped to Derrylin through the Gas to the West initiative.

“When Vidrala bought us they were very clear they wanted to keep the Encirc business as it was; same branding, same management team etc. Over the two-and-a-half years we have learned a lot from each other and during that time we’ve become very strong,” said Curry, adding: “Vidrala have a lot of investments across the group so we have to demonstrate that we are the best return on capital.”

Encirc was part of the initial Gas to the West discussions with the then Enterprise Minister Arlene Foster and the gas providers. The GBP 250 million project,

with a contribution of up to GBP 32 million from the Northern Ireland Executive, will see the construction of approximately 200km of pipeline linking Coalisland, Cookstown, Derrylin, Dungannon, Enniskillen, Magherafelt, Omagh and Strabane to the existing gas network. “Bringing gas in will help environmentally, it will help with our emissions and it also takes three large road tankers [of oil] off the road per day. But it means we will produce less glass because oil is more efficient at melting glass,” said Curry. “The complication is that we have to design our furnaces differently. We’ve worked very closely with Arlene Foster and her team a number of years ago and more recently with the gas providers to get to a point where everyone is certain this is going to happen

because it does influence heavily on the decisions we make,” he added. The first furnace rebuild will take place in 2019 and the second in 2021. Outlining the Encirc 360 sustainability model in more detail, Curry said: “We make bottles in Derrylin that are transported to the plant in Cheshire for filling. We ship wine, beer and soft drinks in bulk from all over the world for filling in Cheshire so we are not shipping glass from all over the world and we can maximise the weight on the container. As it comes in we fill it, we store 260,000 pallets on site and distribute directly to the retailers.

Customers include Baileys, Guinness, Jameson, Bushmills, Britvic, Heineken, C&C, McGuigan wines and Gallo wines (formerly known as Ernest and Julio Gallo).

SATINAL

NEW GENERATION OF GLASS FROSTING MACHINERY IN FRANCE

Satinal, a supplier of glass frosting chemicals and machinery, has delivered and installed a new generation frosting machine for cosmetics in France. High flexibility, high performance and low consumption characterize this new machine, but the most remarkable innovation is the automatic loading and unloading stations. Furthermore the automatic unloading station is directly linked to the dryer tunnel,

allowing frosted items (flacons, jars, small bottles) to come out completely dry and ready for other decoration processes or for being packed.

Leonardo Pirazzoli, general manager of Satinal, said, “Our main goal is to be always a reliable supplier, producing high quality machinery and giving the best support to our customers. All our frosting machines are designed for optimizing and minimizing consumption while always maintaining high quality performance. Our glass frosting machines are the ideal solution for all companies looking for efficiency, flexibility, durability and security.”

Luca Bresciani, owner of Satinal, said, “I’m proud of our work and I’m glad to know that this new generation machine will improve the production system.”

NIPPON ELECTRIC GLASS

FIBERGLASS BUSINESS ACQUIRED FROM PPG



Nippon Electric Glass

Nippon Electric Glass, based in Japan, has acquired facilities in Chester, South Carolina, and Lexington and Shelby, North Carolina; and research-and-development and administrative operations in Shelby and Harmar, Pennsylvania. The newly acquired fiberglass business employs more than 1,000 people and had sales of about 350 million USD in 2016. It supplies the

transportation, energy, infrastructure and consumer markets. Speaking on the sale, **PPG** said proceeds were approximately 541 million USD pre-tax. Last year the company sold its European fiberglass business, stakes in two Asian fiberglass joint ventures and its North American flat glass business. Its key focus is now on paints and industrial coatings.

BA VIDRO

BUYOUT BID FOR BULGARIA'S DRUJBA GLASSWORKS PUBLISHED

Bulgaria's financial regulator has cleared the publication of a buyout offer by *Bareck Overseas*, a wholly owned subsidiary of Portugal's **BA Vidro**, for the remaining 0.20% stake in *Drujba Glassworks*, which BA Vidro does not already own directly or indirectly.

The buyout bid for the 108,805 shares the company wants to acquire is priced at BGN 6.118 (USD 3.7/3.1 EUR) per share, according to a recent statement from the

Financial Supervision Commission.

In June, Bareck Overseas acquired 286,817 Drujba Glassworks shares for BGN 1.75 million in a buyout bid.

In October 2016, Greek glassmaker *Yioula* agreed to sell its Bulgarian unit Drujba Glassworks to BA Vidro as part of a wider divestment plan that also includes the group's glass container business in Romania.

Drujba Glassworks has two glass container plants - in Sofia and Plovdiv.

BA



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STACKERS



COLD-END COATING



Belt Cleaning Brush

- Belt and spindles tempering lines • Annealing lehrs • Chemical tempering ovens •
- Hot-end coating • Mold pre-heating kilns • Stackers + cross conveyors •
- Scraper conveyors • Cullet crushers • Thermal shock test systems

PSR PARKINSON-SPENCER REFRACTORIES

THREE NEW MEMBERS OF STAFF APPOINTED

2017 is proving to be an intense year at **PSR Parkinson-Spencer Refractories** with a series of new appointments being recently made. Tom Foster has been appointed Project Sales Manager. Tom joined PSR in 2010 from Sheffield Hallam University where he obtained a B.Eng in Mechanical Engineering. Since that time he has been working as a project engineer in its Technical Services division and is well known to its clients around the world

where he has supervised the installation of PSR forehearts, distributors and Cord Dispersal Systems.

Tom will continue to be involved with installations but is taking over additional responsibilities for project sales, preparation of quotations, pre-project specification and project management. His experience in the field makes him well qualified for this vital part of its engineered and refractory products supply. Alex Packer has joined

PSR as Sales Engineer. Alex has recently joined the sales team at PSR having graduated from Cardiff University with an MA in Translation Studies.

Fluent in French and German he will not only form an important part of its service to French and German speaking countries but will in due course also take on a wider role of sales support to many countries around the world.

Lizzy Healey has joined PSR as Sales Office

Assistant. Lizzy joined PSR earlier in 2017 having taken a year out since graduating from Newcastle University with a BA in French and Business Studies in 2015. For the past six months Lizzy has been handling the routine activities of its sales office and will already be known as the sales office contact to many customers for consumable refractory parts. Her command of the French language adds a further dimension to its support for French speaking countries.

CORNING AND STEVANATO GROUP

NEW SUPPLY AGREEMENT FOR CORNING VALOR GLASS

CORNING



Corning Incorporated and **Stevanato Group** have announced a new collaboration agreement focused on supplying Corning *Valor Glass* to the pharmaceutical industry.

Valor Glass is a high-quality glass container designed for the storage and delivery of injectable drugs. Drug formulations

and drug manufacturing processes have evolved significantly over the past century, requiring a stronger, chemically durable, 21st century packaging technology to better protect drug products, including life-saving medicines.

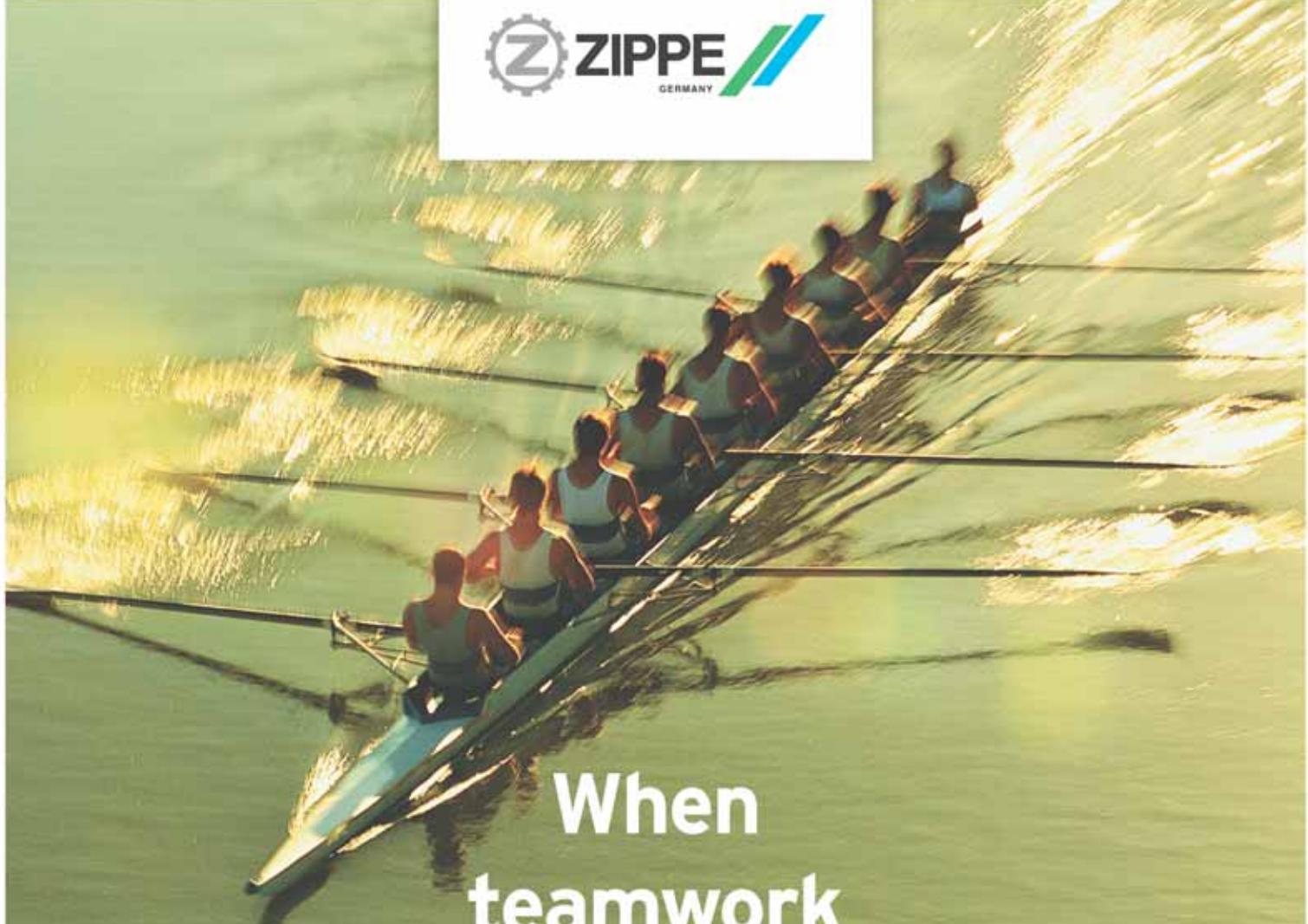
Valor Glass offers superior chemical durability, strength, and damage resistance, resulting in better protection for drug products, according to Corning. *Valor Glass* enables increased throughput and higher levels of quality assurance for pharmaceutical companies, and higher-

quality medicines for patients. Corning and Stevanato Group have been working together since 2011 to enable higher quality pharmaceutical containers. The latest agreement extends that relationship and combines Stevanato's state-of-the-art converting technology with *Valor Glass* to provide pharmaceutical customers with the highest quality pharmaceutical containers.

Franco Stevanato, chief executive officer of Stevanato Group, commented: "Corning and Stevanato

Group have a shared commitment to innovation and bringing the highest quality pharmaceutical containers to the industry. *Valor* is a Type I glass that is well aligned with that shared commitment and we are delighted to be working together on it."

"Stevanato Group is well respected in this industry because they ensure the highest standards of quality and innovation throughout their production process. We look forward to continuing this work with Stevanato to improve quality in the pharmaceutical glass packaging industry," said Ron Verkleeren, vice president and general manager, Corning Pharmaceutical Technologies.



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ENGINEERING AND DESIGN OFFICE ANYANG CELEBRATES 10TH ANNIVERSARY

In 2007 SORG opened a small design office in China. Therefore, the aptly named SORG Engineering and Design Office Anyang (normally shortened to SORG Anyang) celebrated its 10th anniversary in May this year.

What began as a small office with just 6 staff has become an important part of the worldwide SORG Group and now employs 14 specialists. A further expansion of the capacity is currently planned. The development of the Chinese operation is mirrored in the changes in the work carried out there over the past 10 years. Initially the office carried out preparation work for the main drawing office in Lohr,

Germany. They now work independently to produce complete designs and engineering for steelwork and plant components using AutoCAD Mechanical 2D and Inventor 3D to make the drawings.

The official function to celebrate the office's 10th anniversary took place in the Huan Shui Bay Hotel in Anyang on 23rd May 2017. Guests of honour at the celebration were members of the Anyang council and the local Hightech district who joined the staff of the SORG Anyang office and representatives from SORG Germany. After greeting the assembled guests in Chinese SORG Managing Director Alexander Sorg went on to thank the town

SORG

VALUE
BY
DESIGN

and district representatives for their assistance during the establishment of the company 10 years previously and especially for their continued support up to the present time. To mark the occasion Alexander Sorg presented a Certificate and a specially produced glass sculpture to Harald Zenker, Managing Director of SORG Anyang, and Achim Kreser, Engineering Manager in Anyang. Alexander Sorg presented a certificate and glass sculpture to SORG Anyang managers Harald Zenker and Achim Kreser

at the company's 10th anniversary celebration Alexander Sorg went on to emphasise the most important contribution of the employees to the company's success and thanked them for their commitment. Two members of the Anyang team, Gu Fan and Li Rui, have been with the company since the beginning, and the opportunity was also taken to celebrate their personal 10th anniversaries. Alexander Sorg and Harald Zenker offered their best wishes and presented the two with commemorative presents.

STIROM

H1 REPORTS INCREASE IN NET PROFIT

Romanian glassmaker **Stirom** has announced that its net profit increased 77% on the year in the first half of 2017 to RON 20.8 million (USD 5.3 million/EUR 4.5 million) after cost cuts and increased economic efficiency.

Stirom's first-half turnover decreased by an annual 7.5% to RON 128 million, Stirom said in a statement filed with the Bucharest Stock Exchange.

The company attributed the decline to the fact that it has not sold tableware glass products since July 2016. Another reason is that it has not concluded any contracts for glass packaging finished goods with a big client during the January-May period.

Stirom, however, added that it signed an important contract after this date.

Operating expenses decreased 14% on the year in the first half of 2017 to RON 105.5 million, as the

addition of technologically advanced equipment led to energy savings, Stirom said.

In October 2016, Stirom's Greek parent *Yioula* entered into an agreement to sell the company to Portuguese group *BA Vidro* for an undisclosed sum. *Yioula* sold all its glass container business, which also includes *Drujba Glassworks* in Bulgaria, but excludes the glass tableware and Ukrainian glass container businesses.

Stirom was founded in 1968 in Romania's capital Bucharest under the name of *Glass Articles Factory Bucharest*. In 1990, it became a joint stock company under the name of Stirom SA, and in 1995 became a majority private company. In early 2003, Stirom SA was taken over by *Yioula Glassworks*.

The Romanian company's net profit fell 26% to RON 16.3 million last year, as turnover fell 7% to 251 million lei, according to data posted on the finance ministry website.

BA Vidro was founded in 1912 and employs 2,400 in eight factories in Spain, Poland and Germany, where it makes 6 billion glass containers per year.

AGR INTERNATIONAL

NEW TESTING LABORATORY IN DELFT, NETHERLANDS

Agr International has announced plans to establish a new testing laboratory in Delft, Netherlands. This lab will be part of Agr's *American Glass Research* division. The laboratory is slated to open and be fully operational in October 2017.

The creation of this facility is part of Agr International's global expansion and commitment to its customers, and particularly intended to provide European glass manufacturers and fillers with better access to American Glass Research services.

The new location will offer flexibility and reduced turnaround times on projects, lower shipping cost with relation to samples and the availability of American Glass Research expertise within the local time zones. The new lab will provide many of the same services currently offered by American Glass Research in their Butler, PA, US facility that are geared toward solving breakage issues, evaluating container designs and improving both the manufacturing and filling processes. Some of the services to be available initially at the Delft site include:

- Performance testing of glass packaging
- Proof-of-design testing
- Fracture diagnosis
- Dimensional evaluation
- Analysis of label, decoration and closure issues
- Evaluation of coating performance and analysis of coating issues
- Audit of glass plant operations
- Filling line audits
- Glass technical consultancy

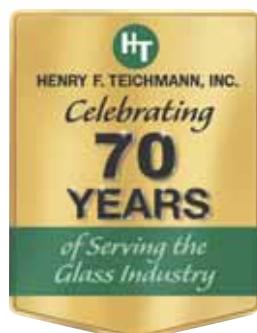
In addition to providing European glass manufacturers and fillers with a range of testing and evaluation services, the new office will also offer a complete schedule of training seminars taught by the American Glass Research staff.

The new Delft facility will encompass 5,500 square feet of laboratory and office space. Nearly 70% of the facility will be dedicated to the fracture analysis, measurement and testing laboratory. The lab will house new, modern testing equipment, microscopes and measurement equipment.

The Delft testing laboratory will be headed by Peter de Haan, AGR Senior Scientist, and a Dutch national, who is returning to the Netherlands following several years at the American Glass Research Butler, PA, US facility. De Haan and his team will have full access to American Glass Research resources worldwide.



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THIRD FURNACE COMMISSIONED AT MERSIN PLANT

Şişecam Glass Packaging, a member of the Şişecam Group and the world's fifth largest glass packaging producer with a 2.3 million tons/year output and production facilities in four countries, has commissioned a third furnace at its Mersin plant. The furnace, which has been modernized using state-of-the-art technology, offers a 90,000 tons/year capacity. Şişecam Glass Packaging operates three plants in Bursa, Eskişehir and Mersin, and the modernization of the third furnace, which cost around TL 120 million, will push the company's annual production capacity in Turkey above the 1-million-ton mark. Commenting on the furnace investment, Şişecam Group Deputy Chairman and CEO Prof.

Ahmet Kirman pointed out that the group ranked third globally in glass home accessories, and fifth globally in glass packaging and flat glass. Kirman added: "We are also the world leader in chromium chemicals and one of the ten largest soda producers of the world. Engaged in production activities in 13 countries around the world, our group reinforces its capacity and technology with innovation, creativity, expertise and highly qualified human resources, and faces the future with confidence thanks to a product and service range that meets the continuously evolving needs of the market."

