glass machinery world plants & accessories

BI-MONTHLY INTERNATIONAL MAGAZINE FOR GLASS MANUFACTURING

YEAR 34 • ISSUE NO. 4/2021

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Glass furnaces

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For an online presentation of the Tiama Xlab please contact us at **marketing@tiama.com.**

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The burner angle is a very important parameter, as it can have a strong influence on the melting process, furnace life and emission values. It further facilitates lower energy consumption. Therefore an accurate and rapid adjustment of the burner angle after burner replacement or cleaning is of utmost importance.

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OLIVOTTO GLASS TECHNOLOGIES

AI GIOTTO platform

The last edition of *China Glass* was an important success for **OGT (OLIVOTTO GLASS TECHNOLOGIES).** This year, in fact, equipment for pharma tubing and vials are representing one of the major topics on the market.

During this 2021 edition, OGT unveiled GIOTTO, the cutting-edge industrial IoT platform, to customers. Many China Glass attendees had the opportunity to see in real time the intelligent tubing manufacturing system on active duty, and most of them said that GIOTTO is a 'must have' tool for the next tubing lines.

GIOTTO helps specialists identify and highlight improvement potentials in production processes by avoiding product quality issues and monitoring influence factors in order to identify and react to quality issues in the shortest time possible.

Analysis of machine sensor data to detect patterns, anomalies and identify potentials for optimizing the production process and machine configuration. The system based on neuronal networks (AI) can reveal hidden patterns and relationships between machine configuration, operation parameters and product quality issues.

Behind GIOTTO platform their a mixed team of domain experts and data science specialists using cutting edge analytic tools and algorithms to ensure rapid results.

Today, GIOTTO's main applications concern tubing glass, but GIOTTO is a comprehensive industrial platform designed for all glass processes, and can increase production efficiency and effectiveness by means of extensive use of Artificial Intelligence

Olivotto Glass Technologies (OGT) has been operating in the field of hollow glass machines since 1946. the company is a global enterprise principally engaged in the conception, research, design, development, manufacture and integration of advanced-technology equipment and services. Thanks to almost 75 years of experience and expertise, OGT provides par excellence hollow glass systems and pharma packaging lines.

In the last decade OGT delivered several turn-key plants for the Glass and Rock Wool production and, more recently, equipment and assembly lines for PV-modules as well.

WWW.OLIVOTTO.IT/

REVIMAC

Servo feeder for small capacities

At the end of 2020, **Revimac** was involved by *iPROTec GmbH* in a project to produce a spout servo-feeder for specific applications of the tableware industry.

iPROTec GmbH, an engineering company of *Zwiesel KristallGlas Group* (formerly *Schott Zwiesel*) top manufacturer in the segment of high-class glass stemware segment, is active in all the continents as leader in the supply of machines and services for the tableware and technical glass industry.

Revimac is mostly serving the glass bottle production industry, however some machinery within its manufacturing range, such as feeder mechanisms, ware handling equipment and glass conditioning forehearths are suitable for tableware production as well.

The servo-feeder supplied is the smallest manufactured by Revimac with a maximum glass production capacity of 36 ton per day and for this specific application has been integrated with the shear and control system of iPROTec.

WWW.REVIMAC.COM/EN/
WWW.IPROTEC-GMBH.COM/EN-UK/

HFT

Logo and brand identity updates

For over 74 years, global glass makers have trusted **HFT** to deliver operationally critical engineering, construction, and glass expertise on projects throughout the world. Whether the project is a turnkey design build factory using the latest technology, a scheduled cold repair or an upgrade to modernize equipment, HFT have forged a name in dependability and quality.

HFT continues to grow and expand their team and ability to service client needs, as well as offering expanded capabilities to provide clients with critical services that include back-up power, micro-grid, heat recovery, renewables, and other power solutions.

As the service offerings continue to grow, HFT's President, Mark Piedmonte, felt it appropriate to update the brand identity and logo:

The new logo and colours reflect the traits and qualities that HFT's brand and staff continue to represent: Dependability, Quality, Trust, Transparency, and Innovation.

The revamped look can be seen on the company website and will be reflected in other HFT business collateral over the coming weeks.

While HFT remains the hard-working and dedicated service provider that glass manufacturers have known and trusted for many years, they will also continue to increase and improve their ability to support clients through greater innovation and creative solutions.

HFT would like to take this opportunity to thank all its clients and partners for their ongoing support, and they look forward to continuing to deliver excellent service, quality, and value to glassmakers around the globe.

WWW.HFT.COM/

HEINZ-GLAS

Investments at Kleintettau plant

The **HEINZ-GLAS Group** has commissioned a new glass melting furnace at its Kleintettau, Germany, location. The project involves investments of around EUR 15 million. The latest generation of electric furnaces can produce high-quality perfumery glass, clear glass with a high PCR cullet content as well as opal glass. For more than 15 years, opal glass was produced by the group of companies exclusively at the site in Dzialdowo, Poland, while now, the fact that this is also possible once again at one of the German locations opens up further opportunities for the HEINZ-GLAS Group.

Carletta Heinz, owner and CEO of HEINZ-GLAS, said, "Technical progress, in particular, helps to overcome crises and create entrepreneurial perspectives. A certain amount of courage to try something new and then the necessary bit of luck are of course also part of it."

Together with electricity from renewable sources and the new, highly flexible furnace technology available today, HEINZ-GLAS has now become one of the most sustainable glass manufacturers in the world. With the investment in the new special furnace, this path is to be continued.

The investment secures more than 120 jobs at HEINZ-GLAS and about the same number of jobs at suppliers in the region.

HTTPS://HEINZ-GLAS.COM/EN/

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GLASS FUTURES

Tender success for world-first R&D furnace from Stara Glass

Glass Futures has appointed Italian glass engineers **Stara Glass S.p.A.** to design its 30 tpd experimental Research & Development furnace – the core of Glass Futures Global Centre of Excellence being built in St Helens in the UK.

Stara Glass is part of the *Hydra Group* of companies which provides depth across the glass industry supply chain including equipment, construction, warm up, and R&D. Based in Genoa, Northern Italy, the Stara Glass team also has close ties with the city's renowned university.

Stara Glass has confirmed its joining Glass Futures as an Affiliate Member to begin looking at technology development following the announcement that global drinks leaders Heineken and Diageo have also joined Glass Futures as Corporate Members.

The comprehensive procurement process, led by Glass Futures' Technical Steering Committee, involving senior representatives, from the global glass supply chain took several months looking through a number of excellent proposals before selecting Stara Glass to design the unique experimental furnace.

The 165,000 sq.ft. Glass Futures' Centre of Excellence is being built on a 14-acre site with the facility centred around a 30-tonne/pd low carbon demonstration furnace creating the world's first openly accessible, multi-disciplinary glass melting facility. This will have provision for research and development trials to establish new manufacturing techniques, raw materials and improved efficiencies whilst decarbonising the glass industry.

Peter Liggett, Glass Futures' Capital Projects Manager, said, "Stara Glass represented the best technical fit for Glass Futures and they demonstrated considerable enthusiasm to work on this ground-breaking project. We are looking forward to working with Stara to ensure we have the very best R&D furnace to lead our innovation work."

Ernesto Cattaneo, Head of Computing and Innovation Projects at Stara Glass, added, "Normally, a glass furnace is commissioned and it runs continuously, as any downtime means a huge loss in production and profit. That is not the case here.

"The Glass Futures' furnace is a world first and will be designed with multi-functionality in mind. It will need to use different fuels such as methane, hydrogen, biofuels and electricity and have multiple test areas; it will be like a playground for glass engineers. There has never been anything like this before and that is what's so innovative about Glass Futures' vision for the industry."

Glass Futures is a not-for-profit research and technology organisation building the GBP 54m Global Centre of Excellence for Glass R&D, Innovation and Training in St Helens, in the north west of England.

The facility is set to connect the glass industry and academia to deliver exportable R&D and innovation, as well as training and up-skilling opportunities, ensuring glass making's future is built on sustainable, recyclable, carbon-zero products.

WWW.STARAGLASS.IT/

TIAMA INSPECTION WORLDWIDE

Acquisition of VIMEC

Tiama Inspection Worldwide HAS announced the acquisition of VIMEC. Based in Eindhoven (Netherlands) and with more than 30 years of experience, VIMEC is one of the world's leading companies in the field of non-moulded glass control & inspection for the pharmaceutical industry segment.

VIMEC developed strong expertise in controlling vials, ampoules, syringes, and cartridges at different steps of their production thanks to its machine vision solutions.

Most recently, VIMEC has been providing dedicated services for the inspection of vials used for COVID-19 vaccines.

Tiama's objectives are to speed up VIMEC's growth by developing synergies (R&D, purchasing, etc.) and increasing VIMEC's Sales and Services presence to a worldwide level.

Tiama also plans to bring technologies it has already developed for food & beverage glass defect recognition (artificial intelligence, deep learning, etc.) to this pharmaceutical segment.

WWW.TIAMA.COM - HTTP://VIMEC.NL

FORGLASS

Second PCR cullet system for Stoelzle

Forglass' PCR Cullet System is one of several innovations that the technology supplier from Poland has introduced to the glass industry in recent years.

The system was originally designed in 2020 for Stoelzle Oberglas in Köflach, Austria. **Stoelzle** is known for their excellence in producing the highest quality extra-flint glass for the pharmaceutical, spirits, food, perfumery and cosmetics industries. Managing PCR cullet is critical for the company's production, so engineers from Forglass and Stoelzle worked together to develop an external cullet preparation line that would optimally fit the demands of the glassworks.

The first Forglass PCR Cullet System in Köflach has proven itself so well that the Client decided to order a second, similar system for their plant in Knottingley, UK.