Stating that the glass packaging plant in Mersin was established in 1969, Kirman said: "Throughout its 81-year history, our group has always

invested its earnings in the country's future, and has now become a global player in its field. Our new state-of-the-art furnace in city of Mersin, where we have been active for almost fifty years, is yet another example of our contribution to the national economy. As always, our group remains committed to sustainable growth". Kirman continued saying that Şişecam Glass Packaging's strategy is to achieve the highest quality standards: "Şişecam Glass Packaging continuously modernizes its existing facilities in line with advances in technology. The newly commissioned furnace will both contribute to Turkish economy and allow us to achieve the state of the art at our Mersin plant. This furnace has been equipped with Industry

4.0 technologies. Şişecam Glass Packaging now has three production lines that can produce anything from jars to bottles in various colours."

Emphasizing that Şişecam Glass Packaging was one of the world's largest glass packaging producers, Kirman said: "Exporting 125,000 tons in 2016, Şişecam Glass Packaging has broken both the industry's record and its own record. The Mersin plant is of critical importance in terms of exports, thanks to its proximity to the port. This new furnace investment has further added to this position.

Şişecam Glass Packaging targets to continue investment projects that will allow it to sustainably increase its export volume in the coming years.

STEKLARNA HRASTNIK

PETER CAS WELCOMED AS GENERAL DIRECTOR

Peter Cas became General Director of **Steklarna Hrastnik** on 1 August 2017, following a three-month stint as Deputy General Director. He decided to join Steklarna Hrastnik due to its vision and strategic focus, which places employees in the centre. With the aim of consolidating the leading position of Steklarna Hrastnik in the top-quality niche segment, he will manage the company by pursuing operational excellence, flexibility, and customer-orientation and will continue fostering good relationships with employees and a responsible attitude to the environment.

After graduating and obtaining his master's degree from the Faculty of Mechanical Engineering of the

University of Ljubljana, Cas, MSc., upgraded and extended his knowledge at various programmes at IEDC – Bled School of Management. He started his career at Gorenje, managing various departments. Along with occupying the position of Chief Technology Officer at Gorenje Valjevo d.o.o. in Serbia, he co-created a plant with 600 employees, which was the result of a successfully completed green field project. He continued his career at the parent company Gorenje d.d. Slovenia. After leaving Gorenje, he joined the SIJ Group as CEO between 2014 and 2016, managing the companies No?i Ravne, Serpa, and Sistemska Tehnika, and in 2016 oversaw the merger of these companies into a joint entity SIJ Ravne Systems. He transformed these three from very traditional companies into a modern, socially-responsible firm with excellent bases for extensive organic and acquisition growth. Between September 2016 and March 2017 he was Managing Director of SIJ Acroni d.o.o.

INNOVATIVE BOTTLE FOR PRECISE POURING



O-I has designed an innovative bottle that allows a more precise pouring of beer. This is particularly important for premium products in the area of craft and gourmet beers. The unusual feature of the bottle is the asymmetrically shaped neck. On one side, the slender neck has a diagonal connection between bottle body and bottle opening. Depending

on the rotation and angle of the bottle, the pourer can influence the way the beer runs into the glass. This innovation was developed by O-I and is now used by breweries in South America. Two beer brands from Paraná in Brazil, "Von Borstel" from Londrina and "Bodebrown" from Curitiba, offer their customers a more precise

O-I

pouring and thus a special serving experience with this bottle. In Europe, O-I is exploring the market potential and investigating whether the European brewers might be interested in using MyPour to create a point of difference for their own brands.

"This feature is especially interesting for microbreweries and niche suppliers. We know that craft and gourmet beer customers have a special relation with the beverage and what we proposed was to expand even further this experience, recreating the act of serving, through the MyPour bottle

shape," explains Steffi Lenz, Innovation Project Manager at O-I.

The breweries which already use MyPour are convinced of the added value. For Marcus von Bortsel, owner of Von Bortstel brewery, the new container is a competitive differentiator because it highlights the product in retail and enhances the customer relationship with the brand. "We strongly believe in packaging power to show customers the product profile, and Artesanal 500 reinforces our dashing and innovative character," says Samuel Cavalcanti, founder of the Bodebrown brand.



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total support with advanced tools – ensuring uninterrupted operations

When considering the continuous, 24/7 operations of a cold-end line, we must always take into consideration the person in charge of the line and with the

highest responsibility – the Line Chief. In this article, Zecchetti's Head of the Electronic Engineering Department, Angelo Olivieri, speaks about how the company works side-by-side with these Chiefs to assist them in carrying out their duties every step of the way.

Managing a cold end line is the highest responsibility of a Line Chief. His experience and knowledge of article dynamics, different in the various points of the line, is paramount.

Zecchetti offers the most advanced tools to support this activity, so as to never leave alone those who have the task of utilizing these lines, aware that their uninterrupted operation – around the clock – is vital.

AN INSIGHT FROM ANGELO OLIVIERI, HEAD OF THE AUTOMATION ENGINEERING DEPARTMENT

Angelo Olivieri, Head of



Angelo Olivieri

the Automation Engineering Department at Zecchetti since 1998, explains how some of the most frequent operations have been simplified and accelerated thanks to Zecchetti supervision software.

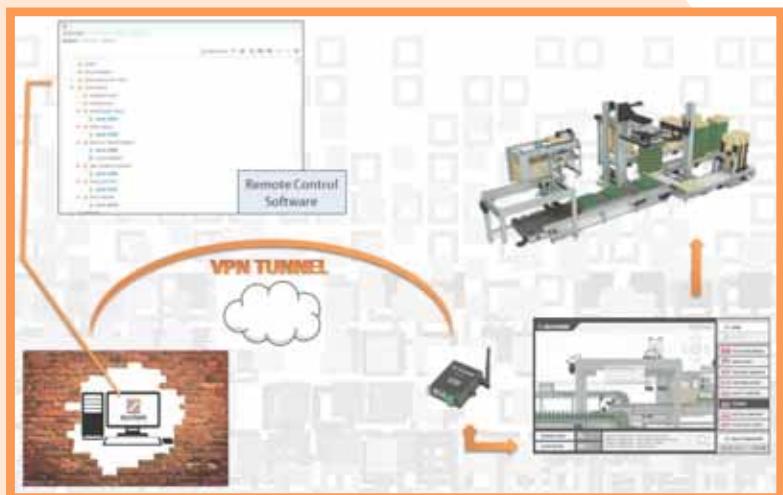
Motor speed – individually adjustable

"Each motor speed is individually adjustable, thus allowing

for the fine tuning of the different line zones. The Zecchetti HMI "ZSA" shows the speed (metres/minute) and the current absorption (in milli-amperes) of each motor. The MOBILE ZSA makes this operation easier and quicker since it allows to modify the parameters at whichever zone and visually observe, in real time, the line behaviour.

Format changeover times

Format changeover times have also been considerably reduced thanks to the management of the so-called recipes which are real ID electronic cards containing all the parameters relevant to a given job.





Recipes can be set up offline and subsequently uploaded. They can be transferred from the PC to the PLC and vice versa, recalled at any time, modified at any time, cancelled if no more used, etc.

Zecchetti ZSA Supervision Software

The Zecchetti ZSA Supervision Software is fully developed in-house which means it can be customized and constantly improved directly by the Zecchetti Automation Department."

"Another important and useful feature of ZSA Supervision Software says Olivieri, "is the alarm management. In fact, active alarms are signalled and the relevant area is visualized on the Touch Screen PC together with the on-line helps which allow to quickly solve and reset the anomaly.

History of the alarms is stored thus giving the possibility of examining the statistics for any period."

A NEW, ADVANCED RELEASE IS ON ITS WAY

Olivieri has anticipated us that the development of a new, advanced release of the ZSA Supervision Software is in pro-

...the Line Chief or staff performing maintenance operations are never left alone ...

gress and will be presented soon.

Most of the functions are being improved and new APPs will be integrated to make this tool more and more helpful and user friendly.

However, despite such clever means supporting the Line Chief, there might be situations where the on-line help, available on the Supervision, is not sufficient to solve a possible problem.

"True, there are situations that would normally require the intervention of a specialized Zecchetti technician because they do not strictly relate to the production but rather to the setting of the equipment.

Prompt support: remote control software

Even in those cases, Zecchetti offers its prompt support to minimize malfunctions and possible stops. In those cases,

remote control software, developed by Zecchetti Automation Department, is activated. This is a program that, through a VPN tunnel, immediately connects our electronic engineers in Zecchetti with the PLC of the plant, wherever it is.

Our technicians can thus check the on-site situation, analyze it and work in real time to solve the problem or in any case to put actions in place to solve it as soon as possible.

We asked Olivieri whether the described software is the only assistance given to on-site operators.

"Actually no. Another important instrument that can be put in place is a Video Camera HMI integrated system that allows the After Sales Service at Zecchetti to watch in real time the equipment operation."

"In practice, the line chief or staff performing maintenance operations are never left alone, they can be assisted in carrying out their duties at any time.

A perfect example of the current trend of automation which goes by the name of Industry 4.0" ■



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IRIS

2018 Evolution Software release unveiled at Glassman Europe



RIS Inspection machines unveiled its latest software release at this September's Glassman Europe exhibition in Lyon. Visitors to the event were able to assess the extended features of the 2018 Evolution Software as part of this world premiere.

With headquarters on the outskirts of Lyon, IRIS Inspection machines is among the international glass container industry's most innovative suppliers of cold-end inspection technology. The company specialises in the development of camera-based, non-contact inspection solutions, offering a range of equipment to satisfy the precise requirements of the world's leading glass packaging manufacturers.

Every year, IRIS Inspection machines reinvests more than 15 per cent of the company's turnover in research and development. The team is constantly working on future versions of software for tomorrow's Evolution machines, with a challenge to increase the precision of hollow glass inspection and the detection of defects, in order to maximize the productivity of the glass container manufacturing process.

IRIS specializes in the development of camera-based, non-contact inspection solutions, offering a

During the recent edition of Glassman, which took place in Lyon, France, 6-7 September, Glass Machinery Plants & Accessories spoke to Jean-Luc Logel, President of IRIS, who gave us his views on how the company is developing and, even more important, customizing its machines to its clients' needs with regards to production inspection.

range of equipment to satisfy the precise requirements of the world's leading glass packaging manufacturers. Its strategy is based on partnerships developed with key customers throughout the world. The technology used in its glass inspection solutions complies with CE and UL standards, with the IRIS organization conforming to ISO 9001 norms.

EXTENDED FEATURES

The company's latest innovation typifies its long-term commitment, involving the release of its next generation software, which will be adopted on all new and existing IRIS inspection modules in the coming months. A series of extended features have been incorporated within the 2018 Evolution Software release for use with the following equipment:

- Evolution12 sidewall and sidewall stress inspection machine.
- Evolution5 base, finish and base stress inspection machine with mould number reader.

- Evolution1 standalone finish inspection machine.
- Evolution ultimate transparent defects camera inspection machine, dedicated to perfume and cosmetic containers.
- Evolution dim online measuring inspection machine.

Among its many extended features, the 2018 Evolution Software incorporates new defect algorithms, with self-adjusted parameters and limited user parameters. The development team has also introduced new defect classification methods, showing the difference between blisters, stones, grease marks, black spots and glass repartition, etc.

There is no limitation on inspection, with the generalization of all detection tools, body finish and base, for non-round ware, specific shapes and engraved articles. New 3D geometrical inspection tools have also been added, so that the Evolution12 machine always gives the same result, irrespective of article orientation.



SOFTWARE

Interview with Mr. Logel

What can you tell us about the company developments and expansion going on at Iris?

As you know, the hollowware glass industry is facing quite a few challenges, and glassmakers need to have high productivity and to ensure quality of course. And high productivity means being able to have high quality products at high speed. And when we speak about high speed production there are always containers with defects so the accuracy of the glass inspection equipment is really a key point in this process because obviously if your machine is not accurate enough you will risk rejecting a lot of good wares. This means that your productivity is going to drop.

Here at Iris we are really working on this because one of the drawbacks of a camera machine is that they were not accurate enough. And to be able to reject the bad ware you were obliged to accept the rejection of some good wares too. So we have been working a lot on the optics of our machines and the algorithms that are involved to be able to increase the precision of rejection and to be able to identify the difference between good and bad ware.

Another challenge is that what is considered good ware is not the same for different countries. This means that instead of good ware I would not consider good ware but sellable ware. This means products that the final end customers can accept.

Are we speaking about tolerances then? And does this mean that your machines need to have different tolerance ranges for different areas of the world?

Exactly. Different tolerances. And in a South American plant, for instance, they have quality A, and quality B and these different levels of quality would be for different customers. For example, international brands would get quality A – top quality, while a smaller and local customer would get (and would request) lower quality at lower price.

This is something that everybody involved in inspection tries to do but it is not so easy.

Here at Iris, we have worked a lot on sophisticated algorithms; if you have an engraving on a bottle for example, our machines can identify the difference between the engraving and a fault. This is really difficult because engraving will appear as a shadow zone, and the fault in the middle will be a black spot inside a shadow zone. This means that you really have to work a lot on the image to identify the difference between a stone, for example, and an engraving. The machines can identify the engraving and then check for faults inside the shadow zone of the engraving.

Speaking about our algorithms, at IRIS there is a dedicated team of people constantly working on these algorithm of image processing each and every day to increase the ability to identify and differentiate between what is acceptable and what is not acceptable.

It would be easy if there was a model for good ware but in the glass industry two good bottles can be very different. They have different features and characteristics such as the reflection of light and light transmission, and glass distribution. These two features mean that the image will be different but they are both good and sellable wares.

Does it also depend on the product they will be used for?

This is part of the work we carry out in glass plants, and it does not really have anything to do with the product that will go into the bottle or container.

But sometimes there are defects in containers that are very difficult to see when the container is empty, such as a light tear on a container for mayonnaise or mustard, but when the

container is filled with the product you will start to see it. And that's very bad because it damages the image of products.

What about lightweight containers? Does that change anything for your machines?

In lightweight bottles, manufactured using Narrow Neck Press & Blow, glass distribution will be almost perfect and there are fewer shadow areas in the image, but there are new faults such as unfilled finished due to the lack of glass in the gob or on the other hand, if you have too much glass you will see some wire edge or overpressed in the finish.



Does this mean that you at Iris have to adapt your machines to these new defects and faults?

Yes, of course. Right now we have just finished working on a new inspection option for the finish available on Evolution 5.

What about the other machines of the Evolution family? Evolution 16, for example?

Evolution 16 is for sidewall inspection, 5 is base finish and stress, while Ultimate is able to detect a very slight faults on high value containers like those used in the perfume sector, where transparency is fundamental.

This is why the machine is called Ultimate – as it's for a very specific and demanding market.

Let's talk about your installations. I know that one of your recent important and big number of installations was in Latin America ...

In Mexico in fact. We have a lot of machines installed in Mexico – about 50, but we have more than 1,000 machines installed worldwide. The exact number is 1,200.

On average, how many of your machines are normally installed in a glassworks and how many do they actually need?

They should have two machines on each line. The number depends on how many lines they have, of course, but we are nowadays speaking of about four to six lines per furnace. And our machines are able to inspect at high speed – up to 600 bpm.

Think of how glass is used and how much glass we need every day. Water, wine, beer, for example, all taste better in glass according to consumers. It enhances the appearance of the products it contains and it does not interfere in any way with the product it contains, and it can be recycled endlessly.

The market is now starting to pick up and we are seeing more sales in markets for containers for food stuffs, but also for high-value containers too.

Of course we need to speak about Industry 4.0, and our machines are camera-based, with a computer system, and most of the innovations on our machines are those regarding software. When you get a new function you have the optics and other features but there is always the software behind these features.

Right now our machines are able to communicate using Wi-Fi and the Internet, and this means that based on very strong software we are able to integrate our machines in 4.0 plants, to send and receive information, to be in contact remotely – all important for the future of our industry.



NEW FINISH INSPECTION STATION

A new widemouth finish station uses a latest generation light source. There are two main benefits of this new inspection station. Being universal, it does not need to be adjusted independently for every different article, because the same setting works for all articles. In addition, it is extremely stable, so that variations of article position on the belts of the Evolution5 machine do not affect the image to inspect.

LONG-TERM PARTNERSHIPS

A WISETEC Group subsidi-

ary, IRIS Inspection machines has created meaningful, long-term partnerships with industrial customers in the space of less than three decades in the areas of electronics and software for machine automation. In addition, exceptional knowhow has been realized in the most innovative vision technologies.

The IRIS ambition is to be recognised as the most trusted supplier of inspection systems for the international glass packaging industry. As a leader in technology, the company anticipates customer needs and provides long-term and cost-efficient

support for its solutions in the field of glass quality control. This partnership with customers is the key to sustainable development.

The 2018 Evolution Software release was unveiled at Glassman Europe 2017 exhibition in Lyon, France on 6-7 September. Attendees were invited to visit IRIS Inspection machines to discover its exciting extended features. ■

IRIS Inspection machines

IRIS INSPECTION MACHINES

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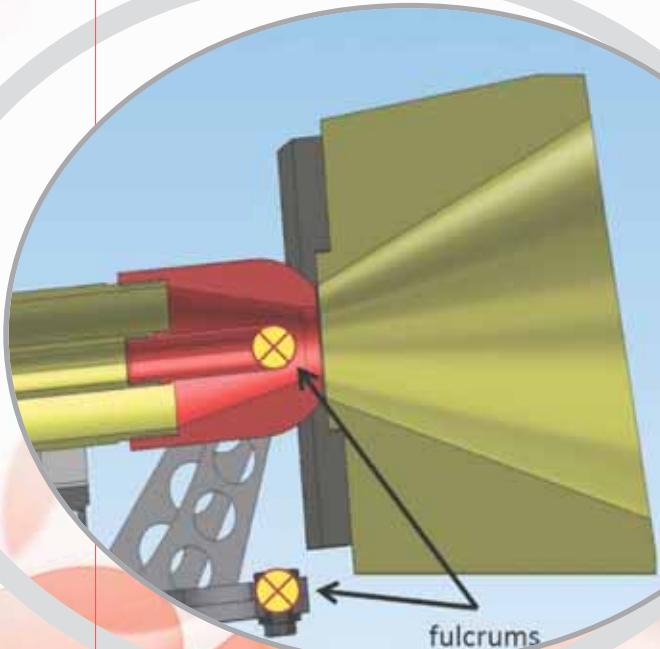
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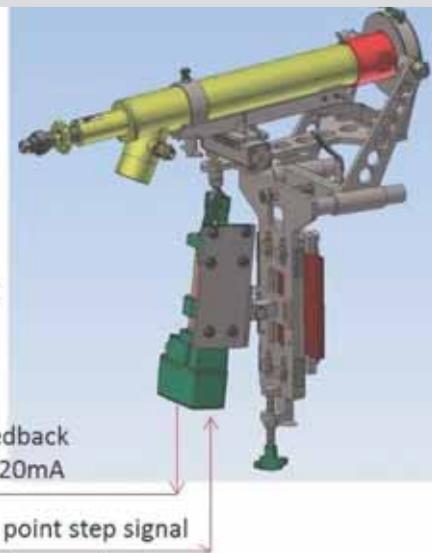
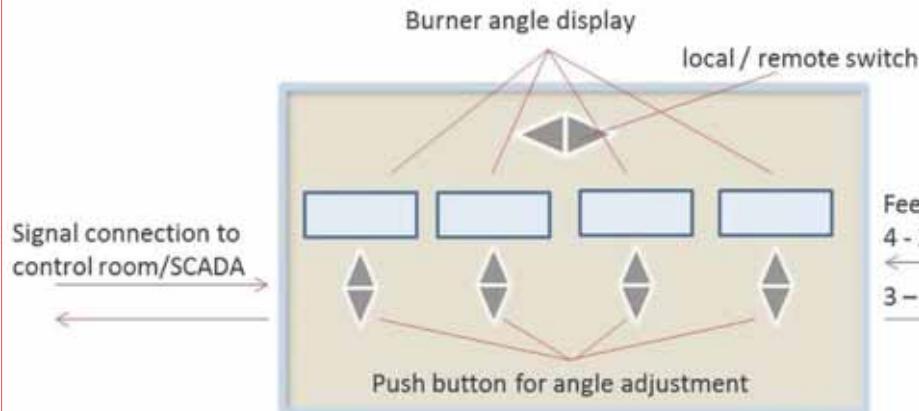
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with new burner holder with
integrated angle adjustment

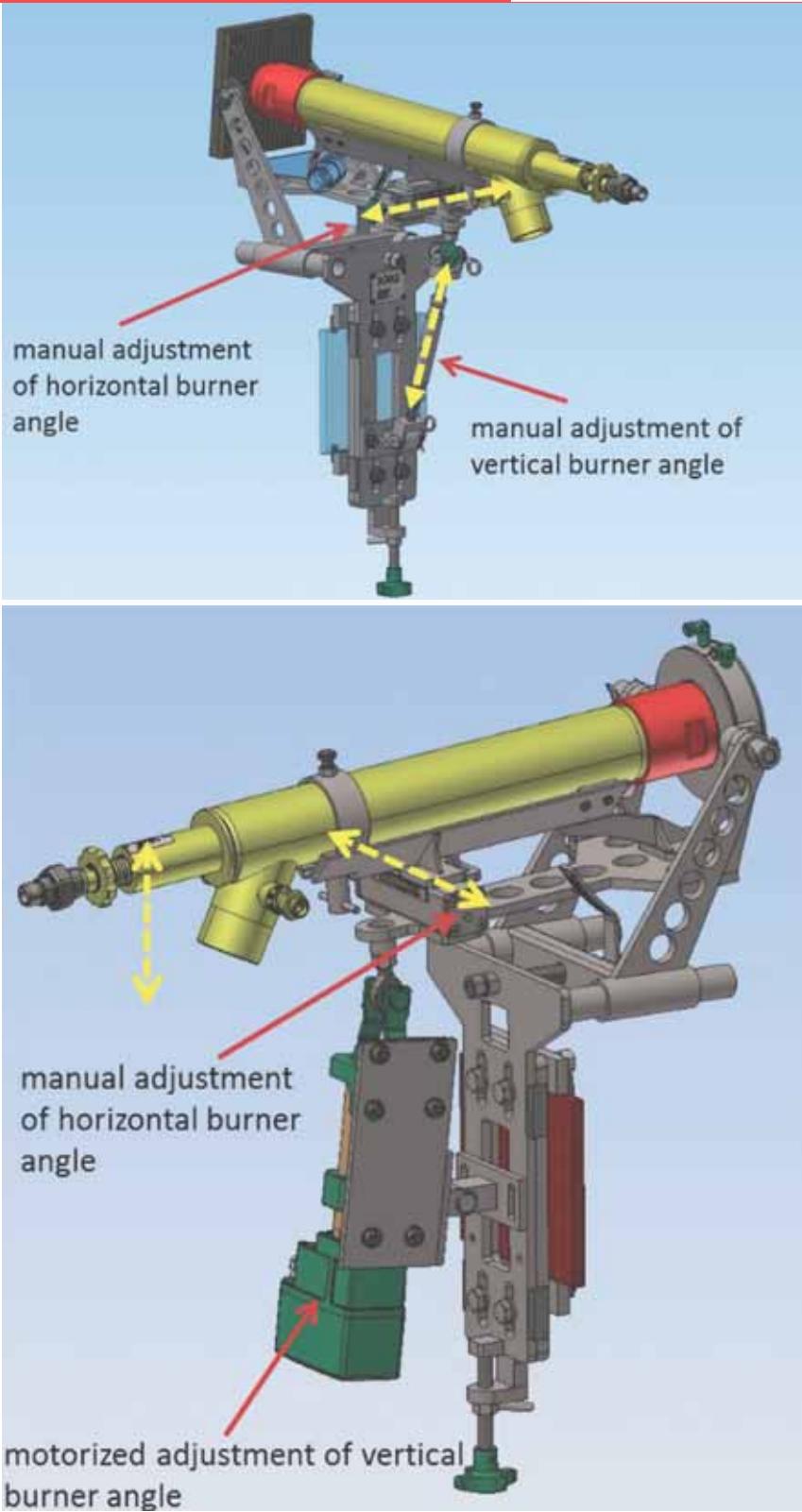


Furnace operations are ever more restricted as far as emissions are concerned, regarding in particular burner settings, which are often complicated and time-taking to adjust. In this article, SORG introduces its new burner holder with integrated angle adjustment to simplify burner set up.

Control panel for local burner angle adjustment



HOT-END EQUIPMENT



EVER-INCREASING RESTRICTIONS ON FURNACE EMISSIONS

Burner holders are an important component of fossil fuel furnaces. All burner and heating

system manufacturers and furnace suppliers design their own burner holders. The same weak points are found in most burner holder designs. Tools and a spirit level are required for the adjust-

ment of the horizontal and vertical burner angles.

Both angle adjustments have an influence on each other, as they are not separated mechanically and the fulcrum of the burner is not located at the burner nozzle. Adjustment of one angle influences the other so that the burner axis moves away from the burner block axis. These two axes must then be realigned.

A cast iron sealing plate is mounted in front of the burner block to protect the block. There is a risk that this plate becomes displaced when the burner angle is adjusted.

The ever-increasing restrictions on furnace emissions require tightly controlled furnace operation. This applies in particular to the burner settings, as these have a strong influence on emissions. Consequently, continuous monitoring of the settings is necessary coupled with adjustment of the burner angle during changes to operating conditions.

BURNER HOLDER WITH INTEGRATED ANGLE ADJUSTMENT

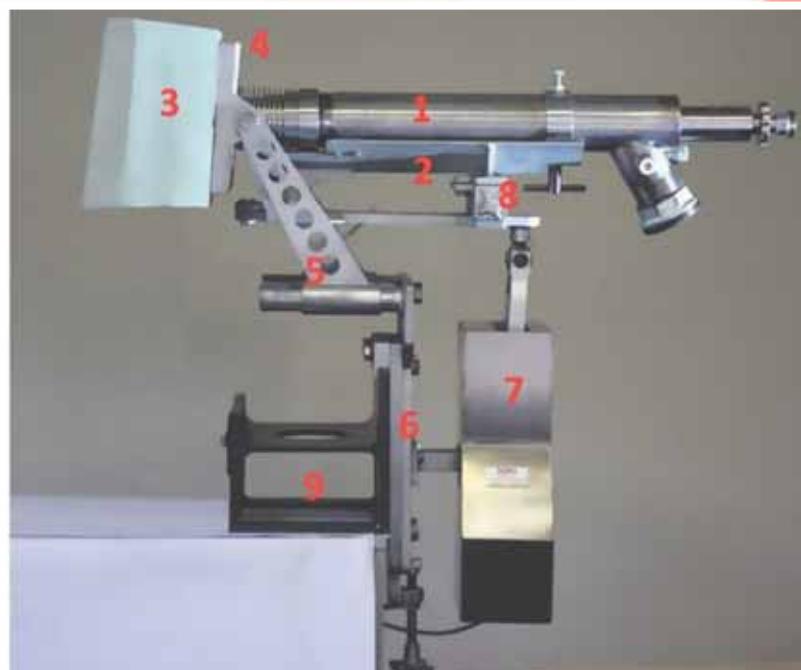
SORG has now developed a new burner holder with integrated angle adjustment to simplify burner set up. These type WSH and WSA holders are now available. These burner holders eliminate the disadvantages of all previous burner holders described above.

The decisive advantage of this burner holder is the location of the burner fulcrum directly in the nozzle head. This means that the exit point remains stationary when the burner is adjusted vertically or horizontally, and no realignment is required.

No tools or measuring devices required

Moreover, no tools or measuring devices are required for setting or checking the burner

- 1** Burner
- 2** Burner seat
- 3** Burner block
- 4** Burner sealing plate
- 5** Sealing plate support
- 6** Burner holder attachment to furnace steelwork
- 7** Vertical adjustment
- 8** Horizontal adjustment
- 9** Furnace steelwork



adjustment. There are manual spindles for adjusting the burner angles and the set values can be read directly from the scales marked on the burner holder. The sealing plate is fixed to the burner holder, so no additional fastening of the plate is necessary and the risk of displacement during burner adjustment is eliminated. Attachment of the holder to the existing furnace steel structure is straightforward.

TWO DIFFERENT VERSIONS – WSH AND WSA

Two versions of the burner holder are available:

1. Type WSH with manual adjustment of both angles. This is the basic version. The angles set can be read on the scales.
2. Type WSA with manual adjustment of the horizontal angle (as with the WSH model), but with motorized adjustment of the vertical angle by means of an actuator.

The actuator provides an output signal that can be connected to the SCADA system so that the

set values can be displayed on the SCADA monitor. It is also possible to use the SCADA system to change the vertical adjustment from the control room. For the first time this enables the operator to adjust the burner whilst observing the influence on the flame pattern monitored by the furnace camera.

The activator moves at 1mm/s, which allows fine adjustment of the burner angle. In practical terms this means that the actuator adjusts the burner angle by 0.1° in two seconds. The actuator is suitable for temperatures up to 80°C, and additional cooling from the furnace cooling air system can be added if required.

Holder type WSH can be upgraded easily to type WSA at any time.

For type WSA there is also the option of installing a local operating unit at the burners. Burner adjustment can then also be monitored directly in situ, in addition to adjustments carried out from the control room. The set angles are shown locally on a display and also on the SCADA system.

Compatible with SORG burners and those from other manufacturers

The new type WSH and WSA burner holders are compatible with the SORG burners NL4, NL5, SDB231 2F and SDB221 2F. In principle they are also suitable for use with other SORG burners or even burners from different manufacturers. However, in each case the possibility must be checked by SORG engineers. ■

SORG | VALUE BY DESIGN

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Thanks to a recent important investment, VOA, specialized in the development and production of high-end bottles, is continuing to gain flexibility and strengthen its positioning on the small and medium-run high-end markets.



Gauging line with Marposs VisiQuick™ installed at VOA

The company, founded in 1896, currently employs over 300 people, and with two furnaces and six manufacturing lines produces 800,000 bottles/day.

VOA is specialized in the development and production of high-end bottles mainly for wine, spirits and soft drinks,

even in small batches, thanks to the flexibility of its manufacturing process.

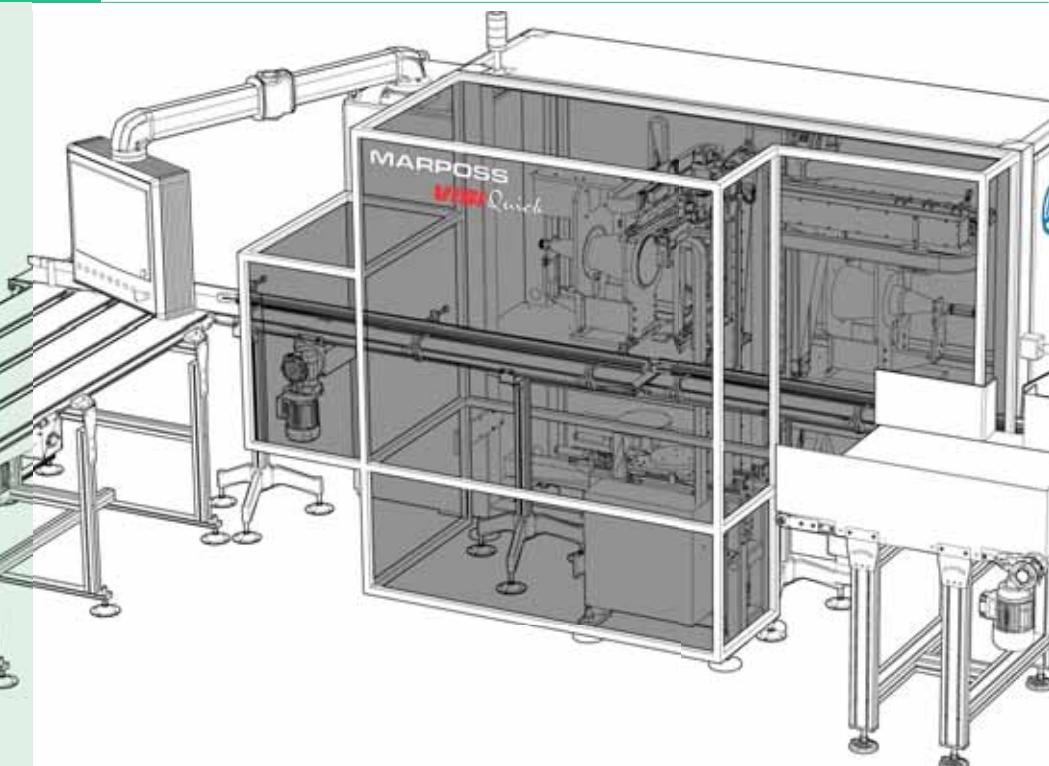
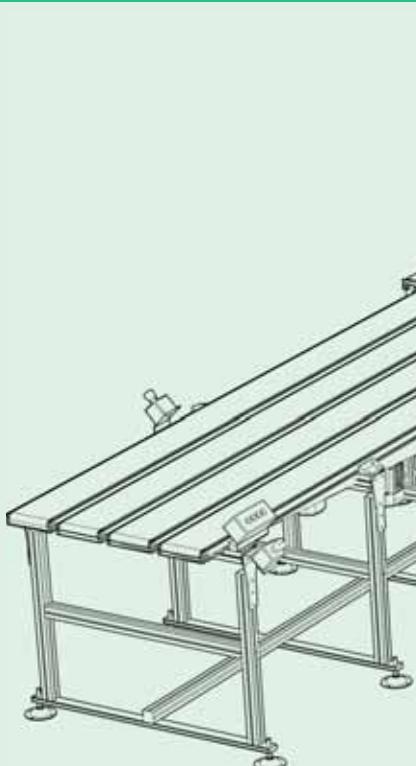
Recently, VOA invested EUR 24 million to modernize half of its production equipment.

Furnace n° 1, dedicated to very high quality extra-flint and flint glass production, has been completely rebuilt together with

all its three production lines to gain flexibility and strengthen its positioning on the small and medium-run high-end markets.

This important investment also involves an innovative inspection line, including a Marposs VisiQuick™ flexible gauging machine for measuring dimensional and geometric characteris-

COMPANY UPDATE



tics of glass containers, on sample basis.

The inspection line, installed in the cold end, near the glass containers production line, includes products from three different companies: Marposs, Somex and Vertech.

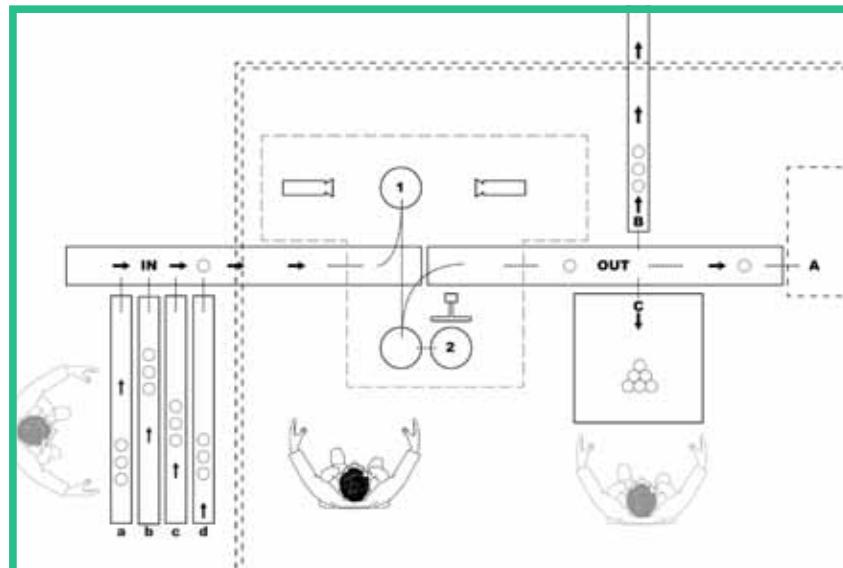
The inspection line is made up of:

- Marposs VisiQuick™, flexible gauging machine with special conveying system;
- Vertech SIL™, production monitoring software;
- Somex Roburst™, automatic glass bottle pressure tester.