The new technology line will include a weighing and dosing system, based on one compact weighing belt conveyor. The system allows dosing cullet with smooth feed regulation from the control room or from the device panel.

What is uniquely challenging about this particular project is that it will include a 70m belt bridge (gantry) that will need to be installed by a massive crane in merely 8 hours.

Fortunately, Forglass engineers and technicians specialise in atypical and challenging projects.

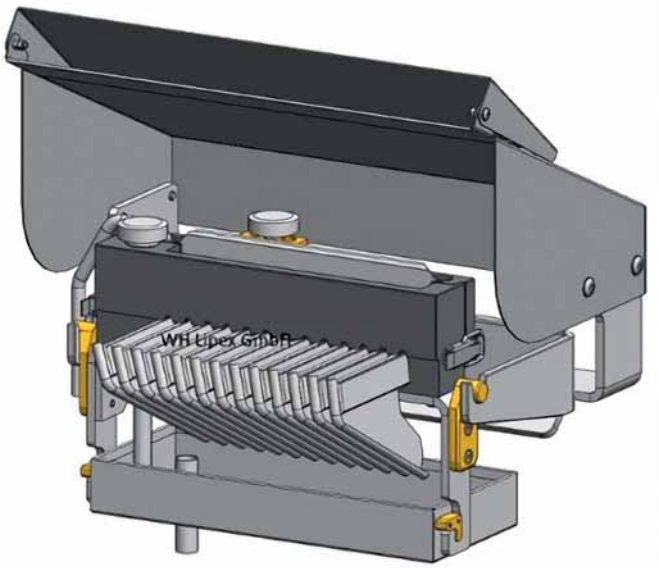
WWW.FORGLASS.EU/EN/

LIPEX

Single fibre applicator for fibre glass sizing application

WH Lipex, part of Woollard & Henry Group, is a Munich based fibre glass technology company supplying know how from raw materials to finished fibres worldwide.

Newly introduced and developed coating module, the single fibre applicator allows coating individual glass fibres with wetting additives. On this single fibre applicator, the fibres are no longer in bundles on the applicator but individually displayed. This ensures that all individual filaments are better enclosed with wetting additive (sizing).



This performance increases significantly the amount of wetting additive on the fibres and thus improves the bonding possibilities to the other materials in which the glass fibres are embedded.

The main advantages for this of applicator are mainly:

- Increases the mechanical properties of the end product,
- New possibilities for weight reduction and cost reduction without losing mechanical properties for end products.

WWW.LIPEX.DE/

GLASSPEX INDIA and GLASSPRO INDIA

Postponed to 2022

In view of the impending uncertainty during these pandemic times, Messe Düsseldorf India has decided to reschedule the combined events of **glasspex India, glasspro India and fenestrationpro India.** The event, which was originally scheduled 23-25 September 2021 at Bombay Exhibition Centre in Mumbai, is now scheduled for 3-5 March 2022, at the same venue.

Thomas Schlitt, Managing Director, Messe Düsseldorf India, stated, "Our objective remains to support the economic recovery by providing a leading platform for conducting businesses safely and effectively at our trade fairs. But the recent development in the pandemic situation does not allow a reliable planning for our trade fairs in India for the next few months. These circumstances make it impossible to hold the Glass Events in India for September 2021. The decision to reschedule the fairs to March 2022 was taken after careful evaluation of the situation together with our partners and key stakeholders."

With this decision, Messe Düsseldorf India is taking into account its obligations towards its partners of the glass industry in India and world-wide. The postponement to a later date will ensure that the event will continue to play its leading role in bringing the global industry stakeholders together once again.

Schlitt added, "We trust that by 2022 the international travel restrictions will be lifted and we will again see a large international participation given the international nature of our events. We are grateful to all our partners for their continued support in these unprecedented times. We stay committed and will take every possible measure in supporting and creating resilient businesses at India's leading industry event catering to the glass fraternity."

WWW.GLASSPEX.COM

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fenestrationpro INDIA 2022 fenestrationpro

NIPRO PHARMAPACKAGING

Acquisition of Piramida completed

Nipro PharmaPackaging is strengthening its position as a leading global supplier of glass primary packaging for the pharmaceutical industry with the acquisition of **Piramida**, a leading Croatian manufacturer of glass pharmaceutical packaging.

Blue Sea Capital, a regional private equity fund, and Nipro PharmaPackaging have closed the sale and transfer of full ownership stake in Piramida. Under the ownership of Blue Sea Capital, Piramida underwent a modernisation of its facilities, with eight new production lines, and witnessed a strong development of its ampoules and vials business. Moreover, production capacity as well as the revenue doubled. This led the company being ranked among the top five largest ampoule manufacturers for the pharmaceutical industry in the European market.

Piramida is, thanks to its important market position in the Central European Territory, alongside an impeccable reputation combined with sound and strong customer relationships, a very important asset to Nipro's future and its ambitious growth plans.

Pharmaceutical glass packaging plays a crucial role in today's challenging world, especially in the wake of the COVID-19 pandemic and the increased production of vaccines. With the acquisition of Piramida and its yearly capacity in excess of 0.5 billion glass containers, Nipro is now able to cater to the market needs in Central Europe.

Stephan Arnold, CEO Nipro PharmaPackaging International, said, "We want to continue to build excellent customer relationships and become the preferred strategic partner to many pharmaceutical companies."

Kresimir Sečak, CEO of Piramida, added, "The management team is looking forward to working with Nipro to further advance Piramida's position on the European and global markets."

Saša Galić, Managing Partner of Blue Sea Capital, commented, "We are proud that Piramida has attracted the interest of one of the leading global players in the pharmaceutical packaging industry. We are excited to watch Piramida enter a new phase of growth with global ambitions."

Mr. Yoshihiko Sano, President or Nipro Corporation, concluded, "This latest acquisition demonstrates that Nipro takes its role and responsibility to society at large seriously. Extending our manufacturing footprint is of the utmost importance when continuity of supply may be at stake.

WWW.NIPRO-GROUP.COM/EN

VETRERIA PIEGARESE

Construction of new plant

Vetreria Piegarese, based in the Umbria region of Italy, has announced that it will build a new plant in the industrial area of San Giorgio di Nogaro in Friuli, Italy. Work on the new plant will start in the second half of 2021 with the aim of completing the intervention at the end of next year. The operation involves the construction of a new, 15,000 sq.m. structure dedicated to the production of glass bottles of various kinds, and an adjoining storage area of another 30,000 sq.m.. The new plant should employ about 80 people.

WWW.VETRERIAPIEGARESE.IT/

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STOELZLE

New cubic 100 ml bottle with short screw cap

Guided by environmental issues, several leaders in the glass industry have joined forces to form a Geometric Flaconnage working group at CETIE (Centre International Technique de l'Emballage et du Conditionnement). This approach has led to the development of a new range of screw rings, adapted to the needs of the market for reusable and/or easy-to-recycle bottles.

The Bottle Neck Geometry group has been working for many months on a short screw ring option and on the FEA/Screw Ring interchangeability option of the same height. Instead of the traditional FEA crimp rings, these new standard screw rings should be as short as possible, allowing the same pump covers to be used as their crimp counterpart, while guaranteeing a good screwing and an optimal unscrewing brake.

This new top-of-the-range model is the perfect fit for this innovative screw ring, which separates and recycles all the elements. For more than a year, the **Stoelzle** team has been carrying out numerous technical tests on customer lines, which have led to the approval of many leading brands.

These rings have brakes in the thread that have been adapted and verified in real conditions; they guarantee good closure and reduce unintentional unscrewing.

This new offer allows each customer to interchange between FEA or VIS rings depending on the brand's strategy, the project and the adaptation time of their packaging lines.

WWW.STOELZLE.COM

AKTIS

Russian glass-container plant is up for sale

The property of the Novocherkassk, Russia, glass-container plant **Aktis** is up for auction. If the auction is twice declared invalid, the only pledge creditor of the enterprise – *JSC Glanit*, a glass container manufacturer from the Tula region, affiliated with the Pikalevskaya Soda Group of Companies – will become the owner of the property.

In total, 41 lots worth more than RUB 4 billion are being auctioned. The most expensive is the Aktis production complex. It includes buildings (except for residential), industrial equipment, components and land. Its starting price is RUB 3.99 billion. Another 40 lots were specialized equipment, cars, trailers and railway vehicles.

Glanit became the only pledge creditor of Aktis, and on 9 March 2021 began work at the facilities of the enterprise. Glanit noted that the company is now assessing the amount of necessary investments and concluding a contract for hot repair of the furnace to prevent its shutdown.

The Aktis plant was built from 2007 to 2013 by the entrepreneur Vladimir Baziyan. The first loan was provided by the Czech Export Bank. The company was crippled by the fall of the ruble in 2014, which critically worsened its debt. In 2017, Aktis was declared bankrupt, and bankruptcy proceedings were opened.

Today Aktis is one of the largest glass container factories in Russia, with production capacity of 1.4 billion units of glass containers per year.

EAGLE GLASS

Operations shut down

Over 100 workers at **Eagle Glass Manufacturing Company** in Kapiri Mposhi, Zambia, have been made redundant, terminating contracts for all its employees, after the factory was closed.

Commenting on the situation, Eagle Glass Managing Director Zhi Zhao said, "We cannot cope with the pressure in the market because of cheap glass products imports and the impact of the Coronavirus."

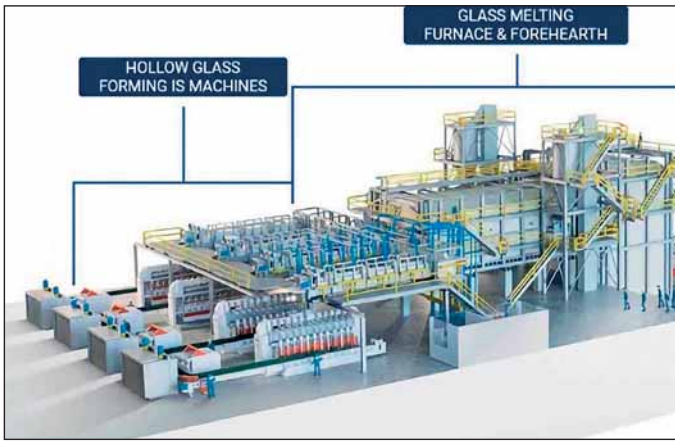
In January 2020 it was reported that Eagle Glass invested USD 15 million to set up a factory with a production capacity of up to 50,000 tonnes of flat and laminated glass annually, for both the national and international markets.

Eagle Glass hope to resume operations once business activity and production line issues are resolved, following which it hopes to re-engage employees who have been made redundant.

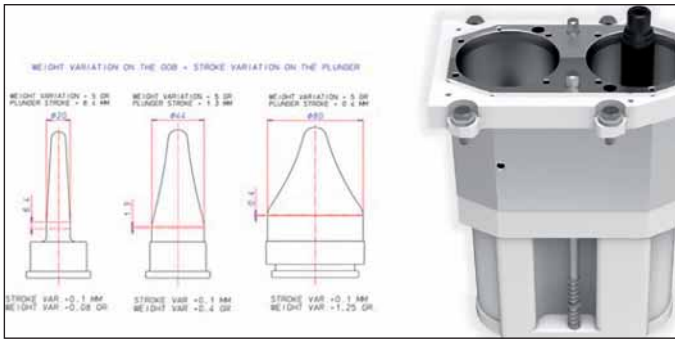
BDF

Integrated Weight Control System 2.0

The **BDF IWS 2.0** stands for perfect control of the correct gob weight, also optimizing it. The correct gob weight is determined by the blank mould cavity design, by the plunger design and by the position of the plunger inside the blank mould. The final position of the plunger inside the mould is reached when all the space, between plunger and mould cavity, is filled with glass. If the position of the plunger is higher than the calculated theoretical position, it means that there is less glass inside the mould, if it is lower there is more glass and this non-conforming or conforming plunger position is the main information needed by the system.



The plunger position inside the mould, when the gob weight is correct, is stored as a reference value for the successive plunger positioning to check for gob weight variation during the forming process. The gob weight variation is calculated by the stroke variation positions which are outside of the reference position. The plunger cylindrical area, which is outside the reference position, is multiplied by the glass specific weight, which determines the weight variation calculation of the gob weight to correct it through a feedback to the feeder.



IWS benefits include:

- Automatic regulation of the gob weight reducing manual operator interventions.
- Qualitative and quantitative improvement of production thanks to the stability of the gob weight and reduction of the defects on the finish of items.
- Best thermal stability of the channel, machine and production.
- Interaction with inductive transducers facilitates and speeds up mechanism set-up.
- Increased speed and production quality thanks to the control of operating air by means of a proportional valve (optional).
- Important step for the automatic control of the forming process.

WWW.BDFINDUSTRIESGROUP.COM/

PNEUMOFORE

Rotary Vane Technology for Weck Glaswerk

Weck Glaswerk, one of the most historical and renowned glassworks in Germany, has been relying on Rotary Vane technology for the supply of vacuum and compressed air for its IS machines for decades.

In 2017, with the expansion of its production plant in Bonn, the company installed the first UV30 vacuum pump designed by **Pneumofore**, leading supplier of centralized vacuum and compressed air systems for glassworks worldwide. This Rotary Vane machine fully met the expectations. The efficient non-stop operation and the ability to independently service the machine reinforced Weck's faith in Pneumofore.

In fact, the company installed a second Pneumofore UV30 unit, equipped with Variable Speed drive, and commissioned a Pneumofore A400.4 low pressure air compressor for the supply of 3 bar(g). Owing to the steady running of the Pneumofore machines under full load over the years, Weck Glaswerk was happy to document the results and the confirmed power consumption savings with a video testimonial.

WWW.PNEUMOFORE.COM

HEINZ-GLAS

More focus on eco-solutions

Despite the year 2020 has been difficult for business, in 2021 **Heinz-Glas Działdowo** is implementing another strategically important investment.

The reconstruction of the electric glass furnace has just started, which will allow the production of glass packaging from opal glass, flint glass, and PCR (Post Consumer Recycling Glass) – glass obtained from selective waste collection from the market.

The production capacity of the new furnace will be from 20 to 50 tons of glass melting per day. Also important, it will be an energy-saving furnace and, additionally, it will be powered with energy 100% generated from renewable energy sources – wind farms.

The investment in HGD is primarily aimed at rebuilding the production capacity and increasing the company's flexibility in adapting to changes and requirements on the glass cosmetic packaging market.

HEINZ-GLAS Działdowo is optimistic about the future, even though the current situation in Poland and in the world is still difficult. The pandemic has taught HGD to respond flexibly and adapt its offer to the current needs of customers.

HTTPS://HEINZ-GLAS.COM/EN/

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FORGLASS

New 400 tpd furnace and 750 tpd batch plant

Forglass, one of the leading European suppliers of glass melting technologies, has won the greenfield project for a major international glass producer, who specializes in the production of brown beer bottles for customers across Europe, the USA and Canada. The environmentally-conscious investor chose Forglass to design and deliver a brand-new furnace and an entire batch plant.

The new furnace, based on technology developed by Forglass (with full automation and safety systems, including gas supply), will deliver over 400 tons of amber glass per day to three production lines. Forglass technology ensures that the new furnace will be more environmentally-friendly due to low energy consumption and low emission of greenhouse gases.

The new batch plant will include raw material and cullet storage, dosing, mixing and batch transport, as well as the cullet return system, including two of the company's innovations: Selectable Grain Crusher™ and SmartScraper™.

The client will enjoy a brand new, turnkey plant for glass production in their new factory in Poland, scheduled to be completed in 2022.

WWW.FORGLASS.EU/EN/

EME

Advanced batch plant upgrade at Techpack Solutions

EME recently successfully completed a complex batch plant upgraded at **Techpack Solutions** in South Korea.

In addition to modernizing the batch material dosing and weighing section, EME exchanged the high-duty pan mixer in this area with very limited space, upgraded the cullet dosing, weighing and addition from a container scale system to a highly sophisticated modern belt scale system.

The entire control system of the batch plant was also upgraded.

WWW.EME.DE/GB/INDEX2.HTML

VISY

Rebuild of glass furnace in South Australia

As a component of **Visy** Executive Chairman Anthony Pratt's recent AUD 2 billion investment pledge in Australian manufacturing, the company announced it would invest over AUD 70 million in South Australia over the next 12 months.

The investment will completely rebuild Visy's West Croydon based glass furnace, ensuring the company will be able to manufacture glass bottles in South Australia for years to come. Visy will also invest in three new glass forming machines used to shape glass bottles.

Visy's glass facility in West Croydon employs approximately 160 people in manufacturing jobs, and the company's manufacturing investment will secure these jobs for the long term.

Visy has committed to increasing the average recycled content glass content used by its glass manufacturing plants from 30-70%, keeping more glass in the circular economy, reducing landfills and creating environmentally sustainable re-manufacturing jobs.

WWW.VISY.COM.AU

GLASS SERVICE

Verallia moves fast forward with Industry 4.0

Verallia has deployed over the last four years an ambitious plan to roll out **Glass Service** Expert System III (ES III™), an advanced control system that enables to face industry 4.0 challenge with process chain digitalization in order to release productivity barriers.

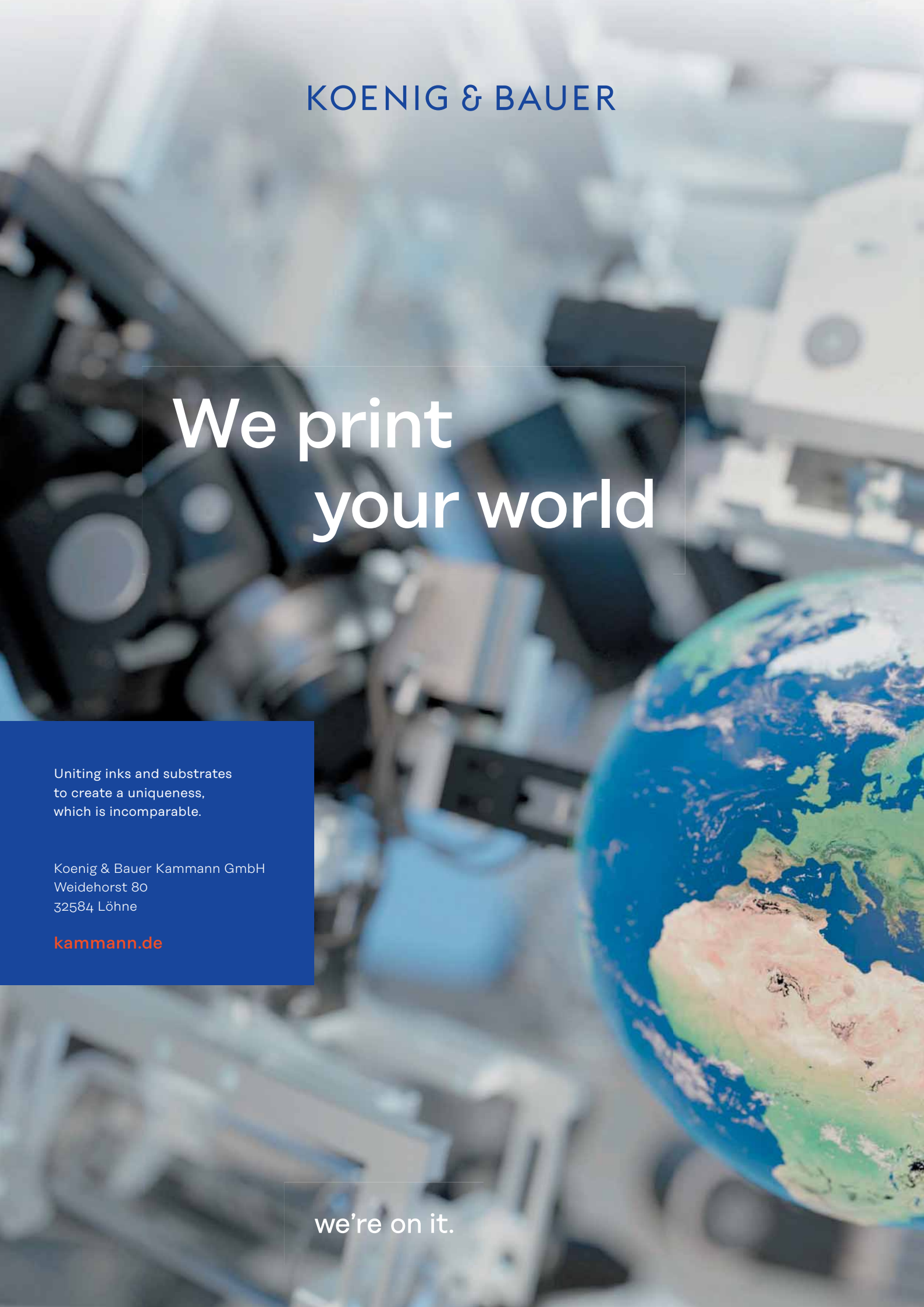
Most Verallia container glass factories are equipped with this ES III™ system, which improved the stability and resulted in an automated cruise control of furnaces and forehearths. This contributed to energy savings and reduction of CO2 emissions as well as a better control and stability of Verallia NOx emissions. In addition, it decreased the defects linked to inclusion in the glass thanks to a better control of the furnace temperatures. The aim is to achieve industrial excellence using the least possible resources and ensure zero defects at the customers' sites.