The inspection line includes four input conveyors (a, b, c, d), to house four sets of different articles. Glass containers to be measured are manually loaded on the conveyors.

Containers present on the conveyors are delivered, one set at a time, in a sequence programmed on Vertech SIL™, to a single input conveyor (IN) entering the VisiQuick™ machine.

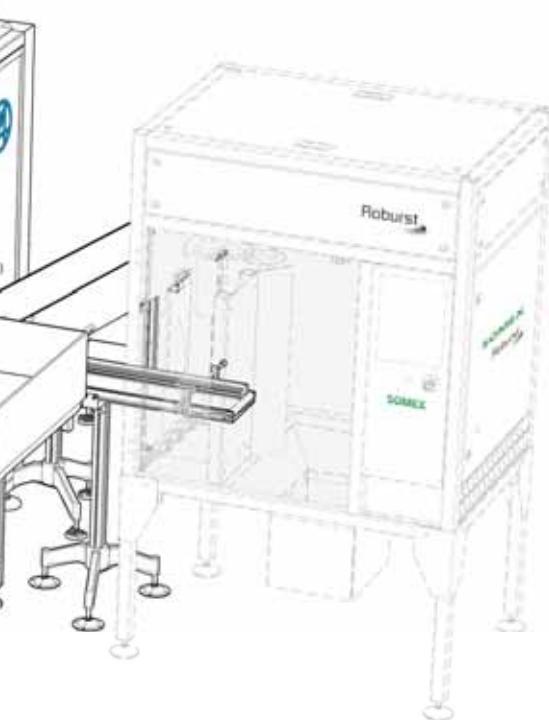
A pick & place device brings the containers from the input con-



veyor (IN) inside the VisiQuick™ machine where they are measured with cameras (1), as far as external parameter are concerned (height, verticality, parallelism, diameters on body neck and finish, long/short side and diagonals on non-round containers, angles, radii and many others), and subsequently with a bore gauge (2), measuring mouth internal diameter, at different depths, and internal profile.

The internal profile measurement is very accurate thanks to the integration of a linear encoder, fully synchronized with the bore gauge readings. This feature is based on Marposs proprietary technology (DigiCrown™ network system).

After being measured on the VisiQuick™ machine, containers are delivered to a single output conveyor (OUT) that can convey them alternatively to the Somex



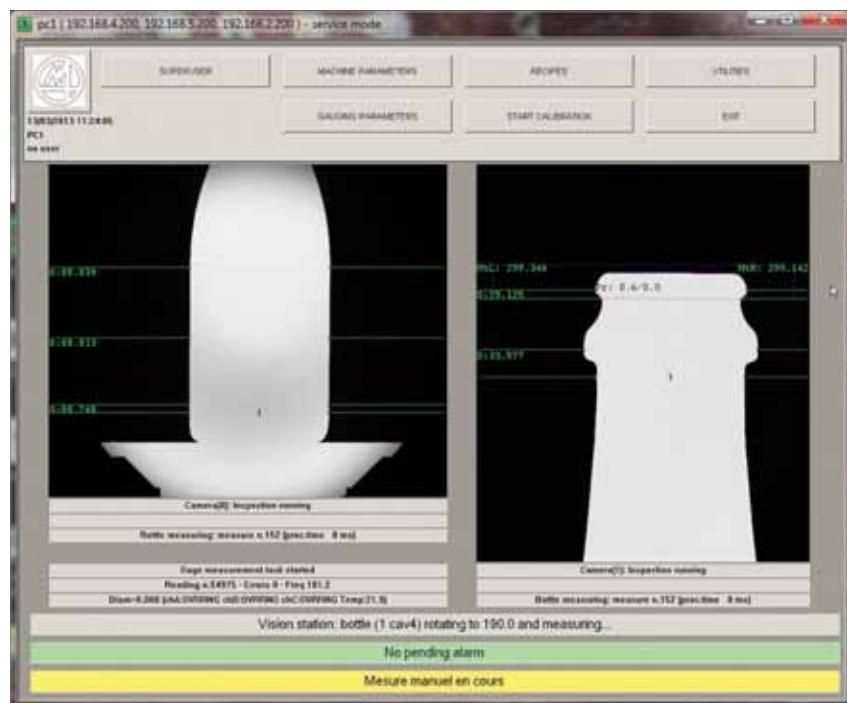
Roburst™ machine (A) for pressure test, to an accumulation table (C), or to a scrap chute (B).

The path the container will follow after the inspection on the VisiQuick™ machine is programmed by the Vertechn SIL™.

The advantage of this solution is that the inspection line does not need to be supervised all the time. After placing four sets of containers on the four conveyors, the operator can carry out other activities while the containers are being measured.

The capability to measure four different articles, in sequence, without any human intervention, is possible because of the VisiQuick™ machine's total flexibility. In fact, no retooling at all is required when the container to be measured changes, even though dimensions and shapes are very different. This feature is not present in any other glass container gauging machine available on the market.

Thanks to the communication protocol developed together by Marposs and Vertechn, recipes programmed on the SIL™ are



sent to the VisiQuick™ machine. This means that the operator does not need to programme the recipes relevant to the articles to be measured twice, but just once on either the SIL™ or the VisiQuick™.

The inspection line was manufactured and installed in record time, just after three and a half months from the order, thanks to the close cooperation among all the parties involved in this project.

Marposs VisiQuick™ machine has a modular structure and can include additional measuring stations. For example stations to measure weight, push-up or glass thickness.

Marposs is a global leader in precision equipment for measurement and quality control in the production environment. The company was founded in 1952 and, since then, has experienced continuous growth. Marposs is present in 34 countries, almost everywhere with its own organization, and currently employs 3,100 people. Production is based at its headquarters in Bentivoglio,

Italy, as well as in other countries such as China, Germany, Japan, Korea, the US.

VisiQuick™ machines – often more than one at the same customer – are installed at the plants of main glass containers manufacturers such as Bormioli Luigi, Saverglass, Shandong Huapeng, Verallia, VOA, Zignago Vetro. ■



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ANNIVERSARY



celebrating 40 years of glass

FEVE - the European Container Glass Federation - is the voice of the glass container industry in Europe. Founded in 1977, the association has become instrumental in promoting glass as an ideal packaging material for its unique environmental, economic and social assets for consumers, stakeholders and policy makers.



FEVE is the Federation of European manufacturers of glass containers and machine-made glass tableware. Its members produce over 20 million tonnes of glass per year. The association has some 60 corporate members belonging to

approximately 20 independent corporate groups. Manufacturing plants are located across 23 European States and include

global blue chip and major companies working for the world's biggest consumer brands.

GLASS, A SUSTAINABLE LIFESTYLE CHOICE – FOR OUR FUTURE

Living sustainably is not just about saving the planet; it is also about looking after your health. Choosing glass is one way to do both. Growing consumer preference for healthy living, combined with concern for the environment, is driving increased trust in glass as a packaging choice, with 85 per cent of Europeans willing to recommend glass to friends and family.

Glass packaging guarantees long-time preservation of taste and flavour, safe delivery and attractive presentation of a vast array of consumer products, supplied to European and global markets. Whether used for drinks, food, cosmetics, perfumes or pharmaceuticals, glass packaging plays a vital role in supporting European trade and commerce. Glass is 100 per

cent and endlessly recyclable in a closed loop, it is inert and it preserves the nutritional qualities and original taste of the products it contains. Glass is the number one packaging preferred by consumers.



EUROPE – THE CRADLE OF GLASS MANUFACTURING

In Europe, Venice is the cradle of glass, with origins dating back to the Roman Empire. Today, this heritage continues to cross generations, with more than 160 production sites across Europe.

The industry continuously invests in innovation and high quality glass manufacturing. Today, the European Glass

Container Industry is a pioneer of the circular economy, with EUR 610 million invested per year in upgrading plants and improving innovation, energy efficiency and decarbonisation.

COLLECTION – GLASS IS 100% RECYCLABLE

In the last 15 years, bottle-to-bottle glass recycling has increased by 139 per cent throughout Europe. The establishment of local recycling infrastructures for glass containers has contributed to local job creation and enabled the collection of 74 per cent of all postconsumer glass packaging in the EU. Glass containers can be reused many times.

Glass recycling has increased by 139% in the last 15 years. The first bottle banks were set up in Europe in the 1970s to collect and recycle glass, and today there are some 1.5 million bottle banks available in Europe. Today in Europe, 74 per cent of glass is collected to be recycled into a bottle closed loop, resulting in a 40 per cent increase in glass production across Europe. The same European supply chain also maintains 125,000 direct and indirect jobs, also contributing up to EUR 9.5 billion to the annual EU GDP.

The glass industry expands production while keeping environmental impact low, with energy consumption reduced by 80 per cent; CO₂ emissions reduced by 70 per cent, and glass bottles are 30 per cent lighter, while maintaining product preservation, recyclability and innovative design.

This caring for the EU economy means that almost 9 out of 10 Europeans choose glass because they say it is the best packaging to preserve their food and beverages; 3 out of 4



ANNIVERSARY

Europeans view glass as the most environmentally friendly packaging, and 1 in 2 Europeans claim to use more glass than in 2014.

PRODUCTION

In the last 50 years, the glass packaging industry has reduced energy use by 80 per cent. On average, up to EUR 610 million is invested every year in industry development. And some 125,000 jobs are maintained both directly and indirectly in the industry with its 160 manufacturing plants distributed across Europe. The industry remains committed to further implementing a circular economy model for a more sustainable Europe.

FF Bottle-to-bottle glass recycling up by 139% in Europe in the last 15 years **55**

RAW MATERIALS AND RECYCLING

Glass is nature's ideal packaging made from natural resources. It epitomises the circular economy, where the same resources remain productive over time. No matter how many times it is recycled, the permanent nature of glass means that its quality never diminishes – glass remains glass. This makes it ideally suited for the packaging industry to minimize its environmental footprint. In addition, the more times glass is collected and recycled, the more the industry is achieving a closed loop production cycle.

CONSUMPTION - GLASS PACKAGING USE UP BY 39 PER CENT IN THE LAST 15 YEARS

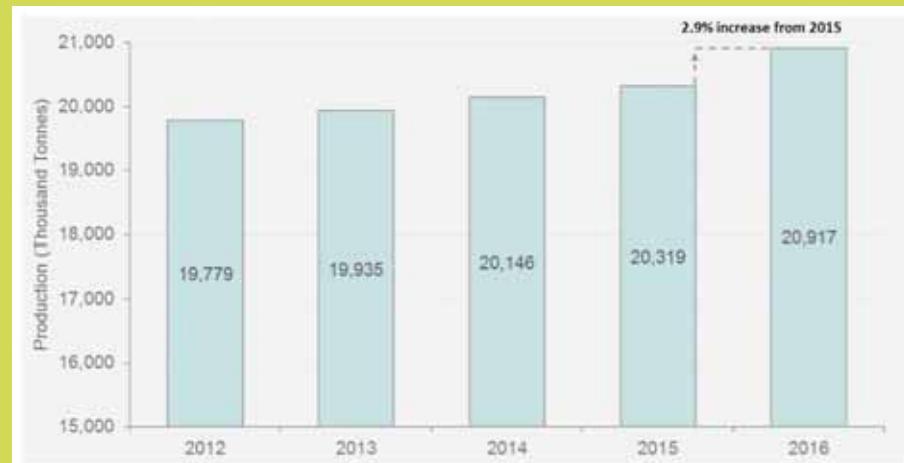
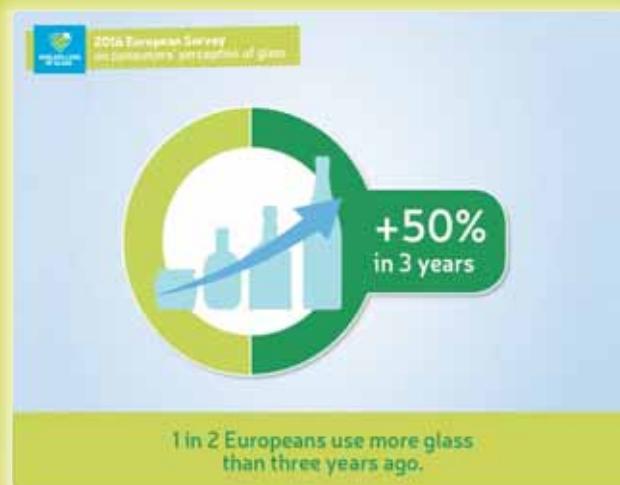
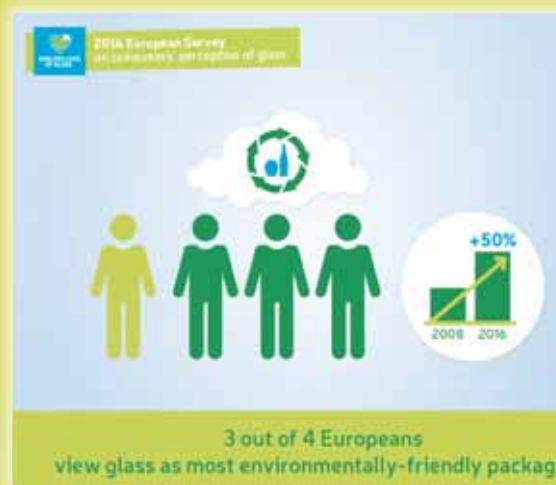
In the last 15 years, the use of glass packaging has increased by 39 per cent. Glass container

Glass packaging demands growths: the market trusts glass

STRONG PRODUCTION GROWTH IN 2016 REPRESENTS A SIGNIFICANT INCREASE ABOVE THE HISTORIC AVERAGE GROWTH RATES FOR GLASS PACKAGING

Glass packaging production in Europe grew by 2.9 per cent in volume (Tonnes) and by 2.1 per cent in unit terms in 2016 according to data published today by the European Container Glass Federation (FEVE⁽¹⁾). The growth was driven by exports as well as continued demand for glass packaging in food and beverage segments in Europe. A total volume of 20.9 million tonnes or 75.9 billion units were produced in Europe for the EU and international food and beverage markets.

"The buoyant demand for glass is a strong signal of trust from customers in our industry and in glass



Source: FEVE data

packaging to help brands stand out on the shelves both in the European market and internationally," says FEVE President Johan Gorter.

The strong performance in 2016 confirms the steady trend of the last 5 years. Since 2012, the industry has increased its production by 5.8 per cent in volume and 6.1 per cent in units. Glass continues to be the reference packaging material for leading markets such as spirits, wines and beer, while it is increasingly gaining share in the food, water and dairy sectors. This is not only due to new consumption trends for local, organic and natural food, but also because of the positive image of glass packaging and the strong consumer trust in glass as their preferred packaging for environmental, health and taste preservation reasons. According to a recent survey⁽²⁾, glass is consumers' favourite packaging, with 1 in 2 Europeans saying they use more glass than three years ago and 75 per cent of Europeans view glass as the most environmentally friendly packaging.

"It is encouraging that consumers trust glass because of its sustainability credentials and because it best preserves the quality of their preferred products. As an industry, we are committed to making the inherent properties of glass more visible to our customers and to the final consumer" continues Johan Gorter.

⁽¹⁾ Production of container glass for food and beverages in the EU, Switzerland and Turkey based on direct industry production data from FEVE member companies compiled by Vivid Economics for FEVE.

⁽²⁾ InSites Research 2016. View Summary report on the Friends of Glass platform.

Glass Container Production for Food and Beverages in Europe

Delivering safe and sustainable packaging solutions...

manufacturing companies produce some 22 million tons of glass containers, or 80 billion pieces, per year. They provide a wide range of glass packaging solutions for food and beverages, flacons for perfumery, cosmetics and pharmacy, as well as glass tableware to their European and world customers. And today, glass bottles are 30 per cent lighter than 20 years ago while still maintaining their product preservation qualities, recyclability, and innovative design.

WHAT DO WE STAND FOR IN THE FUTURE?

The aim of the European Container Glass Federation is to continue to drive innovation and sustainable growth to remain the industry reference in the packaging sector in Europe, building an economic model that produces no waste, as raw materials are continuously used, reused and recycled in a closed loop.

NEW EXECUTIVE TEAM TO SHAPE THE FUTURE OF THE CONTAINER GLASS INDUSTRY

FEVE elected its executive team for the 2017-2019 term of office at its Annual General Assembly, with appointments that mark a significant milestone as it celebrates its 40th anniversary.

Johan Gorter, Chief Executive Officer of Ardagh Glass Europe, was elected as President of the association: "It is an honour to take on this role and I believe that

collectively, we can continue to drive innovation and sustainable growth in the glass packaging sector," said Mr. Gorter. "In the last 15 years, the consumption of products packed in glass has increased across Europe despite a challenging economy. To ensure that we retain our leadership position I will support our industry in its efforts to drive technology advancement, energy efficiency and circular economy policies which are critical for Europe's future," he added.

Jean-Pierre Floris, Chairman and CEO of Verallia Group, was also elected Vice-President. Commenting on the new FEVE presidency, Jean-Pierre Floris said: "I am delighted to support the new FEVE president. The executive team remains as committed as ever to grow the competitiveness of the container glass industry and deliver sustainable packaging solutions to our customers."



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Glasproduktions-Service GmbH



TRADITION, INNOVATION AND CUSTOMER FOCUS

Based in Essen, Germany, Glasproduktions-Service GmbH (GPS) is a leading developer and supplier of IS machines and modules for the container glass manufacturing industry. After more than 90 years as part of Verallia Deutschland AG, GPS became an independent entity in 2016, a move that brought the specialist German company both, commercial and technological success in its very first year. Six new patents, substantial revenue growth and the recruitment of additional highly qualified personnel, GPS had an exceptional year in 2016 and the upward trend is continuing in 2017. This success is no coincidence, and GPS's international customer base today benefits from the IS machine specialist's many years of expertise, as well as the reliability of a traditional enterprise coupled with the innovativeness and flexibility of a young company. This has been well received by customers and GPS products are more in demand than ever before.

A RELIABLE PARTNER WITH TRADITIONAL ROOTS

As the former subsidiary of a major container glass manufacturing company, GPS has almost 100 years of experience, practical know-how and unique sector insights, so it knows what internation-

GPS is quite a young company if we consider that it became an independent entity in 2016, but if we consider the 90 years of its history as part of Verallia Deutschland, we can understand the experience that GPS has. This article 'introduces' us to the company, its products and its ideas for the future.



part and every service we provide," continues Themann.

"The GPS management buyout in 2016 was followed by a restructuring phase that allowed us to make the company more modern, more innovative and more flexible. Today we combine tradition, innovation and flexibility, uniting the best of both worlds in our unique portfolio of products and service," says Rolf Themann, Managing Director GPS. "GPS is a quality and sustainability-driven company. For us, 'Made in Germany' is not just a mark of quality, it is also a commitment to our customers that is evident in every machine, every

al glass manufacturers want and need. As a result, the IS machine manufacturer has a stable market position and an unparalleled insider perspective. This knowledge about its customers, their requirements and the challenges they face in their daily business makes GPS unique. Such profound, experience-based competence is also advantageous in the development of special products. The entire GPS portfolio, from IS machines and modules to servo mechanisms, feeders and cross-conveyors to control and drive technology, reflects this knowledge advantage.

INNOVATIVE STRENGTH AND FLEXIBILITY FOR A SUSTAINABLE FUTURE

Any company that delivers first-rate products and services needs more than tradition, experience and a quality orientation, and GPS is no exception.

Innovativeness and flexibility are also essential to developing solutions for the container glass industry. The company's independence enables it to maximise its innovative strength and technical excellence. The IS machine expert has since registered a number of new patents, including a gob delivery system, a safety door, a system for automatic lubrication, a shear spraying system, a deadplate cooling unit for glass containers and a servo plunger, and it is currently in the process of developing a new Control & Drive. GPS innovations are always developed to optimise quality, process reliability, efficiency and environmental friendliness. Above all, however, they are customer oriented. Now that it is independent, GPS can flexibly integrate its modules into double, triple and quadruple gob IS machines of all makes.

WORKING WITH CUSTOMERS FOR CUSTOMERS

GPS is a full-service provider with a premium product portfolio offering comprehensive life-cycle management for installed machines, parts and Control & Drive. All product support services are geared to customers' individual needs, from problem diagnosis, solution finding and planning to consultancy services, product financing options, maintenance and upgrades, as well as machine operation and maintenance training. Even in challenging and complex projects, GPS always delivers the optimum solution for customer requirements.

This could be custom-made or consist of tried-and-tested standard elements. It might involve the installation of a brand new IS machine or simply the optimisation of some of the existing machine's mechanical components.

At GPS, the best solution does not necessarily mean the most expensive one. The company is committed to delivering good value for money to its customers. Based on this knowledge and its own standards of excellence, GPS develops optimum solutions in perfect quality for customers around the globe. ■

GPS – the company

GPS is a leading German-based developer and supplier of IS machines catering to the needs of the international container glass manufacturing industry. The specialist company's product portfolio includes IS machines and components, servo mechanisms, feeders and conveyors as well as control and drive systems for various applications. It also provides consultancy and training services to customers in the container glass manufacturing industry. GPS offers both all-inclusive and modular concepts, because all-inclusive solutions do not always meet the container glass manufacturers' requirements. Sometimes all an IS machine needs is a professional upgrade or the replacement of individual components to achieve improvements in efficiency and product quality. Based on this knowledge and its self-imposed standards of excellence, GPS develops optimum solutions in perfect quality for customers around the globe - at unbeatable value for money.



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The role of a consultant in today's REFRACTORIES INDUSTRY



This article gives us an insider's opinion and information on today's refractories industry from a consultant's point of view. We are updated on how this role has changed with the market, and which new roles and responsibilities he is now requested to cover.

**Michael Walton
and Wayne Wright**

REFMET, MELBOURNE, AUSTRALIA

In recent years the refractories industry has undergone significant change. The role of the consultant has also changed in step with market requirements. Although the consultant still provides the same expert services as before, for example: forensic analysis of failures, help with selection of materials, advice on installation, he has found some new roles. Amongst these new roles is that of trainer and adviser on OH&S. Many of the changes in the industry, caused by the repeated 're-engineering' of companies, have resulted in a severe lack of refractories experience/expertise within individual organisations, both user and even supplier.

This is evident in both the trade and professional areas. More reliance is now placed on outside resources. The consultant is now often required to fill

these gaps, not only in providing his expertise on a project basis, but also, to be prepared to pass on some of his expertise into the user's organisation, by the provision of tailored training courses, and mentoring of younger engineers.

INTRODUCTION

The authors' comments are based on the Australian situation, but probably have much wider applicability. Everyone thinks they know what consultants do. There is an image of a very learned, mature gentleman, to whom others go when help is needed, a bit like an industrial doctor or specialist. Not that long ago, this was true in the refractories industry as well. Many were experienced practitioners who put themselves out for hire, often after retirement, usually for a project or a specific assignment for EPCM contractors.

Historically, there have been very few fully independent consultants. This was the case because most large refractories' consuming companies had their own employees with most of the

skills necessary for the day to day running of their processes. In addition to this, most refractories suppliers had a significant depth of similar skills to supplement these, making staff available to their customer base.

This was the situation into the eighties, and even into the early noughties, with larger companies. However the situation has changed quite significantly in the small to medium sized company. With 're-engineering' forced upon many by the downturns of the past decades, many have allowed these skills to lapse, as being none core, (unlike accountants etc.). The skills void is only now being fully appreciated. This void does not only encompass normal technical issues, but has also touched on training and OH&S.

THE TRADITIONAL ROLE

As suggested above, consultants were only called on when all else failed. With the users' in-house skills, married to the suppliers knowledge of materials, most problems were soluble without recourse to the expense of the consultant. When one was

necessary, he was often hard to find. Because of this collaboration between user and supplier, not many could earn a living solely as a refractories' consultant. Generally, they were found in the offices of one of the large multinational engineering/project management firms.

More often than not, the problems requiring consultants were caused by the use and application of new technologies, perhaps those with limited local examples, imported from USA, Japan or Europe. The consultant would be called in at the design stage to overview the refractories' component, and to assist with material specification, purchasing and installation. In the days before ISO 9001, he would also preside over the QA procedures.

A second role concerned 'Original Equipment Manufacturers' (OeM), who may have numerous mechanical, electrical engineers etc., but would not keep a specialist, such as a refractories engineer on their books. They would bring him in at a certain stage of each project, to make sure that the refractories' requirement and the basic mechanical design were not in conflict, or more correctly, not fatally in conflict.

The last traditional role of the consultant was as expert witness in dispute settlements. For this, a totally independent person was generally sought, and this was often the sphere of the retiree, with some reputation in the industry, who brought his years of experience to the issue.

RECENT CHANGES

In the last decade, as a result of economic downturns, recessions, (and even depressions), companies have had to dispense with the services of personnel they would otherwise have liked to keep. This downturn for the user has also forced similar action onto the supplier and the installer.

Severe rationalisation has been forced upon the producers and installers by way of takeovers and mergers, to bring supply and demand for product and services back into balance. This rationalisation has led to a huge loss in skills to the industry, often in the critical middle management areas, playing havoc with any succession planning. The state of the industry has not improved sufficiently for these skills to have been recovered, and the prognosis is that they will be lost totally. While it is still fairly safe to rely on suppliers for (free?) advice, as the rationalisation of the industry continues, the number of specialists employed by these companies has decreased significantly, and the view offered by individual suppliers has become increasingly narrower.

THE PRESENT

Many of the experienced personnel who have been on the receiving end of 're-engineering' have made themselves available for consulting, to try and fill this void. They are now used more as contractors, doing their old job under different conditions of employment, but some have become true consultants, either for specific industries, or in a more general role. The line between a consultant and contractor is worth clarifying. If an engineer does the same job, on an hourly rate, as he would as an employee, then he should be classed as a

contractor. If he does a very specific task, with unique skills, and a different task for many clients, then he may be a consultant. In many cases he may be doing elements of both.

The consultant's current role is very complex. The events described above have opened new opportunities for the consultant. His role can now embrace the entire scope of the refractories engineering/project spectrum. Not only is there a wide lack of technical understanding of refractories, as untrained discipline engineers take over these responsibilities, but there is a lack of understanding of other peripheral issues like Health and Safety, installation practices, storage requirements, and even down to the everyday 'buzzspeak' of the refractories industry. All of these issues must be addressed.

Some of these areas are discussed here.

PROJECTS/TURNAROUNDS

- Quantitative evaluation of previous lining performance(s)
- Assistance in the preparation of the Request For Quotation.
- Choice of suppliers for tender
- Technical Evaluation of tenders
- Detailed technical discussion with suppliers/contractors
- Site management of suppliers/contractors, QA of performance.
- Monitoring of campaign performance.
- Generation of refractories based standard procedures for QA manual.

In effect, a good consultant would be a part time member of the maintenance/asset management team, called upon at the appropriate times to add his/her skills to the project.

EXPERT WITNESS

This is a traditional role of consultants. Unfortunately, it



seems to be one area of business growth, related almost entirely to the loss of the skills base elsewhere, and the reliance on supplier and contractor information and services. Most would, perhaps, agree that money is more effective when spent on sound technical advice, rather than on the legal profession.

Appropriate use of the consultant can avoid major adverse incidents often leading to time consuming litigation, invariably avoidable by timely action during the project planning and procurement stages.

HEALTH AND SAFETY ISSUES

OH&S is of particular importance. Refractories do not pose a general threat, where normal precautions are taken, but there are exceptions. Years ago, as an example, asbestos millboards were widely used. Their use was (and still is) considered a serious problem. Then along came ceramic fibers as the answer to all these problems. But no! They are also problematic, especially on removal, as they cause skin irritation, and crystalline silica can be formed in service.

The same can be said for Chromic oxide containing bricks. These are not a problem on installation, but in many applications hexavalent Chrome compounds are formed in service. The problem is then one of satisfactory disposal. These toxic compounds do not form in every application, but many users and suppliers have decided not to risk association with these materials on moral or legal/liability grounds.

While suppliers and professional installers are generally aware of these issues, the law says it is the user's responsibility, and here he may need expert advice which is no longer available in-house.

TRAINING

For many practitioners, the most urgent issue is the loss of the skill base. There is no course in Australia, for example, where refractories engineering is taught comprehensively. The number of people entering the industry is so low, that no institution can justify a dedicated course, at either trade or professional level.

Many ad-hoc 1- or 2-day courses are offered, and these are normally good value, but a complete program of training and progression, which is transferrable between companies and/or countries, is rare. Even an interstate transfer can cause severe problems for tradesmen. This is not a problem confined to Australia, but here the problem seems to have been missed or ignored, to the point where it will soon reach crisis levels.

On a professional level, there is some attempt to teach the rudiments at degree level, but this is often lost, or ignored, as an elective, in a general ceramics/materials engineering course. The trade situation is just as bad. The only formal training is a small part of the bricklayers' apprenticeship. Most refractory tradesmen are initially taken from the role of domestic bricklayers, and have no useful training until they are employed by a refractory installer, or a user company. Here they invariably pick up the bad habits of their supervisors. In terms of training in the installation of gunning and ramming materials, again this tends to occur 'on the job'.

There have been some attempts to rectify these issues in a formal way by the various training boards, but refractory skills traverse the industry based format of these bodies, and only now are they attempting to coordinate their efforts. This has been prompted by the action relevant industry bodies, such

as the Institute of Refractories Engineers, which has offered technical and QA assistance to the training boards.

THE FUTURE

For the future, we see the main role of the consultant moving away from the traditional areas, although his skills will still be needed here. There is a wider role for him to play to help maintain the industry's necessary skills base, by sharing his experience with others through general and specific training courses, and mentoring of young engineers. On the trade side, he can help coordinate the required training courses with the registered authorities and training boards, while on a more academic level, he must lay the foundations of course modules available to engineering students, either on campus or via correspondence.

CONCLUSIONS

The role of the consultant is changing. While the traditional tasks will still be required of him, he must turn his attention to areas from whence skills have been lost by industry, namely OH&S and training. ■



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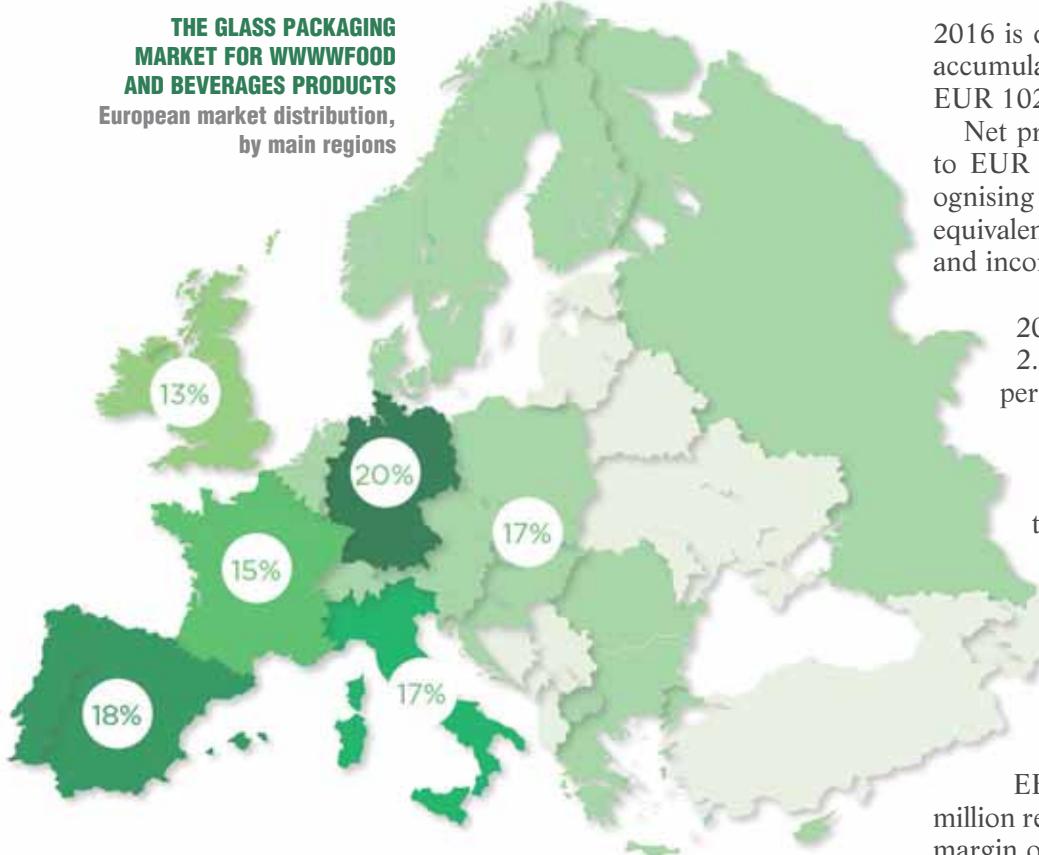
VIDRALA

growth, development and sustainability

Since it was established in Llodio, (Alava – Spain) in 1965, with manufacturing activities starting in 1966 with one furnace, two machines and a yearly output of 25,000 tons with only a dozen models, Vidrala Group has continued to grow, incorporating the most recent technological developments to its manufacturing processes and finished product control, becoming an obligatory reference in the container glass sector.

One of today's reference companies in the container glass sector, Vidrala, is continuing to grow and develop, closely following the changes in consumer trends not only in what we drink, but where we drink it and what we expect the packaging to deliver

above and beyond traditional expectations. This is the result of the demographic progress and social trends such as the impulse of middle classes, the increasing weight of urbanisation or the transformation in purchasing patterns derived from the technological advances.



THE MARKET

Consumer packaging is an essential part of modern lifestyles. It protects, preserves and enables efficient distribution of products that require them to be consumed in optimal conditions. It also helps brand owners to inform end users, identifying and promoting their goods, playing a basic marketing tool and an iconic representation of the product inside. Modern day living, and the vast availability of consumer products we take for granted, is predicted, in part, on the existence of an efficient packaging supply chain.

In this context of progress, glass as a packaging material plays a prevailing role. Consumers increasingly demand healthy and sustainable packaging solutions that protect and preserve flavour and properties of the product within, thereby improving the consumption experience. Likewise, brand owners seek to provide quality assurance, differ-

entiation, design and attractiveness to their product. These are characteristics that differentiate glass and elevate it as the preferred packaging material.

FINANCIAL RESULTS

2016

Vidrala's sales in 2016 amounted to EUR 773.1 million, a drop of 3.7 per cent compared to the prior year. At a constant exchange rate, sales witnessed organic growth of 1.6 per cent.

Gross operating profit, EBITDA, for the year amounted to EUR 170.7 million. This represents a reported increase of 5.9 per cent on the prior year in organic terms, and 11.2 per cent at a constant exchange rate.

At balance sheet level, debt at 31 December 2016 stood at EUR 322.3 million, having been reduced by 20.3 per cent during the year. This represents a leverage ratio equivalent to 1.9 times EBITDA for the period.

The decline in debt during

2016 is due to the generation of accumulated free cash flow of EUR 102.6 million.

Net profit for 2016 amounted to EUR 67.7 million, after recognising an annual finance cost equivalent to 1.1 per cent of sales and income tax of 19.7 per cent.

Earnings per share in 2016 amounted to EUR 2.73/share, a rise of 11.0 per cent on the prior year.

First-quarter 2017

Sales during the first three months amounted to EUR 182.9 million, showing an organic growth of 4.5 per cent and a reported change of +0.1 per cent including forex.

Operating profit, EBITDA, was EUR 41.5 million representing an operating margin of 22.7%.

Net debt at 31 March 2017 stood at EUR 326.8 showing a reduction of 19% over the last 12 months.

Net sales registered by Vidrala during the first three months of 2017 amounted to EUR 182.9 million, representing an increase of 0.1 per cent over the previous year. On a constant currency basis, organic sales growth was 4.5 per cent.

Operating profit –EBITDA– generated over the first three months reached EUR 41.5 million. It represents an increase of 8.4 per cent over the figure reported last year reflecting an organic growth, on a constant currency basis, of 12.4 per cent.

Over sales, EBITDA reached a margin of 22.7 per cent.