Verallia was awarded in September 2020 by the RH&M Group and received the Artificial Intelligence (AI) and Enterprise Trophy, which highlights the transformative role of AI in organisations.

Glass Service developed ES III™, an advanced control system which includes connected instrumentation, data analysis, machine learning and model based predictive expert control including human experience. It has been installed on over 300 furnaces worldwide and has become the leading solution for improved furnace and forehearth controls.

Romain Barral, Head of Operations at Verallia, commented, "Verallia is keen to collaborate with best experts who can help us progress in our operations, achieve industrial excellence, and decrease our environmental impact. One lever is to digitize our industrial equipment to have a better control of our processes with self-diagnostic capabilities and improve our production performance. This project is the result and the success of Verallia teams who were able to train and adopt this new tool, so they can focus on more strategic tasks, as analysing data and make decisions to ensure the best running of furnaces."

WWW.GSL.CZ/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O-I GLASS

Potential plan of reorganization for Paddock subsidiary

O-I Glass, Inc. (O-I) has announced that its wholly owned subsidiary, Paddock Enterprises, LLC, has reached an agreement in principle for a consensual plan of reorganization under section 524(g) of the Bankruptcy Code.

Paddock, the Official Committee of Asbestos Personal Injury Claimants (the "ACC"), and the legal representative for the future asbestos personal injury claimants (the "FCR") all agreed to accept the terms of a mediator's proposal regarding a potential consensual plan of reorganization for Paddock.

O-I Glass supports the agreement among Paddock, the ACC and the FCR that follows a successful court-approved mediation process conducted by Kenneth Feinberg and the Honorable Layn R. Phillips in connection with Paddock's ongoing Chapter 11 case.

"From the beginning of the Chapter 11 process, we have been committed to supporting a resolution of Paddock's legacy asbestos liabilities in a manner that ensures claimants are treated fairly while providing finality and certainty for O-I Glass and Paddock. This agreement is a positive and significant step toward achieving those objectives.

"O-I Glass and Paddock look forward to working cooperatively with the ACC and FCR to implement the terms of the agreement. We believe this is the best path to not only equitably address Paddock's legacy liabilities but also move expeditiously toward emergence," said Andres Lopez, CEO of O-I Glass.

Under the terms of the accepted proposal, the total consideration to fund a section 524(g) trust on the effective date of a confirmed plan of reorganization would be USD 610 million. The agreement is subject to definitive documentation and satisfaction of certain conditions including, but not limited to, court approval of a plan of reorganization for Paddock that will channel all current and future asbestos personal injury claims against Paddock into a trust created under 11 U.S.C. § 524(g) and establish an injunction protecting Paddock, O-I Glass, and their affiliates from assertions of current and future liability from such channelled claims.

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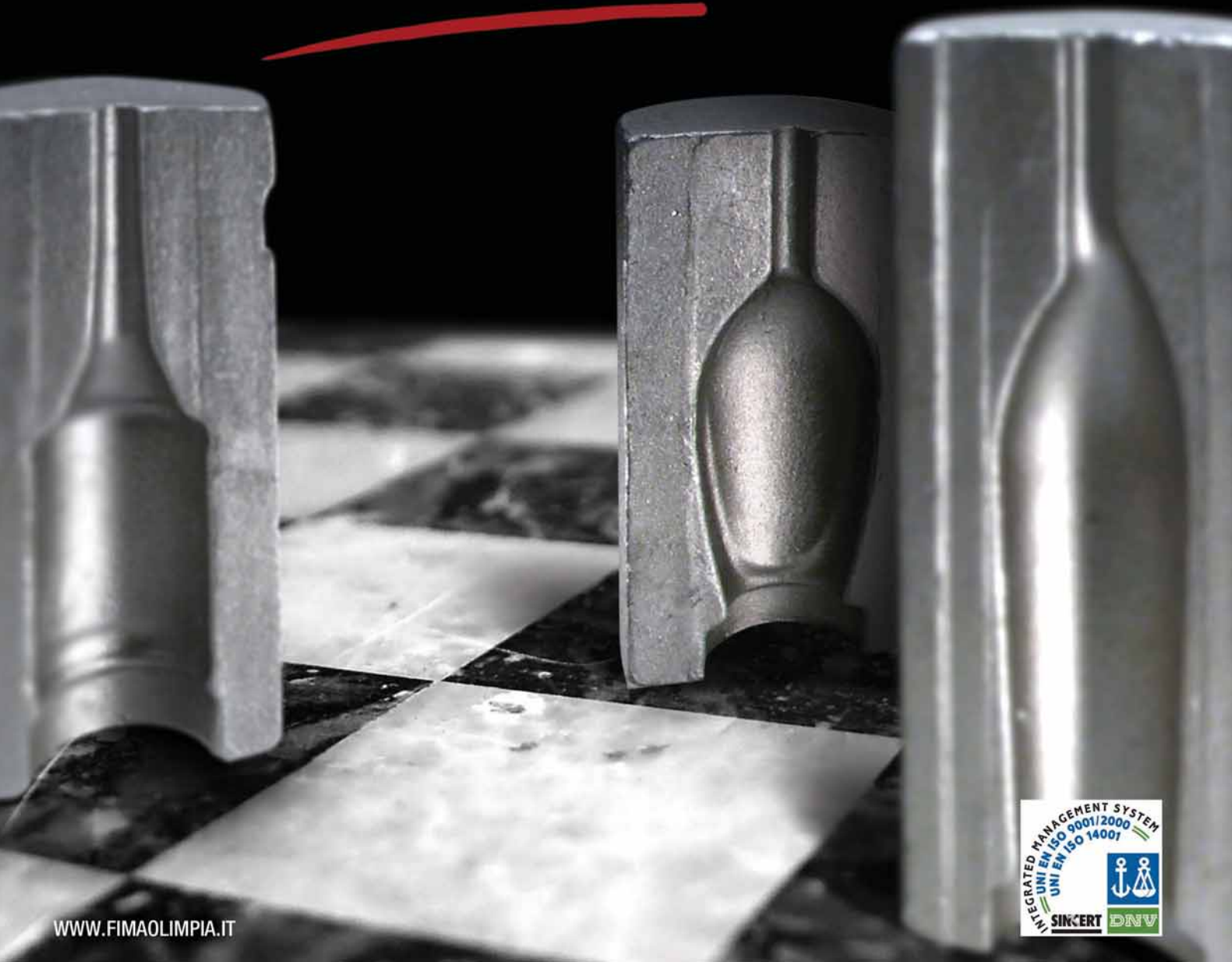

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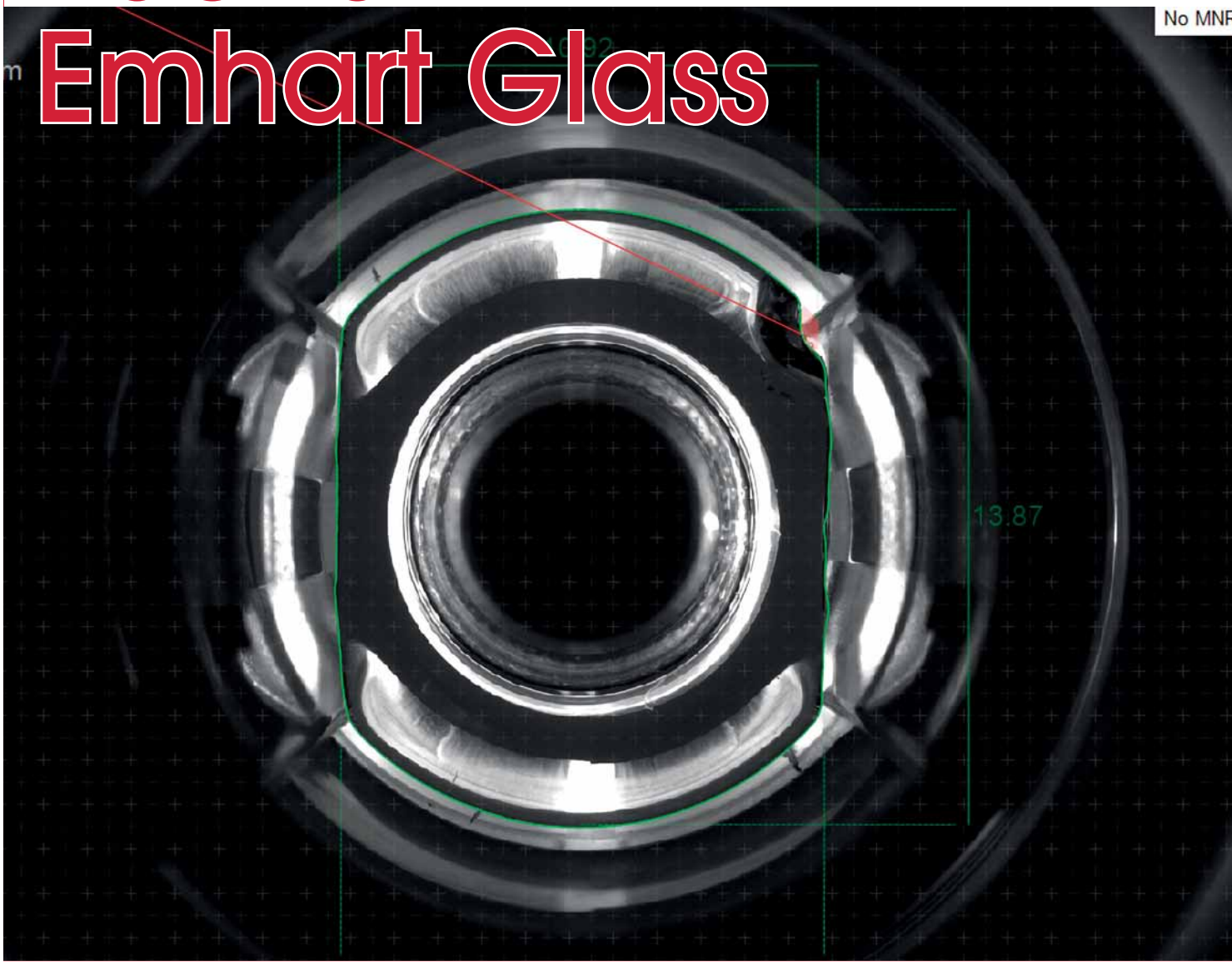
‘Deep learning’ to enable new inspections with SCOUT Ai from Bucher Emhart Glass



'Artificial intelligence', 'Deep learning' and 'Neural networks' are just some of the expressions we are learning about day by day, and which will soon be taking us all to the next level as we learn how to harness the power and apply it into new inspection technologies.

Niki Estner -
Software development manager
BUCHER EMHART GLASS

INTRODUCTION

This is the first installment in a short series of articles that will highlight the introduction and evolution of 'Artificial intelligence', 'Deep learning' and 'Neural networks' as it pertains to their use in glass inspection machines. In this installment, Niki Estner, Software development manager at Bucher Emhart Glass, provides two examples where the limitations of conventional machine vision to detect issues with the items being inspected proved itself difficult and marginally acceptable. In these articles, Niki will explain 'SCOUT Ai' and how it uses deep learning to enable new inspections, improve usability, increase accuracy and reduce setup times.

THE HYPE

Artificial intelligence, deep learning and neural networks have been buzzwords for more than a decade now. I always assumed they were a hype. The promises just sounded too good to be true. If you are like me, you have learned that most 'silver bullets' do not work as advertised.

THE FIRST PROJECT

My view of this technology changed radically a few years back, when I started working on a camera-based quality inspection system for a pharmaceutical product.

For this application, the customer provided us a set of good and bad samples. One of the first challenges we faced, was the fact that the inspection could only be performed when the object was already partially assembled. This made the image processing of the object to be inspected quite difficult.

To achieve an inspection accuracy rate of 80 per cent on the samples provided was easy. It took just a few days of time. Getting the results to 90 per cent took much longer. It took months and a series of updates, to achieve an accuracy rate of 95 per cent. Every fraction of a percent cost weeks of development time. This effect is widely known as the Pareto principle or the law of diminishing returns. We see it in many inspection problems: The closer you get to 100 per cent accuracy rate, the harder it becomes to gain that 0.1 per cent.

To complicate the situation, every time our customer made changes to their product, all of those painstakingly optimized parameters were no longer optimal and the detection rates (especially false rejects) deteriorated.

In this case, every false reject cost over a thousand euros of sellable product and every undetected defect could lead to an injured patient. Due to the value of the product, there was constant pressure to improve detection accuracy. After exhausting the potential of conventional inspection methods, we decided to give the deep learning 'silver bullet' a shot.

We had a few false starts. Training took a long time. Inspection hardware became more expensive. However, in the end, we came up with a deep-learning based inspection that is now detecting 99.9 per cent of all defects and 99.93 per cent of all good objects correctly.

Imagine how much development effort this result would have cost, with conventional means.

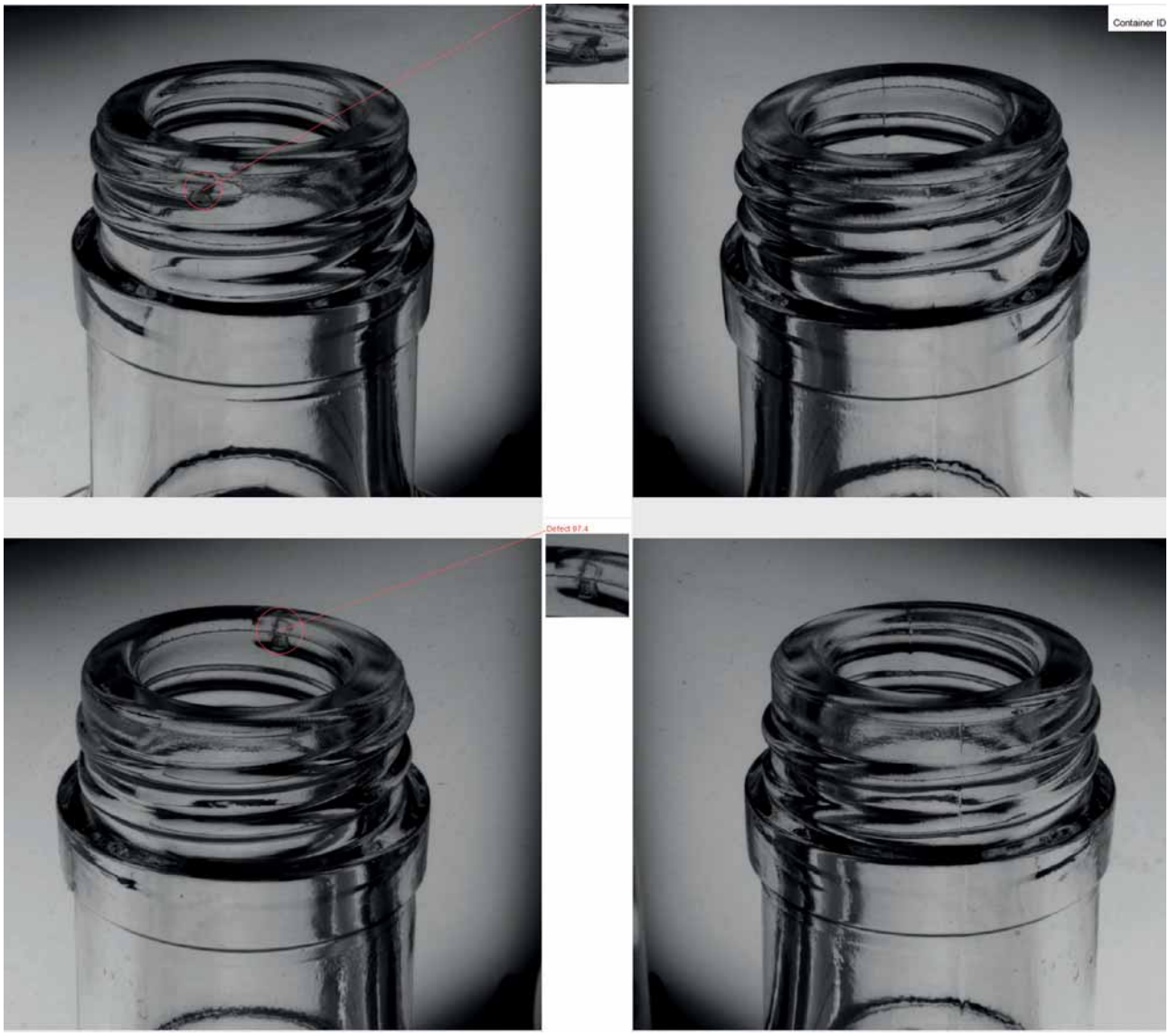
CONTAINER GLASS INDUSTRY

The pharmaceutical industry is only a small part of our product range. But with its high quality and regulatory standards, it continuously drives us to improve our inspection quality, safety, and traceability standards.

Therefore, we next started using this technology in our core business area, the container glass industry.

One of the projects we used artificial intelligence for was the thread inspection system (TID).

Inspecting the thread area is notoriously difficult as it is full of features that cause light refraction and reflection effects that make the same container look completely different in different orientations. To make it more difficult, all of



those refraction 'shadows' change over time, as the thread shaping and annealing process change.

The image above shows a small defect near the start of a thread. Finding this defect is hard for a human. It is nearly impossible with conventional inspection technology.