Net profit obtained during the first three months amounted to EUR 17.3 million. As a result earnings per share during the period reached EUR 0.70. This represents an increase of 24.9 per cent over the previous period.

Net debt at 31 March 2017

COMPANY UPDATE

stood at EUR 326.8. Leverage ratio stood at 1.9 times 12 months EBITDA.

Outlook

Demand for food and beverages glass containers still show a gradual progress throughout the main markets of Vidrala. This trend is consistent with the progressive development of products, brands and consumption patterns that choose glass as the preferred material.

Under this context, Vidrala's financial results throughout the current year should continue to be supported by the solid business profile.

In any case, management priorities will remain firmly focused on optimizing customer service, ensuring cost competitiveness and strengthening the solvency of the capital structure as a foundation for sustainable long-term value creation.

THE COMPANY AND THE ENVIRONMENT

The Vidrala Group declares itself firmly committed to protecting the environment. With this objective in mind, Vidrala implements specific action plans in relation to emissions in the atmosphere, dumping, waste, the consumption of raw materials, energy, water and noise.

Glass manufacturing is an inherently energy-intensive process as melting furnaces are in operation 24 hours a day, 365 days a year. Given the industrial nature of the process, one of management's objectives is to reduce the associated environmental impact. In order to achieve this, specific investments are made to upgrade factory facilities and adapt them to the most efficient technological systems for reducing environmental impacts. The efforts geared towards energy efficiency have a global effect on the business,



reducing consumption, cutting costs and minimising the impact on the environment. Additionally, operating priorities are focused on intensifying the growing use of recycled products as the main raw material for manufacturing glass, the effect of which is twofold as it not only avoids the consumption of natural raw materials, but also contributes to reducing fossil fuel consumption and the resulting pollution.

One of the Group's strategic guidelines is the implementation of environmental management systems. In line with this commitment, all the Group's production facilities have ISO 14001:2004 certification, demonstrating that Vidrala operates under a global, externally verified and recognised environmental management system. Furthermore, in keeping with its undertaking to continuous improvement, the implementation and certification of new environmental standards has begun, such as ISO 14064:2012, related to the voluntary declaration of CO₂ emissions, or the ISO 50001:2011 energy management system standard, both of which, CO₂ emissions and energy, are of clear environmental significance in our industrial process.

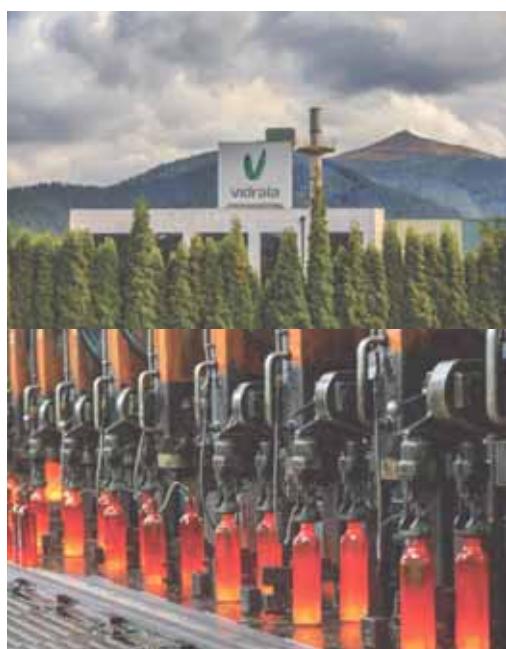
In addition, Vidrala has a specific commitment to invest in minimising the potential polluting effect of its facilities. Of particular relevance during 2016 in this regard was the conclusion of

a major project to install special atmospheric emissions purification systems, called electrostatic precipitators or electrofilters, in all production centres. These installations, which have cost the Group more than EUR 20 million over the last eight years, are aimed exclusively at reducing emissions of particulate pollutants, and are recognised under European legislation as the best currently available technology in this regard. Electrofilters work by attracting and retaining particles generated during the melting process through electrical fields, and reduce typical melting furnace emissions by more than 90 per cent.

OCCUPATIONAL HEALTH AND SAFETY

Vidrala's daily activity is carried out by some 3,200 employees, the majority of whom work in an industrial or manufacturing environment.

Consequently, the Vidrala Group remains committed to establishing the soundest occupational health and safety measures. This commitment is endorsed by the gradual implementation of occupational health and safety management systems based on



OSHAS 18001:2007, which are certified by independent entities accrediting the existence of an internationally recognised management framework.

With a specific view to preventing labour-related accidents, and more importantly, to improving health in the workplace, Vidrala implements specific and systematic ongoing staff training and awareness plans. The sustainability report, attached to this report, details the progress of occupational health and safety management indicators. These plans are developed and distributed among all agents involved in the organisation, allowing health and safety trends to be objectively measured and documented, and enabling the actual effectiveness of the processes and controls implemented to be observed, and whether additional corrective measures are needed.

THE SUPPLY CHAIN AND ITS RISKS

Production-intensive, continuous-service industries such as Vidrala's can be vulnerable to risks of distortion in the supply chain.

As regards supply risk affecting key products, materials, instal-

lations or technologies for the production process, management initiatives include the continual and specialised search for supply sources and strengthening ties with suppliers, diversifying and forging long-term relationships, establishing ongoing audit and standardisation processes and developing supply alternatives in all relevant areas.

Steps taken to address customer service and product quality risks include the development of a specific departmental area separated from the rest of the organisational areas dedicated exclusively to quality. There is a specific investment project nearing completion that aims to guarantee product quality targets and optimise product quality control through the implementation of state of the art technology across all the Group's facilities.

Concerning inventory risk, the Group systematically carries out a specific and periodic controls to ensure the quality of finished products in the warehouse, and optimise ageing and rotation so that both the volume and value of stocks are balanced to sales forecasts. These controls have resulted in the implementation of automated stock monitoring processes and the subsequent application of specific adaptation, physical and valuation measures, which in 2016 are giving rise to inventory impairment adjustments in the income statement.

DEBT AND SOLVENCY

At 31 December 2016, the Vidrala Group had consolidated net financial debt of EUR 322.3 million, having reduced indebtedness by EUR 82 million, or 20.3 per cent, during the year. The financial solvency indicators at the reporting date reflect a debt equivalent to 1.9 times accumulated EBITDA for the last 12 months, representing a financial deleveraging compared to the

ratio of 2.5 at the prior year end.

The core of the financing structure is a long-term syndicated loan signed on 13 March 2015 with a consortium of nine financial institutions, for an original amount of EUR 465 million. After a second novation of the loan terms was signed in November 2016, the applicable interest rate on the loan in 2017 will be a variable rate pegged to Euribor plus a spread of 1 per cent, reviewed on an annual basis by tranche based on the evolution of the net debt/consolidated EBITDA ratio. The due date of the loan has been extended to 13 September 2022, and is gradually repayable from 13 March 2019. Consequently, in 2017, the loan will be in a grace period, with no obligation to repay the principal. ■



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Glass Industry



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First Edition

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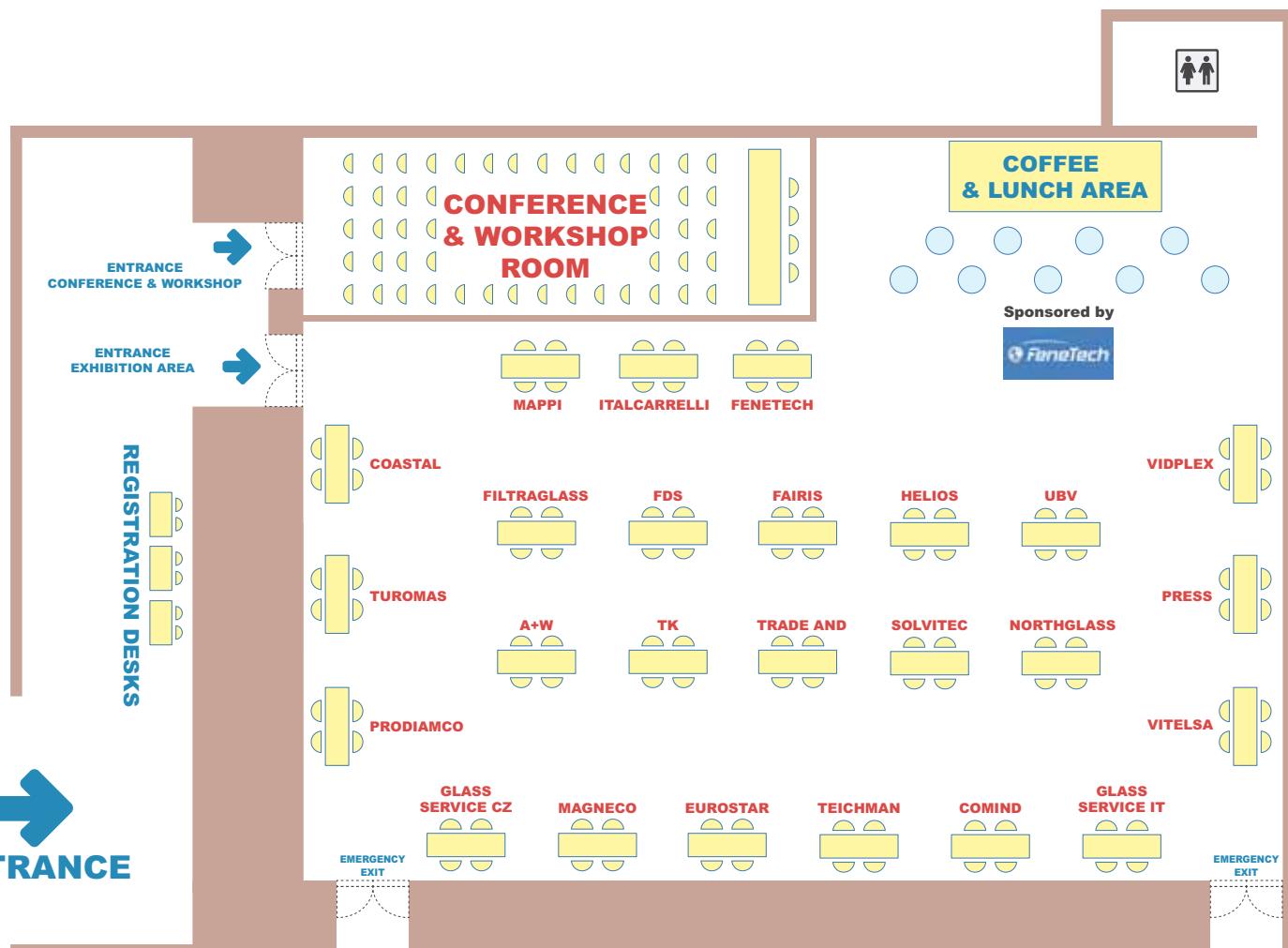
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The Glass Industry Event for Colombia, Venezuela, Ecuador, Peru and Panama



BUSINESS MEETING AREA MAP



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Conference & Workshop Programme

24th October 2017 - Santa Fe Conference Room

10.00

WELCOME COFFEE

10.30

WELCOME ADDRESS

10.40

EVOLUTION OF SAFETY GLASS REGULATIONS

Vidplex - Alfonso Garcia

11.00

FENETECH: THEIR SOLUTIONS AND INTRODUCTION TO THEIR PRODUCTION CAPACITY CONTROL

Fenetech - Alex Ochoa Camberos

11.20

**SMART STORAGE, LOADING & CUTTING:
THIS IS WHERE IT ALL BEGINS**

Turomas - Edoardo Nieto

11.40

PRESENTATION OF THE COMPANY

A+W - Luis Javier Plà

12.00

FDS GLASS CORPORATION IN THE LATINAMERICAN GLASS INDUSTRY

FDS - Sergio Cordova

10.20

VITELSA – ENVELOPES AS A CONTRIBUTION TO ENERGY EFFICIENCY ON BUILDINGS, PROGRESS IN PROCESSING SOLAR CONTROL GLASS AND SPECIFICATION FACTORS

Vitelsa

12.40

PERFORMANCE AND FUNCTIONALITY IN CONTEMPORARY GLASS: HOW TO CORRECTLY SPECIFY GLASS?

Vidplex - Alfonso Garcia

13.00 - 14.30

LUNCH BREAK

14.30

HELPING THE GLASS INDUSTRY WITH CUSTOM MADE TOOLS THAT IMPROVE THEIR PROCESS

Glass Service S.A. – Gabriel Noboa

14.50

CREATING VALUE THROUGH INNOVATION FOR THE GLASS INDUSTRY

Magneco Metrel

15.10

ALL NEW “ONM” – ORIFICE AND NEEDLE MIXING . COMBUSTION SYSTEM FOR FEEDERS

Glass Service Srl – Giulio Isernia

15.30

COFFEE BREAK

16.00

PHOTOVOLTAIC, FIRE-RESISTANT AND OTHER TYPES OF SPECIAL GLASS: HOW TO ASSESS NEED, SUITABILITY OR COST-BENEFIT?

Vidplex - Alfonso Garcia

16.20

IR AND UV TECHNOLOGY IN THE GLASS SECTOR

Helios Quartz – Luigi Gastaldo

16.40

QUESTION TIME

A+W Software GmbH

A+W is the market leader for software in the flat glass industry as well as the windows and doors business. We develop ERP-, PPS- and optimization software in order to make glass and window manufacturers even more efficient.

Our products are suitable for small, mid-sized and large companies.

We have been active on the market for 40 years and we sell our products worldwide, strongly growing in Latin America. A+W cooperates with experienced and competent companies in the industry such as machine builders. This combination provides the best possible solution for our customers.

Our solutions help you to control and optimize the whole value chain, from basic glass to finished windows or facade elements.

A+W es líder del mercado de software en la industria del vidrio plano. Desarrollamos sistemas de software ERP-, PPS- y optimizaciones para hacer aún más eficientes su empresa de vidrio procesado.

Nuestros productos se adaptan a empresas pequeñas, medianas y grandes multinacionales.

Estamos en el mercado durante 40 años y vendemos nuestros productos en todo el mundo y creciendo fuertemente en Latinoamérica. A+W coopera con las empresas con más experiencia y más competentes del sector p.ej. fabricantes de maquinaria. Esta combinación hace de A+W la mejor posible solución para nuestros clientes. Nuestras soluciones le ayudan a controlar y optimizar completamente su cadena de valor, desde vidrio básico al producto terminado listo para ser entregado.



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Coastal Construction Products

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Colombia Minerales Industriales - Comind

COMIND's activity is extraction, treatment and sale of silica sand. The mine (contract EHP-141; environmental license CAR.....) and the treatment plant are in Sibaté.

The modern plant, with the best technologies, includes: washing and granulometric/gravimetric classification to obtain a very high quality silica sand, used to produce glass, ceramic, silicate etc.

Reserves are over 30Mt and production capacity of the plant is 250,000t/y.

The clay obtained by washing is used in ceramic. Environmental aspects are very important for us: we carry out environmental analyzes, continuous monitoring and environmental recoveries to ensure a sustainable development of RNR (Renewable Natural Resources).



COMIND realiza extracción, tratamiento y comercialización de arena silicea. La mina (título EHP-141; lic. ambiental CAR 1897) y la planta de tratamiento están en Sibaté-C/marca. La planta es moderna, con la mejor tecnología existente, comprende lavado, clasificación granulométrica y gravimétrica, se obtiene arena con calidad y pureza muy alta para ser utilizada en la producción del vidrio, cerámica, silicato, etc. Las reservas son superior a 30 M/t y la capacidad productiva es de 250.000 t/a. La Arcilla que se obtiene del lavado se puede utilizar en el sector cerámico.

Es fundamental el respeto por el medio ambiente: realizamos análisis ambientales, monitoreo continuo, recuperación ambiental garantizando un desarrollo sostenible de los RNR.



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Eurostar Concrete Technology SpA



Eurostar has been manufacturing planetary mixers and relative accessories since 1999, while key staff have 30 years of experience.

Planetary mixers bring new a mixing concept into the glass industry: ingenious design, revolutionary lay-out, combined mixing star/blade movements and high speed place this mixer close to the top

in terms of performance, homogeneity and cycle time. Pertinent data available from Philips Lighting test certificate.

Eurostar fabrica mezcladoras planetarias con sus correspondientes accesorios desde 1999, aunque su personal clave tiene más de 30 años de experiencia en este sector.

Las mezcladoras planetarias introducen en la industria del vidrio un nuevo concepto de mezcla, diseño ingenioso y configuración innovadora, que junto con el movimiento combinado de estrellas y palas de mezcla así como su elevada velocidad colocan nuestra mezcladora en lo más alto en lo que a prestaciones, homogeneidad y tiempo de ciclo se refiere.

Los ensayos y pruebas correspondientes están disponibles en el certificado de prueba realizado por Philips Lighting.



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- Faiclima: Insulated glass panels, flat and bent.

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Our lines:

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Fairis C.A. desde 1928 dedicados al proceso de transformación de vidrio de alto desempeño plano y curvo.

Nuestros productos:

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- Failam: Vidrio Laminado con PVB o SentryGlas plano y curvo;
- Faiclima: Paneles de aislamiento termoacústicos plano y curvo.

Capacidades: Impresión digital, serigrafía,

corte con chorro de agua, entalles, perforados, producción CAD/CAM. Certificados SGCC (Safety glazing certification council)

Nuestras líneas:

- Arquitectónica
- Deportiva
- Accesorios

Descarga nuestra APP:"FAIRIS VIDRIO" en APP Store o Google Play.
www.fairis.com



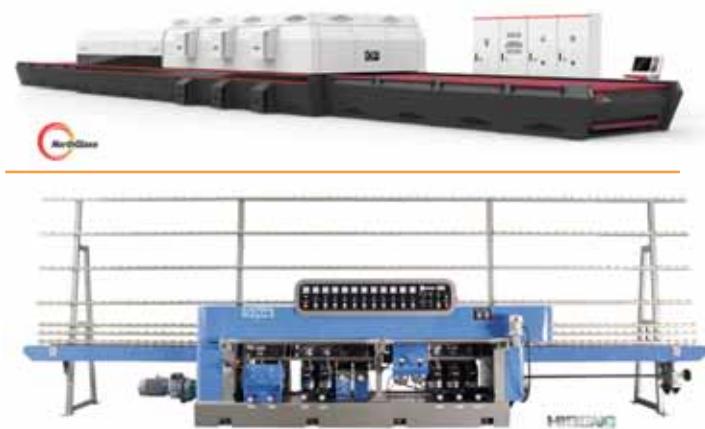
Verdeloma, 0298
180150 Ambato - Ecuador
+593 - 32521057
+593 - 32520898
jluis@fairis.com

www.fairis.com



FDS Glass Corporation

FDS Glass Corp. is the exclusive representative in Latin America and the Caribbean area for several important manufacturers for the flat glass industry. Covering mostly every process related to the flat glass industry FDS Glass Corp. offers top of the line glass tempering furnaces, cutting tables, automation lines, screen printing machines; PVB and EVA laminating lines; Insulated Glass lines; washing, drilling, edging, beveling machines; loading and storage systems, automotive glass bending furnaces; Waterjets; Quality control scanners; Water treatment; Specialized Software; and a wide range of Hardware, supplies and parts. (North Glass, Handong Glass, Humam, Hiseng, Deltamax Automazione).