Even with deep learning technology, this application is difficult as some defects simply do not show up in the images. Even for a human, it can be hard to tell what is a real defect and what is a normal reflection caused by a feature in the glass. Learning to discriminate these differences, can only be accomplished using a neural network. With every new training image, the network gets a little bit better at distinguishing defects from good ware. Today we have this system running in production continuously with only an occasional training update required to compensate for production variances.

SUMMARY

After years of development and testing, I can say that deep learning is not a magical 'silver bullet'. Nevertheless, it is an incredibly useful tool and it makes previously unsolvable problems solvable. The future of machine vision is here, 'Artificial intelligence', 'Deep learning' and 'Neural networks' will be taking us all to the next level as we learn how to harness the power and apply it into new inspection technologies. ■

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FLA18 – the new vial forming machine from OCMI-OTG

Developing a new machine is never easy, and developing a machine that manufactures medical containers is even more complex. Combine this with moving away from traditional production and we can see how intense the work has been behind the development of this new machine for OCMI-OTG.

OCMI-OTG, worldwide leading supplier of borosilicate glass tube processing lines for medical containers with particular focus on ampoules and vials, is glad to introduce its new vial forming machine model FLA18.

DIFFERENT FROM TRADITIONAL FORMING MACHINES

This machine is strongly deviating from OCMI-OTG traditional production of forming machines since it follows the index rotation working concept even if many features of continuous rotation forming machines FLA20/S and FLA35 have been applied to this new equipment.

Now OCMI customers and prospects can choose between FLA20/S 20-station machine with continuous rotation, and FLA18 18-station machine with index rotation that can guarantee approximately the same maximum output. On the other hand, FLA35 continuous rotation forming machine still represent the best solution for the highest production speeds of up to 4500 pcs/hr.

FLA 18 FORMING MACHINE

FLA 18 forming machine been developed with 18 stations on the upper mouth forming crown and nine stations on the lower bottom finishing turret. This configuration and combination between upper and lower working turrets assures to maintain maximum productivity even in the event that one lower station is down for any reason.

The machine has been developed to reach a maximum output of 55 pcs/min. with 2R vials, with the possibility of processing glass tube diameters from 10mm to 30mm.

Turret rotation is driven by torque-motor that is supplied together with water chiller for its cooling. The same chiller can be used for the cooling of the forming plungers.

Forming operations are performed through three dedicated stations respectively dedicated to roughing and shoulder preparation, pre-finishing and finishing.

SERVO-DRIVEN FORMING STATIONS

As for OCMI continuous rotation forming machines, these stations follow the rotation of upper chucks through rotating bearings mounted on forming heads and, therefore, they do not need any manual alignment with chucks. All these three stations can be removed to make maintenance and job-change operations much easier for the operator.

The tools, plungers and rollers are servo-driven, making setting and forming operations much more precise and smoother. Thanks to this feature, operators can adjust the parameters related to tools starting/ending position and their acceleration from the machine control panel.

OPTIVIAL CAMERA SYSTEM

After mouth forming operations, main dimensions can be controlled by the OPTIVIAL camera system, coming from the experience acquired with other OCMI vial forming machines.

A new generation cameras allows to take up to 15 pictures of the same rotating vial and, consequently, to obtain more precise average values for each dimension. Servo-motors also drive the setting of tube receiving plates and cutting station, while nine lower chucks of the lower turret are driven by independent motors.

A dedicated station positioned before the unloading device, flattens the bottom by means of a containment buffer, which is important especially for large size vials.

Lower chucks are equipped with blowers enabled by solenoid valves, aimed to remove fumes from the inside of vials in order to keep alkalinity within the limits fixed by ISO standards.

Take-out, with servo-driven transfer system, has been developed for connection with OCMI after-forming lines.

The operator can, from the machine control panel, easily set the starting and ending positions of plates and cams driven

by servo-motors with user-friendly software. The operator can use remote push-button, by enabling jog mode during setting and job-change operations.

FLA18 machine are also suitable to be connected with the automatic loaders supplied by OCMI, now available in different versions for the pick-up of single tubes from bundles, or for collection of complete bundles inside the loading storage area.

Digital technical documentation about the new equipment is now available and will be loaded very soon on the new OCMI website, that will be updated according to the last reorganization of the group.

COMPLEMENTARY AFTER-FORMING LINES

The new index-rotation forming machine will be suitable to be connected with LF520 series existing vial after-forming lines developed by OCMI and MODERNE MECANIQUE.

These after-forming lines area available in two configurations according to the type of electrical annealing lehr supplied. Standard lehrs with rack-type conveying systems can process vials with minimum total length of 35mm and guarantee the absolute removal of strains from the glass surface thanks to the optimal distribution of heating elements along the three furnace sections.

The alternative new version of vial annealing lehrs developed at OCMI's Italian headquarters, is supplied by an in-feed manipulator with six mechanical grippers, picking the vials from the cooling conveyor and placing them in horizontal position on drilled metal trays. The pick-place manipulator allows to reduce the total length of vials to be processed since the grippers are adjustable according to vial height.

The LF520 line, in standard configuration, works with traditional packing sections with mechanical vial pushing devices inside the box.

On the other hand, the Automatic Packing machine PM-V, available with four or five box filling stations positioned on a rotating table, replaces traditional manual packing operation and solves the problems of friction between vials, and consequent scratches. With this option there is no contact between vials thanks to picking from the line by means of vacuum cups and, therefore, the risk of scratches or breakages during packing operations is minimized. ■

FLA18-9 is the new machine engineered and manufactured by OCMI to produce parenteral glass containers. Cutting-edge technology, innovation, quality are the features that make **FLA18-9** a real "star maker", a new point of reference in the panorama of the pharmaceutical industry.

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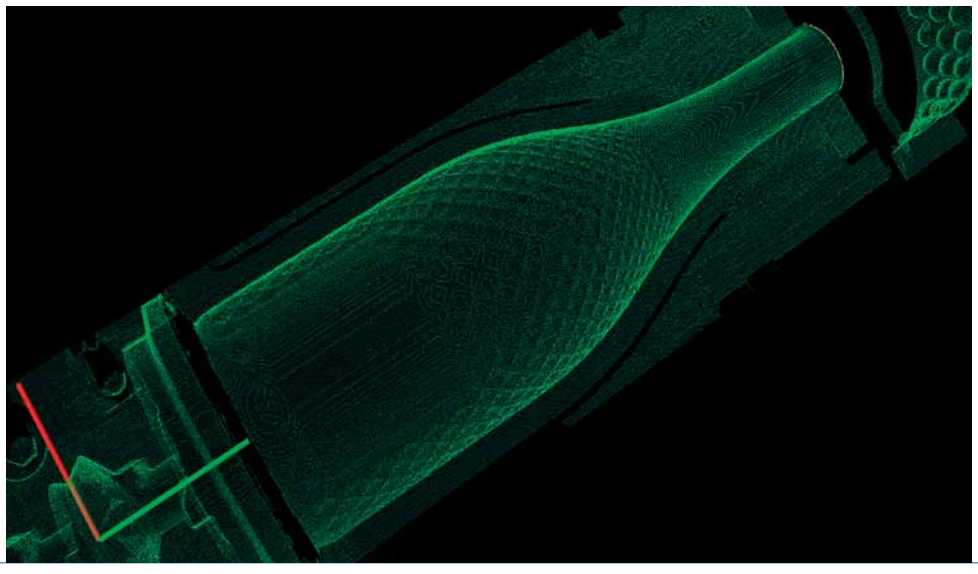
MOULDS

Measuring the volume of moulds has never been so simple as with LMS V1 from LUBEN GLASS

LMS V1 project, a certified laser system for measuring the volume of the mould, was started up some years ago by Luben Glass and its partner Hypertec Solution, looking for a solution to overcome the limits of mould volume measurement. The resulting system provides almost total daily control of entire mould series, with measurement accuracy and repeatability, as well as ease of use.



LIMITS OF CURRENTLY USED CONVENTIONAL SYSTEMS

For many years, the measurement of the volume of moulds has been linked to laborious and imprecise systems such as measurement with water.

This procedure has always required specific surrounding conditions, such as the use of distilled water at a controlled temperature, skilled operators, the removal of excess grease, etc., all parameters that make it very difficult to obtain fast and accurate results.

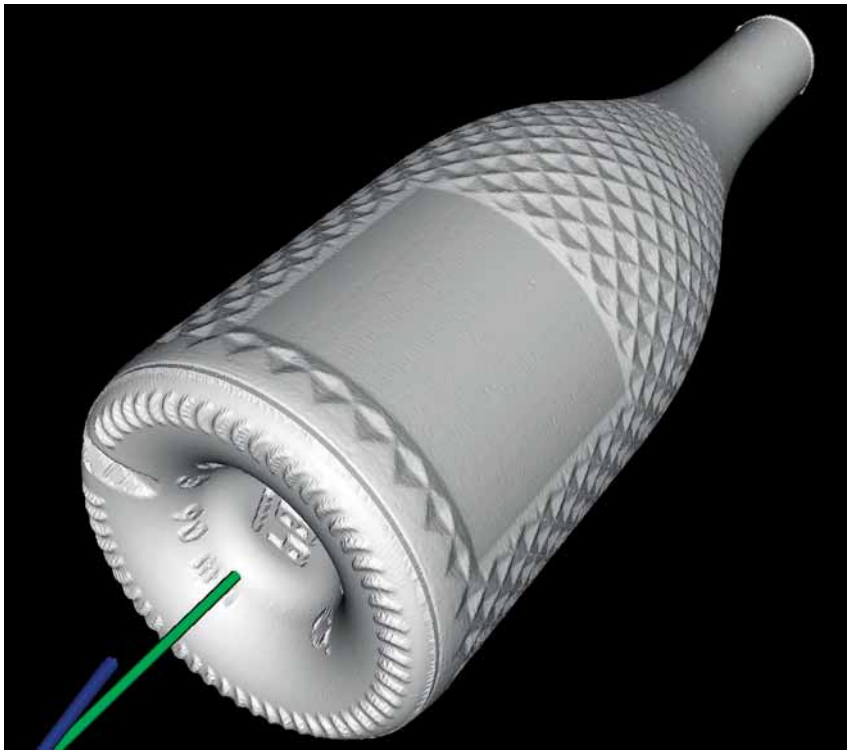
The difficulty of repeating the measurement with the same conditions on each mould, and the imprecision of the final result have accompanied glassworks' staff over the past years.