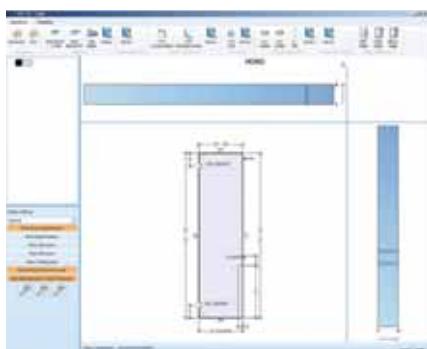
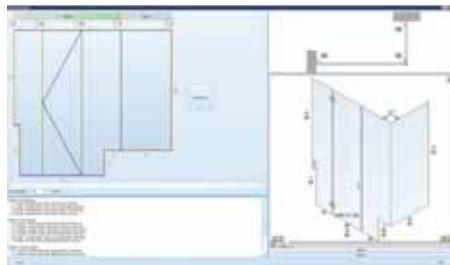
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+1 - 954 - 8423694
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sales@fdsglass.com

www.fdsglass.com

FDS Glass Corp. es representante exclusivo en Latinoamérica y el Caribe de importantes fabricantes de maquinaria e insumos para la industria del vidrio plano. Cubriendo casi todos los procesos en vidrio plano, ofrece hornos de templado, mesas de corte, sistemas de automatización, líneas de serigrafía; Líneas de laminado con PVB y EVA; Líneas para doble vidrio; Lavadoras, taladros, pulidoras, biseladoras, bilaterales; cargadoras, sistemas de almacenamiento, hornos de curvado de parabrisas; WaterJets; Escáneres de control de calidad; Tratamiento de agua; Software especializado; y una amplia gama de herramientas, insumos y partes. (North Glass, Handong Glass, Humam, Hiseng, Deltamax Automazione).

FeneTech Inc.

FeneTech will be presenting the latest release of their software solution FeneVision MAX ERP for glass fabricators. This integrated software operates on a graphical user interface running on a single database, allowing employees to see - in real time - exactly what is happening on the production floor. FeneVision provides all the tools necessary to control each phase of production, including web and client-based quotation and order handling, pricing and costing, an integrated CAD for glass shapes, a comprehensive shower door designer that allows customers to choose their own hardware, the dynamic creation of bills of materials, capacity planning, production scheduling, dynamic glass cutting optimization, Business Intelligence and more...



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sales@fenetech.com

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FeneTech presentará su más reciente actualización de su solución en software FeneVision MAX ERP para procesadores de vidrio. Esta solución opera en una interfaz totalmente amigable y gráfica, que va guiando al usuario en todo momento, el sistema corre en una sola BD (Base de Datos), permitiendo que los usuarios vean en TIEMPO REAL exactamente lo que está sucediendo en su piso de producción y en toda la empresa. FeneVision brinda todas las herramientas necesarias para controlar cada fase de la producción, incluyendo una aplicación web (WEB CENTER) que permite cotizar y colocar pedidos desde web, así como también un control de precios y costos, un CAD, un diseñador de duchas de baño, reportes online (BI) y más...

Filtraglass

MANUFACTURE OF WATER RECYCLING SYSTEMS FOR THE GLASS INDUSTRY.

Filtraglass designs and manufactures water filtration systems that are ideal for installation and use in the glass industry. The fully programmable system collects the water used in glass treatment processes and filters it to separate any residual glass dust and produce water of the best quality for reuse. Among other benefits, Filtraglass offers its clients:

- Reduced water consumption
- Longer useful life for machines and reduced maintenance
- Production line continuity because no stops are needed
- An environmentally-friendly company profile



FABRICACIÓN DE SISTEMAS DE RECICLAJE DE AGUA PARA LA INDUSTRIA DEL VIDRIO.

Filtraglass diseña y manufatura sistemas de filtración de agua ideales para su instalación y uso en la industria del vidrio. El sistema, completamente programable, recoge el agua empleada en los procesos de tratamiento del vidrio y la filtra hasta separar, de una parte, el polvo de vidrio residual y, de la otra, el agua de calidad óptima para su reutilización. Entre diversas ventajas, Filtraglass ofrece a sus clientes:

- Reducción del consumo de agua
- Extensión de la vida útil de las máquinas y reducción de su mantenimiento
- Continuidad en la línea de producción al no necesitar paros
- Un perfil corporativo ecológico



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info@filtraglass.com

www.filtraglass.com



Glass Service (GS), A.S.

Glass Service (GS) is a leading global consultant for glass melting/conditioning, furnace control, operation, troubleshooting, and furnace design.

Mathematical modeling GFM software (design optimization) and Expert System ESIII (automated furnace and forehearth control) provide cost savings and ease of operation. GS labs analyze 2000+ defects yearly, and offer melt testing utilizing basic and applied research.

GS also supplies selected high quality raw materials to the glass industry, fulfilling REACH regulations for importing chemicals to the EU. GS is the only company in Europe to have registered lead silicate.

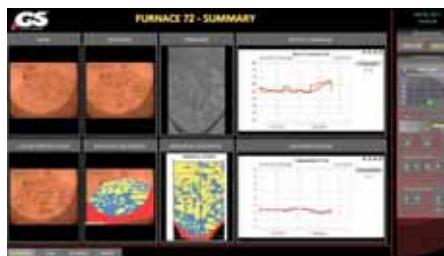
Headquartered in Czech Republic with offices in Netherlands, USA, China and Slovakia.



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www.gsl.cz

Glass Service (GS) es un líder y consultor mundial para la industria de vidrio en las áreas técnicas de fundición, condicionamiento en canales, control de la operación del horno, laboratorio y modelo para diseños de hornos. También incluye entre sus portafolios para hornos de vidrio equipos de combustión (FlammaTec), ayuda eléctrica (FIC) para hornos. El software de los Modelos matemáticos de Glass Service ayudan a optimizar los diseños de los hornos y los sistemas de control expertos de GS ayudan con la operación de los hornos. Las combinaciones de estas tecnologías ayudan a nuestros



clientes ahorrar energía y hacen una operación más fácil. Los laboratorios de GS analizan más de 2000 defectos cada año proviniendo de todo tipo de horno y vidrios. Los laboratorios de GS utilizan la tecnología más avanzada para hacer los análisis de defectos, pero lo más importantes es la interpretación de estos análisis hechos por nuestros expertos en vidrio y lo que ayuda a nuestros clientes resolver el posible problema más rápido.

El corporativo de Glass Service se encuentra en la República Checa con oficinas en Holanda, USA, China, Rusia y Eslovaquia.

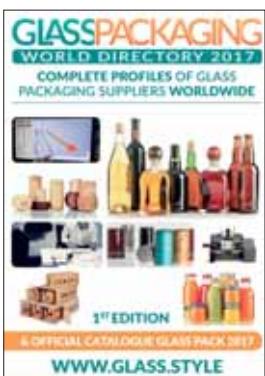
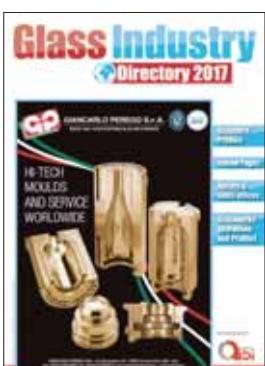
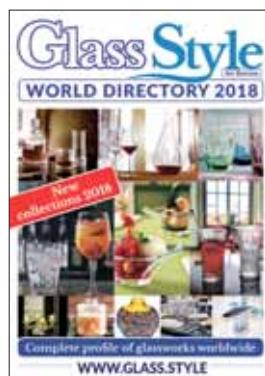
The World's Leading Glass Industry Website
www.glassonline.com

Glass Style
glass.style

GLASS MAGAZINE



ANNUAL GUIDES



Glass Service Srl

Glass Service Srl, Italy, provides solutions for the glass industry such as complete furnaces and batch plants, also on a turnkey basis, but even single components such as batch chargers, level controls, combustion systems, forehearts and coloring forehearts, boosting systems, etc. Our skilled team will interface with your staff to study your needs and find together the right solution among a wide variety of well proved and up-to date technologies. Recuperative, Regenerative, Oxyfuel, Electric and Combined Fuel-Electric furnace technology can be supplied, as well as advanced solutions for the working end. And this can be done for soda-lime glass as well as for technical glasses as Sodium Silicate, Type C and E glasses, Neutral Borosilicate, etc.



Glass Service Srl, ofrecemos soluciones para la industria del vidrio: hornos completos , batch plant, proyectos llave en mano, incluso componentes individuales como controles de nivel, sistemas de combustión, forehearts , sistemas de boosting, etc.

Nuestro equipo especializado en colaboración a su personal estudiará sus necesidades en modo de encontrar la mejor solución.

Suministramos tecnología a la vanguardia, para: hornos recuperativos, hornos regenerativos; Oxyfuel, eléctricos y a combustión combinada, así como soluciones avanzadas para el working end; Nuestra tecnología puede ser aplicada a vidrios soda-lime, vidrios técnicos como Silicato de Sodio, Tipo C y E, Neutro Borosilicato, etc.



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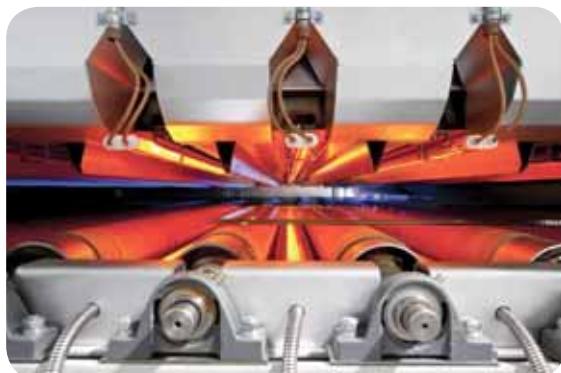
Helios Quartz

Founded in 1940, Helios Quartz is a family-owned company with two production plants - Italy and Switzerland – and offices in the US, in Asia and in South America, which has become a major international supplier for Quartz Glass processing and for the manufacturing of IR & UV Lamps. Helios Quartz products are used in many fields of application of the Glass Industry: laminated glass production and processing, drying screen printing and coating curing, mirror production, glass bending and many others. Discover our AUTOMATIC TIN DETECTOR, the best quality control solution for all operators in the glass industry, who want the certainty that the whole processing is made on the "air side" of glass sheets.



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20060 Cambiago (MI) - Italy
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marketing@heliosquartz.com

www.heliosquartz.com



Histórica empresa de familia fundada en 1940, HELIOS QUARTZ, con sedes productivas en Italia y Suiza y oficinas en todo el mundo, es uno de los mayores protagonistas en la producción de lámparas IR y lámparas UV. Los productos Helios Quartz se utilizan en múltiples ámbitos de aplicación en el sector del vidrio: lámparas infrarrojas para la calefacción del PVB durante el proceso de laminado, para cortar el vidrio laminado, para la aplicación de serigrafía y secado coating, para la producción del espejo, la curvadura y la fusión del vidrio. Descubre nuestro AUTOMATIC TIN DETECTOR, un aparato para indicar en modo autónomo la presencia del lado del estaño o del lado aire del vidrio float.

Italcarrelli Srl

Italcarrelli® is a world leader in the design and construction of special machineries and solutions for the storage and handling of goods. Along many years of experience on the field, the company has acquired a remarkable knowledge of the glass sector and, thanks to investments in the research of innovative solutions, the company is providing its own products to all the most im-

portant glass manufacturing companies all over the world.

Range of products:

- Platform glass transporters
- In-loader glass transporters
- Multi-directional side-loaders
- Special equipment for glass handling
- Machines to handle packed glass inside closed top containers.

ITALCARRELLI®

TOP HANDLING SOLUTIONS SINCE 1962

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36072 Chiampo (VI)

Italy

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📠 +39 - 0444 - 420195

✉️ info@italcarrelli.eu

www.italcarrelli.eu

Italcarrelli® es un líder mundial en el diseño y la fabricación de máquinas especiales y otras soluciones para el almacenaje y la manipulación de mercancías.

A lo largo de años de experiencia, la empresa ha adquirido un conocimiento notable del sector del vidrio y, gracias a las muchas inversiones en la investigación de soluciones innovadoras, proporciona sus propios productos a los principales fabricantes de vidrio en todo el mundo.

Gama de productos:

- Plataformas transportadoras para vidrio;
- Transportadoras Inloader;
- Transportadoras Side-loader;
- Máquinas especiales para la manipulación de vidrio;
- Máquinas para la manipulación de vidrio empaquetado en contenedores cubiertos.



Magneco/Metrel, Inc

Magneco/Metrel, Inc. (MMI) is a privately owned American company dedicated to the manufacture of refractory pumpable / castable / shotcreatable monolithic products and ceramic shapes and blocks for the heavy industry.

Magneco/Metrel, Inc has developed a family of unique refractory monolithic products referred to as "Metpump" for Glass Furnace Applications. MMI's unique colloidal silica bonded

refractory products offer an alternative to the traditional bricks and blocks refractory lining for the glass furnace and are used for

- Glass Furnace Major Repairs
- Full or Partial Crown Construction or Repair
- Minor Repairs of the Melter and Regenerator
- Full Construction of the Glass Furnace
- Hot repair applications



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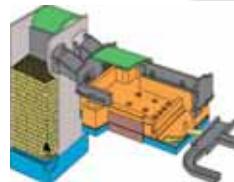
✉️ marketing@magneco-metrel.com

www.magneco-metrel.com

Magneco / Metrel, Inc. (MMI) es una empresa Americana de carácter privado dedicada a la manufactura de concretos refractarios y piezas cerámicas para la industria pesada.

Magneco / Metrel, Inc ha desarrollado una familia única de productos monolíticos llamados "Metpump" para aplicaciones en el horno de vidrio. Los productos refractarios ligados con sílica coloidal de MMI ofrecen una alternativa al tradicional sistema de ladrillos y bloques refractarios del horno de vidrio, y son usados en

- Reparación mayor del horno de vidrio
- Construcción completa o parcial de bóvedas
- Reparación menor del tanque de fusión o regenerador
- Construcción completa del horno de vidrio
- Reparaciones en caliente



Mappi International



over 50 nations across the globe. This represents steady growth due to investments in research, uncompromising quality, focusing on the needs of each and every customer, and their consistent desire to outdo themselves time and time again. The new ATS 4.0 is the company's newest redesigned furnace developed from Mappi International's experience. The company truly believes this furnace will be the tempering 'Masterpiece' for years to come.

Mappi International es el líder en la producción de hornos para el templado del vidrio. Sus maquinarias son las más seguras y las más confiables. Por esta razón se han convertido rápidamente en una fuente de orgullo de Made in Italy. Más de 300 plantas instaladas en más de 50 naciones representan las etapas de una trayectoria de crecimiento constante, de inversiones en investigación y desarrollo, de calidad intransigente, atención a las necesidades específicas de cada cliente, sobre todo el deseo constante de superar. El ATS 4.0 completamente rediseñado ATS viene de Mappi experiencia internacional y realmente creemos será la obra maestra en el horno de templado para los próximos años.

Mappi International is a leader in the production of glass tempering furnaces. The company's machines have been accredited for extremely high standards in both safety and reliability. For this reason, they have quickly become a "Made in Italy" source of pride. More than 300 furnaces have been installed in



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info@mappi.it
www.mappi.it



Prodiamco

Prodiamco, a professional manufacturer specialized in diamond tool production, is proud to continue to provide quality diamond tooling to the glass, stone, optic and concrete industries. With our factory in production since 1992, we have been providing quality diamond tooling to the world for more than two decades, and we continue to look ahead.

Our main strength in achieving exceptional product quality remains our ability to produce our own diamond powder and to test the quality of all of the diamond powder used in the manufacturing of our tools.

Through the years our customers have come to rely on our products' consistent quality and performance as well as our reliable customer service.



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+57 - 1 - 7433416
vidrio@prodiamco.com
www.glasstools.co

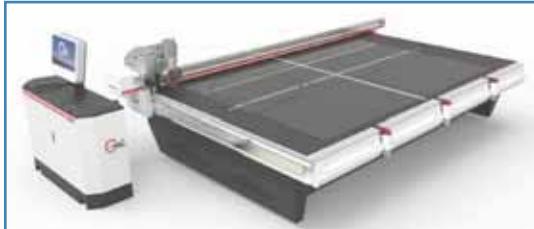


Prodiamco, fabricante profesional especializado en la producción de polvo y herramientas diamantadas, continúa produciendo orgullosamente herramientas diamantadas de alta calidad para las industrias de vidrio, piedra, concreto y óptica. La historia de Prodiamco comenzó con la fundación de nuestra fábrica en 1992. Hoy en día, más de dos décadas después de nuestra fundación, continuamos fabricando y suministrando al mundo herramientas superiores y desarrollando líneas nuevas para satisfacer las necesidades de nuestros clientes. La ventaja principal de la compañía continúa siendo producir y mejorar un polvo diamantado excepcional que se usa en la fabricación de nuestras herramientas. A través de los años nuestros clientes han venido confiando en nuestros productos, debido a nuestra calidad constante y buen desempeño de nuestras herramientas como también en la calidad de nuestro servicio al cliente.