Not even the advent of machines with water membranes has been able to solve the problem connected with checking mould volumes: in fact, this type of machine provides a volume control through the comparison of the measurement carried out on a sample mould (and only on some types of mould) and then reproduced on all moulds, measuring the deviation of the data with respect to the sample volume. A comparative system, therefore, and not absolute, which involves many limits (inaccurate readings, rupture of the membrane with water spillage, etc.).

THE LASER REVOLUTION

It is precisely from the analysis of these limits that the LMS V1 project, a certified laser system for measuring the volume of the mould, was started up some years ago.

Luben Glass and its solid and reliable partner Hypertec Solution, have pursued the ambitious project of creating and marketing a new mould volume measurement system based on two concepts that are as simple as they are fundamental:



1. measurement accuracy and repeatability; and
2. ease of use.

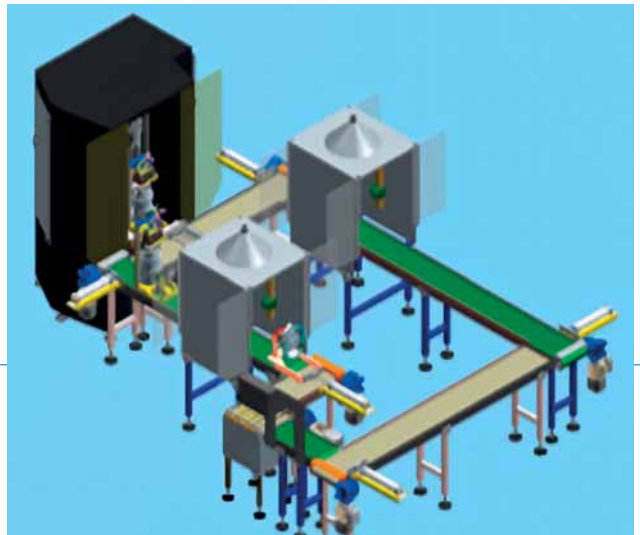
Today LMS V1 is the only patented volume measurement system that can certify its measurements guaranteeing the repeatability of the measurement with absolute accuracy of the data.

CERTIFICATION OF MEASUREMENTS

As is known, the main international measuring units have reference masters (for example the meter kept in the Paris' Bureau International des Poids et Mesures) while this is not the case for volume which does not have a prototype. Thus, some questions arise: how to certify a volume? How to validate its measurement? To give an answer, a master mould was created with a volume certified by INRIM, the Italian National Institute of Metrological Research. This allowed to demonstrate that the volume measurements performed by the LMS V1 system are within the tolerance range of volumes certified by INRIM. LMS V1 represents a unique system of its kind, characterized by the total reliability of the read measurement.

SIMPLE AND INTUITIVE USE

Consisting of a measuring heart with a very high precision laser head (currently with accuracies of at least 20 times higher than any other scanning technology), the machine scans the volume and the dimensions of the mould in less than 3 minutes, regardless of its shape: the system has no limits of autonomous recognition of the internal shape of the mould. The extraordinary operating speed of the LMS V1 allows for an almost total daily control of entire mould series and, in addition to the dimensional data, the system provides a 3D version of the bottle as well as the internal shape of the mould in real time.



NO SPECIALIZED STAFF REQUIRED FOR OPERATIONS

After having fixed the components of the mould on the machine table (both blank or blow mould and, respectively, baffle or bottom plate) in a simple and safe way, in fact, the operator only has to close the door and to press 'start': the cycle starts automatically without any other additional operation being required.

The output is an STL file that can easily be exported to be used, for example, in the reconstruction of solids. The machine and its patented technology do not require any specific skills for their use: the software does not need a 3D file of the mould to be measured and is able to reconstruct the volume of the cavity in total autonomy and in just 2 minutes, while taking into consideration the manufacturing techniques of moulds (deepening, coupling tolerances between bottom plate and bottom of the mould, etc.). ■

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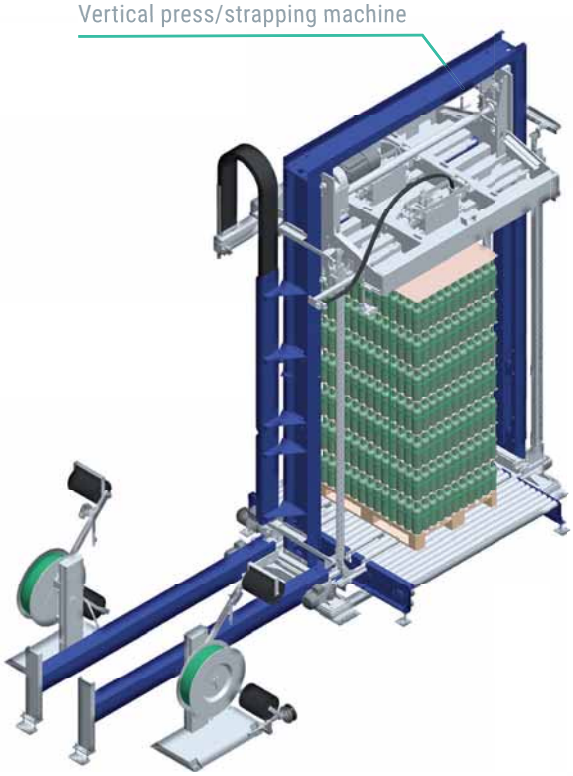
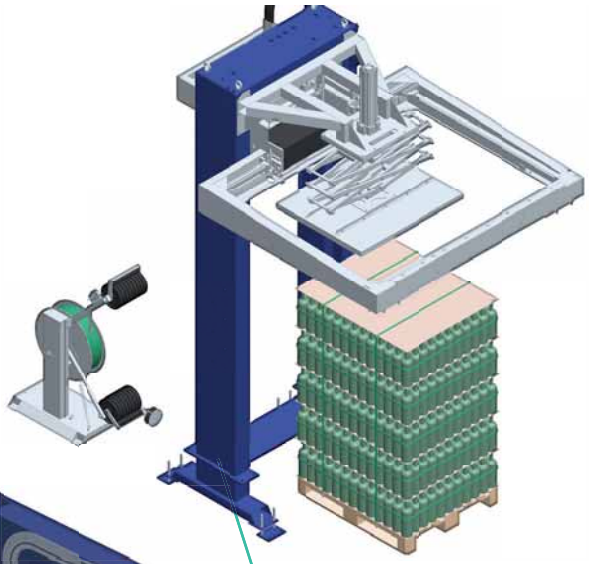
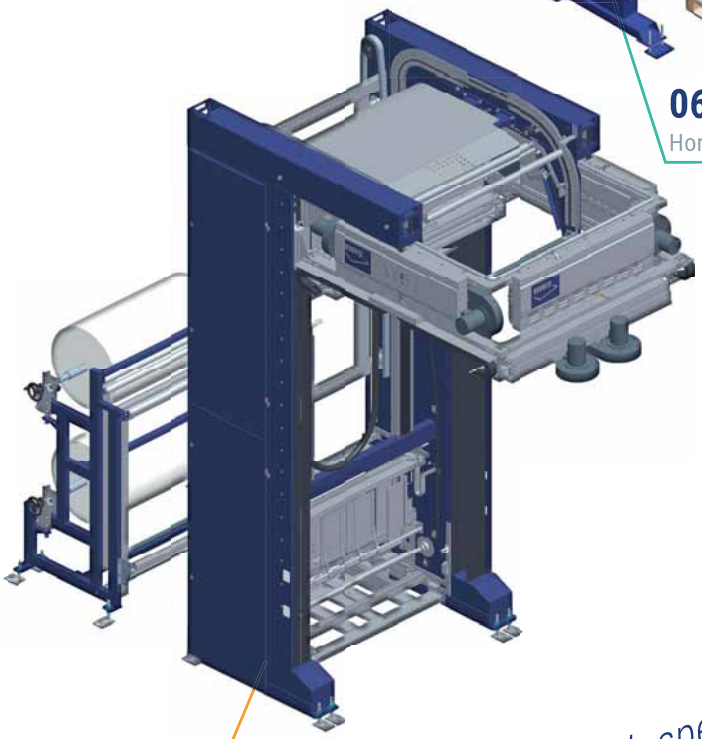




06CL
Horizontal strapping machine



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BIRGI and MEFAR: Working together to provide ampoules, vials, lyophilized vials, BFS and pre-filled syringes

The Turkish based company Birgi bridges the gap between Asia, The Middle East and Europe supplying glass vials, lyophilized vials, ampoules BFS and pre-filled syringes. Working closely with Mefar its sister company, producing parenteral solutions, renders Birgi highly acquainted with the complexities of the filling process. Birgi provides complete dedication to quality standards, consistent excellence in customer service and through its logistics company Defar, unmatched flexibility in delivery.