Shanghai North Glass Technology Industrial Co., Ltd.

NorthGlass Corporation was founded on May 18 1995 in Luoyang/China, is mainly engaged in the R&D and manufacture of glass deep-processing equipment and safety glass production. In past 22 years, NorthGlass Corporation has developed into the largest Chinese enterprise in the field of glass processing equipment, with 11 branches and 5 huge production bases located in Luoyang, Shanghai, Tianjin, Beijing and Guangdong.

- GLASS TEMPERING FURNACES
- LOW-E GLASS COATING LINES
- AUTOMATION SYSTEMS
- SCREEN PRINTING MACHINES
- GLASS PRE-PROCESSING LINES
- DEEP-PROCESSED GLASS PRODUCTS



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Solvitec SAS

Solvitec is a Colombia Company with 7 years of experience in the latinoamerican market, It is representative and link between the best factories of machinery, tools. supplies and materials for this industry - present in Asia and Euro D E and the Colombian businessman who transforms glass and elaborates designs based on this material. It is also a manufacturer of machinery for this industry.

In Solvitec the business owner of the glass industry finds materials and machinery of excellent quality, capable of favoring its competitiveness and development, as well as advice and support in decision-making to streamline your business and renew the market with new products.

Solvitec es una Empresa Colombiana con 7 años de experiencia en el mercado nacional y latinoamericano. Es representante y enlace entre las mejores

fábricas de maquinaria, herramientas, insumos y materiales para esta industria-presente en Asia y Europa, y el empresario colombiano que transforma el vidrio y elabora diseños basados en este material. Así mismo, es fabricante de maquinaria para la industria.

En Solvitec el empresario de la industria del vidrio encuentra materiales y maquinaria de excelente calidad, capaces de favorecer su competitividad y desarrollo, así como asesoría y acompañamiento en la toma de decisiones para dinamizar su negocio y renovar el mercado con nuevos productos.

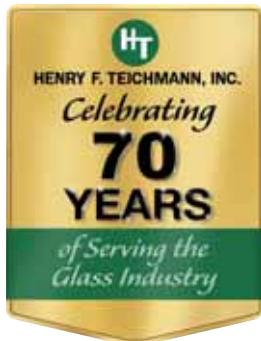


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Henry F. Teichmann, Inc. / E.W. Bowman



Henry F. Teichmann, Inc. is celebrating its 70th year of services to the glass industry. Since 1947, our engineering, technical service, purchasing, construction and project management teams have been committed to providing turnkey services for batch plants, complete glass plants, electric furnaces, container glass furnaces, float glass furnaces, fiber glass furnaces, foam glass furnaces, sodium silicate furnaces, pressed glass melting services, hand glass processes, tableware & lighting products.

World famous lehr supplier EW Bowman is now part of HFT. EWB specialize in the supply of container glass annealing lehrs, decorating lehrs, mould pre-heating ovens, belt cleaning brushes annealing, lehr process consultation & lehr overhauls.



TK Srl

Tk Italy. Pure Italian Technology
For 20 years Tk has been designing and manufacturing tempering, laminating, Heat Soaking and chemical tempering furnaces. Thanks to our know-how achieved through years of cooperation with customers, we can say that our furnaces have the lowest energy consumption among those available on the market:
 - flat and curved tempering machines and chemical temper oven;

- EVA laminating furnaces and EVA/PVB laminating lines with and without autoclave;
- Heat Soaking ovens;
- bending ovens and lines;
- furnaces for artistic fusion.



Tk Italia. Tecnología italiana pura
Durante 20 años Tk ha diseñado y fabricado hornos de templado, de laminación, de HST y hornos de templado químico. Gracias a nuestro know-how logrado a través de años de cooperación con los clientes, podemos decir que nuestros hornos tienen el menor consumo de energía entre los disponibles en el mercado.

Nuestra gama:

- hornos de templado plano y curvo y hornos de templado químico ;
- hornos de laminado con EVA / PVB con y sin autoclave;
- hornos de HST;
- hornos y líneas de curvado;
- hornos para fusión artística.



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 ☐ ask@tkitaly.com

www.tkitaly.com



Trade And

Trade And SAS is a company created in order to meet the needs of customers willing to enter into an increasingly competitive, punctual and demanding global market. With a wide experience and highly qualified professionals, we are dedicated to offer integral solutions to our customers with multipurpose services in the business areas that help process improvement and positioning in the market and the development of new business opportunities.

Our mission is to provide integral solutions to companies in the Latin American market, through different lines of business, offering products and services of high quality that meet the individual needs of each of our customers.



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Trade And SAS es una empresa creada para satisfacer las necesidades de los clientes dispuestos a entrar en un mercado global cada vez más competitivo, puntual y exigente. Con una amplia experiencia y profesionales altamente cualificados, nos dedicamos a ofrecer soluciones integrales a nuestros clientes con servicios polivalentes en las áreas de negocio que ayudan a la mejora de procesos y posicionamiento en el mercado y el desarrollo de nuevas oportunidades de negocio.

Nuestra misión es brindar soluciones integrales a las empresas del mercado latinoamericano, a través de diferentes líneas de negocio, ofreciendo productos y servicios de alta calidad que satisfagan las necesidades individuales de cada uno de nuestros clientes.

Turomas

Since 1985, Spain-based TUROMAS has been focusing all its efforts in developing Smart Glass Storage, Loading & Cutting machinery that exceeds customer expectations. All related operations such as engineering or manufacturing are carried out in its Spanish facilities to achieve the highest quality standards.

The highest priority of TUROMAS is to provide reliable, safe, efficient machines that are flexible enough to become future-proof investments. Our development team is constantly working to adapt our solutions to our customers' specific needs, since there are no two identical installations.



Desde 1985, TUROMAS focaliza sus esfuerzos en desarrollar maquinaria inteligente para el Almacenamiento, Carga y Corte de vidrio que supere las expectativas del cliente. Todas las operaciones que ello conlleva, como la ingeniería y la fabricación, son llevadas a cabo en sus instalaciones españolas con el fin de asegurar los más altos estándares de calidad.

La máxima prioridad de TUROMAS es proporcionar máquinas fiables, seguras y eficientes que sean suficientemente flexibles para convertirse en una inversión de futuro. Nuestro equipo de desarrollo trabaja constantemente para adaptar el producto a las necesidades específicas de nuestros clientes.



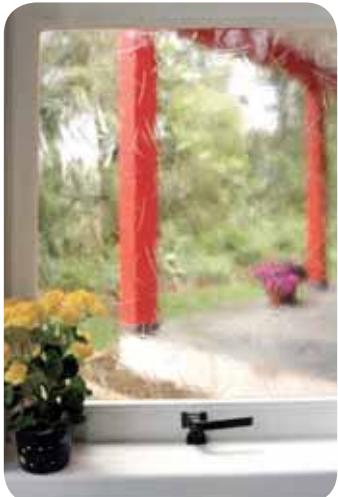
TUROMAS
OUR PASSION, YOUR PROGRESS

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UBV - União Brasileira de Vidro



Founded in 1957, the UBV (União Brasileira de Vidros), is the largest manufacturer of the Patterned Glass in Latin America.

Pattern glass are sheets of translucent glass, whose main feature is the embossed texture on its surface. With a range of unique products, many of them exclusive, the UBV Glass are intended for decoration and construction markets, serving different types of applications, such as shower doors, doors, partition walls, engineering, furniture and frames.

Fundada en 1957, la UBV (União Brasileira de Vidros), es una empresa de vidrio impreso brasileña y es el mayor fabricante del vidrio impreso en América Latina.

Vidrios impresos son láminas de vidrio translúcido, cuya característica principal es la

textura en relieve en su superficie. Con una gama de productos únicos, muchos de ellos exclusivos, los vidrios UBV están destinados a los mercados de decoración y construcción, que sirve diferentes tipos de aplicaciones, Divisiones de baño, Escuadrias, Puertas, Ingeniería, muebles y marco.



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www.vidrosubv.com.br



Vidplex Universal s.a.



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Lindner

Sheppée International
Waltec Maschinen

RAW MATERIALS

Bohemi Chemicals
Colorobbia
Fonderie Bartalesi
GCG - Glass Consulting
Group
Minerali Industriali

RECYCLING PROCESSES

EME
Lizmontagens Thermal
Technologies

RECYCLING SYSTEMS

Colorobbia
Falorni Tech
GCG - Glass Consulting
Group
Lizmontagens Thermal
Technologies
ZIPPE

REFRACTORIES

Bucher Emhart Glass
Falorni Tech
Fusiontec-Revimac
Lizmontagens Thermal
Technologies
S.I.G.M.A.
Waltec Maschinen

REFRACTORIES INSTALLATION SERVICES

Bucher Emhart Glass
Colorobbia
Falorni Tech
Fusiontec-Revimac
Lizmontagens Thermal
Technologies
SKS - Sorg Karrena
Service
Teichmann, Henry F. /
E.W. Bowman

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ROBOTS: BALL GATHERERS

Falorni Tech
Glass Service
Waltec Maschinen

ROBOTS: HANDLING & PACKAGING

All Glass
Emmeti-Sipac
Falorni Tech
KYP Accesories
Messersì Packaging
MSK Covertech
Spami-Optrel-
Stevanato Group
Waltec Maschinen

ROTATING TABLES

Messersì Packaging
Olivotto-Antas-Lynch-
Lindner
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SANDBLASTING MACHINES

Olivotto-Antas-Lynch-
Lindner

SAW MACHINES

Olivotto-Antas-Lynch-
Lindner

SECOND-HAND EQUIPMENT

BDF Industries

ERMI Glass Control

Falorni Tech
Forma Glas
Heye International
Horn
KYP Accesories
Olivotto-Antas-Lynch-
Lindner
Vidromecanica

SERVICES

EME
Forma Glas
Lizmontagens Thermal
Technologies

SHEAR BLADES

BDF Industries
Heye International

SHEAR BLADES LUBRICANTS

Graphoidal
Developments

SHEAR SYSTEMS

BDF Industries
Bottero
Falorni Tech
Forma Glas
GPS - Glasproduktions-
Service
Graphoidal Developments
Heye International
Olivotto-Antas-Lynch-
Lindner

Revimac-Bottero
Waltec Maschinen

SHUTTLE CARS

Zecchetti

STRETCH & SHRINK FILM WRAP MACHINES

All Glass
Messersì Packaging

MSK Covertech

Thimon
Zecchetti

SHRINK OVENS

Messersì Packaging
Thimon

SILKSCREEN INKS

Fluorital

SILKSCREEN PRINTING LINES: HOLLOWARE & TABLEWARE

Fermac

SILKSCREEN PRINTING LINES: VIALS & AMPOULES

Moderne Mecanique
OCMI OTG

SOFTWARE

BDF Industries
Bottero
Bucher Emhart Glass
futronic
Heye International
TIAMA
Vertech'
Waltec Maschinen

SPINNING MACHINES

Olivotto-Antas-Lynch-
Lindner
Waltec Maschinen

STACKERS

All Glass
BDF Industries
Bottero
Bucher Emhart Glass
Car-Met
Emmeti-Sipac
MT Forni Industriali
Olivotto-Antas-Lynch-
Lindner
Revimac-Bottero
Shepppee International
Vidromecanica
Waltec Maschinen
Zecchetti

STEMWARE PRODUCTION LINES

Falorni Tech
Forma Glas
Olivotto-Antas-Lynch-
Lindner
Vidromecanica
Waltec Maschinen

STEMWARE SEALING MACHINES

Falorni Tech
Forma Glas
OCMI OTG
Olivotto-Antas-Lynch-
Lindner
Waltec Maschinen

STIRRERS

BDF Industries
Bottero
Colorobbia
Falorni Tech
Fusiontec-Revimac
GCG - Glass Consulting
Group
Glass Service
MT Forni Industriali
Olivotto-Antas-Lynch-
Lindner
Revimac-Bottero
Stara Glass
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Olivotto-Antas-Lynch-Lindner

TAKE-OUT DEVICES & EQUIPMENT

BDF Industries
Bottero
Bucher Emhart Glass
Falorni Tech
Forma Glas
GPS - Glasproduktions-Service
Olivotto-Antas-Lynch-Lindner
Ramsey Products
Renold
Vidromecanica
Waltec Maschinen

TEMPERATURE MEASUREMENT & CONTROL

BDF Industries
Bucher Emhart Glass
Falorni Tech
Graphoidal Developments
KYP Accesories
Lizmontagens Thermal Technologies

TEMPERING LINES

Vidromecanica
Waltec Maschinen

THERMAL CLEANING SYSTEMS FOR FURNACES

Lizmontagens Thermal Technologies

Preriscaldo Forni

THERMAL SHOCK TEST MACHINE

Vidromecanica

THERMOCOUPLES & ASSEMBLIES

Falorni Tech
GCG - Glass Consulting Group
Lizmontagens Thermal Technologies

THERMO SHOCK MACHINE

BDF Industries

TIN OXIDE ELECTRODES & CONNECTORS

Horn

TRAY FORMERS

Zecchetti

TOOLS & EQUIPMENT

Bottero
Lizmontagens Thermal Technologies

TUBING LINES

Falorni Tech
Olivotto-Antas-Lynch-Lindner

TURNKEY PLANTS ENGINEERING & CONSTRUCTION

Amig
BDF Industries
Colorobbia
Falorni Tech
EME
Glass Service
Lizmontagens Thermal Technologies
Spami-Optrel-Stevanato Group
Stewart Engineers
Teichmann, Henry F. / E.W. Bowman
Waltec Maschinen

UV LAMPS

Graphoidal Developments

VACUUM PLANTS & ACCESSORIES

Pneumofore

VACUUM PUMPS

Pneumofore

VIAL AFTER - FORMING MACHINES/LINES

KYP Accesories
Moderne Mecanique
OCMI OTG
Spami-Optrel-Stevanato Group

VIAL FORMING MACHINES/LINES

Moderne Mecanique
OCMI OTG
Spami-Optrel-Stevanato Group

VIAL PACKAGING MACHINES

KYP Accesories
Moderne Mecanique
OCMI OTG
Spami-Optrel-Stevanato Group

VIBRATING EQUIPMENT

Stara Glass
ZIPPE

WASTE GAS CLEANING SYSTEMS

BDF Industries

WASTE GASES DUCT WORKS AND VALVES CLEANING SYSTEMS

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WATER CLEANING SYSTEMS

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Glass Style

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Current plant

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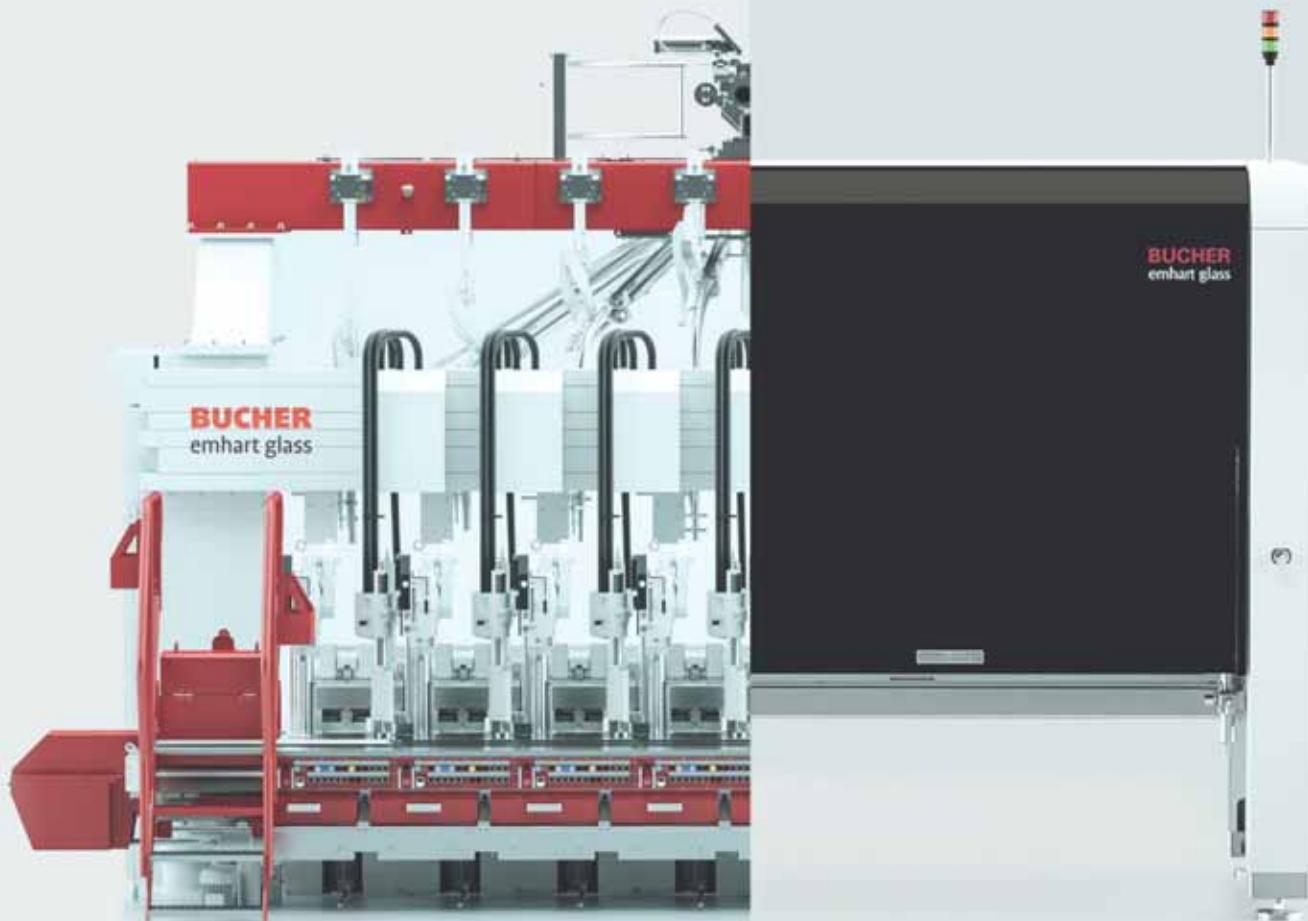


New plant



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Hot End

Cold End

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