STATE OF THE ART PRODUCTION LINES AND COMPLETE RELIABILITY

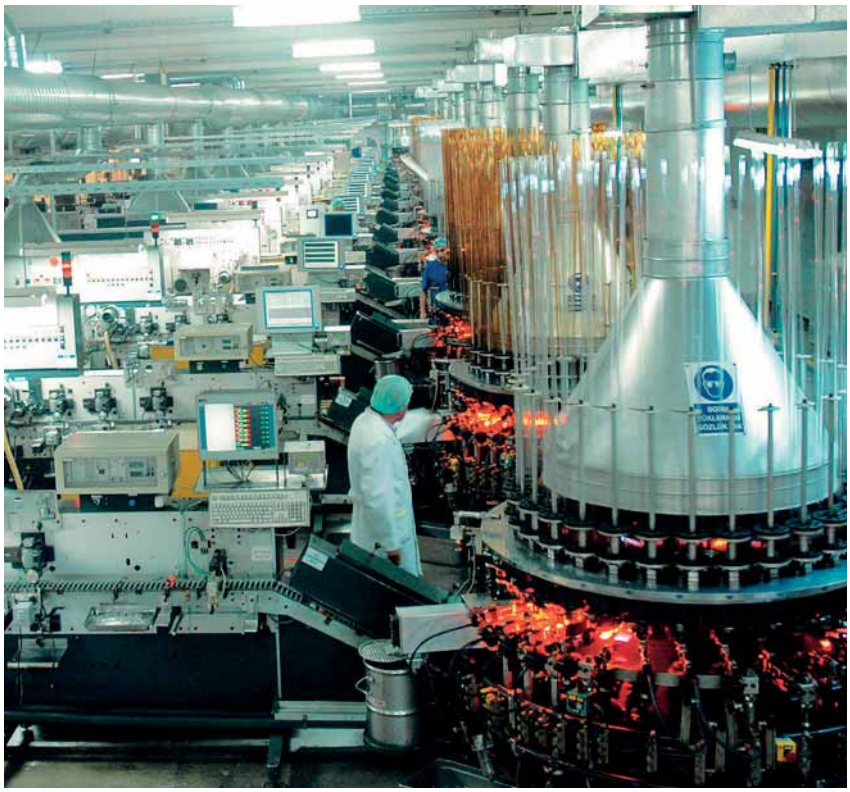
Founded in 1963, Birgi has been forming type 1 glass into ampoules, vials and pre-filled syringes for the pharmaceutical industry in Turkey and across Europe for over half a century. Employing advanced computer controlled camera systems, GMP focused production policies and state-of-the-art production lines, enable Birgi's complete dedication to the highest quality standards, consistent excellency in customer service and unequalled flexibility in delivery schedules all of which make Birgi the most reliable partner in client supply chains.

CERTIFICATION

Birgi was the first company in Turkey to gain ISO 15378 certification - "Primary Packaging Material for Medicinal Products" - essential requirement for acquiring ISO 9001:2000, referring to "Good Manufacturing Performance" (GMP). Since 2006 Birgi holds DMF numbers for vials and ampoules from the FDA, and likewise from Canada since 2014. Birgi also possesses ISO 10002:2004 Certification for its excellent Customer Complaints system and was awarded ISO 14001 and OHSAS 18001 certification in 2009 demonstrating its belief that happy healthy employees ensures high product quality.

BIRGI'S SUPPORT ANYWHERE IN THE WORLD

Birgi's exports already count for over 45 per cent of its overall sales and mainly cover Europe. Its strategic location, Istanbul, however, means that it is in a position to support customers from all over the world.



PRODUCTS - AMPOULES

A wide range of type 1 glass tubing ampoules in 100 per cent tamper proof packaging ranging from 1ml to 30ml in different types and sizes, including stem-cut (Type- B), funnel (Type-C) and closed end (Type-D). Custom-made ampoules are also possible.

Ampoules with O.P.C. (one-point-cut) easy-break and colour-break ring systems are produced to customer requirements, while special higher hydroltyic resistant ampoules are also available on demand.

For identification purposes as many as three code rings can be applied and printed ampoules with a wide range of heavy metal free colours are available.

VIALS

High quality vials are supplied in sizes ranging from 2ml to 30ml in Type-1 glass tubing produced by leading European glass manufacturers. Birgi is also able to produce vials with different neck-finish designs to satisfy any needs. Designs include:

- standard injection vials;
- American or European style blow-back vials;
- screw neck vials; and
- special vials for lyophilized products.

BIRGI QUALITY: EXCEEDING CUSTOMER EXPECTATIONS

Constant monitoring through numerous camera control systems, parallel to unceasing control of products separated by automated systems along the production line on all visual, dimensional, physical and chemical parameters ensures that Birgi maintains the highest quality. Birgi's Quality Control performs necessary checks in accordance with internationally accepted guidelines while the company's existing and new clients make periodic audits and Birgi itself holds rigorous, internal, annual inspections. Moreover Birgi carries out customer satisfaction surveys evaluating its performance based on the feedback it receives thus manifesting that excellent quality coupled with the highest safety standards of products, processes and employees are at the core of Birgi's success.

Through its sister company Mefar, a leading contract manufacturer of parenteral solutions in ampoules, vials, lyophilized vials, BFS and prefilled syringes, Birgi is highly acquainted with the complexities of the filling process.

MEFAR

Founded in 1985, Mefar is a leading pharmaceutical contract manufacturer of parenteral solutions for human and veterinary usage in ampoules, vials, lyophilized vials and ampoules, BFS (blow-fill-seal containers) and PFS (pre-filled syringes).

Mefar was the first company to fill vaccines in Turkey, with a state-of-the-art sterile facility designed to maximize transparency by the use of floor-to-ceiling hygienic glass partitions, while preventing any form of waste of capacities, staff and other resources through its well-thought layout.

As a business partner with an impressive global customer base, Mefar provides flexible customized services with over 700 employees with a full commitment to quality.

The synergy between Mefar and Birgi generates significant cost-savings and flexibility on delivery schedules. ■

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R-PAL: one thousand of these palletizers from EMS GROUP

We recently spoke to Giordano Colli, Sales Director at EMS Group, about an important milestone reached – that of having more than 1,000 of their R-PAL palletizers up and round around the world.

EMS Group recently announced that the number of its R-PAL palletizers installed, up and running around the world has exceeded 1,000, and has thus become the most used system in glassworks.

R-PAL is a state-of-the-art palletizing system for the container glass sector:

- The palletizers are equipped with innovative push or grip stackers for the feeding and preparation of the rows of articles.
- They can be equipped with patented MPH (Multi-Purpose Head) universal palletizing heads.
- They include also last-generation ZET-APP interactive supervision system, the most user-friendly application for the control of every component of the installation, even from tablets or smartphones.

This article, in the form of an interview with Giordano Colli, Glass & PET Sales Director at EMS Group, gives us an idea of how this important success has been possible.

WHAT DOES IT MEAN FOR YOU AND THE COMPANY TO HAVE REACHED THIS IMPORTANT MILESTONE OF MORE THAN 1,000 SYSTEMS UP AND RUNNING?

Giordano Colli, Sales Director at EMS Group: First and foremost, it is a source of great satisfaction for the whole EMS

Group. At the same time, while it is important to celebrate this important goal, we must also consider the goal as a new challenging starting point.

It is a commitment towards ourselves and our customers, giving continuity to the incredible 'group' work, with quality and passion of all of us here in the company, which have led to this important result.

I would also like to add a more personal comment: just like many of my colleagues, I was born and grew up here in Montecchio Emilia, which has always been the headquarters of the parent companies of our group, so this goal of absolute global excellence is a further source of pride linked to the love for our territory and the par excellence of Made in Italy products.

These results are the strong driving force that pushes us to grow and develop, to honour those who were here before us. Our companies, in fact, now have more than 50 years of history, and are continuing to create employment and development opportunities for young people.

WHO ARE THE KEY PEOPLE BEHIND THIS SUCCESS?

EMS Group: The team, without a doubt. Building plants and systems is, and has always been, stimulating and fascinating team work. There are no shortcuts or alternative routes to take when creating a top level product in plant engineering: everyone needs to work together with and for colleagues, combining their skills and experience. The longevity of the success of R-PAL is a clear indication of how – over the years – we have all managed to group together to meet the needs of our customers.

This has been, and will continue to be, our main commitment: to repay market trust by working together to excel in the solutions and services we provide.

WHAT IS R-PAL?

EMS Group: R-PAL is an automatic rotating column palletizer for empty glass bottles; the letter 'R' in the initials of the model highlights the concept of 'Rotating'.

The bottles leaving the annealing lehr, move along chain conveyor belts through inspection and control machines and then, divided into an appropriate number of single rows, they reach the entrance of a stacker, which is the first element of the palletizing system.

This unit prepares and transfers the appropriate number of rows of articles on a motorized table for the preparation of complete layers. Each layer is then picked up by the palletizing head installed on the main column, and then placed on the pallet.

Stability and squaring of the layer are guaranteed by the centring system; the TAI feeder device then places an interlayer

separator (flap/tray/cap) on each layer. This cycle is repeated by the palletizer until the expected number of layers has been transferred to the pallet.

WHAT ARE THE MAIN ADVANTAGES OF THIS SYSTEM?

EMS Group: The system has been very successful in glassworks because it combines a series of characteristics particularly appreciated in this sector:

- compact layout;
- flexible operations;
- the highest level of reliability;
- total accessibility.

All palletizer operations are carried out at a low level, thus allowing easy access to the work and maintenance areas by the operator.

EMS' know how concerning mechanical design and automation software allow R-PAL to operate non-stop for several years, 24 hours a day, 365 days a year.

24/7 operations and reliability for such a long time are essential features for a sector such as glassmaking, where processes never stop during the lifetime of the kiln (except for short programmed periods during which format changes and maintenance are carried out).

The strong points of the system are:

- suitably oversized components for 'around-the-clock' operations;
- ad hoc software developed in-house;
- interpolated speed and acceleration control;
- precise management of axes and dedicated axes cards in the event of servo-motors.

R-PAL therefore guarantees:

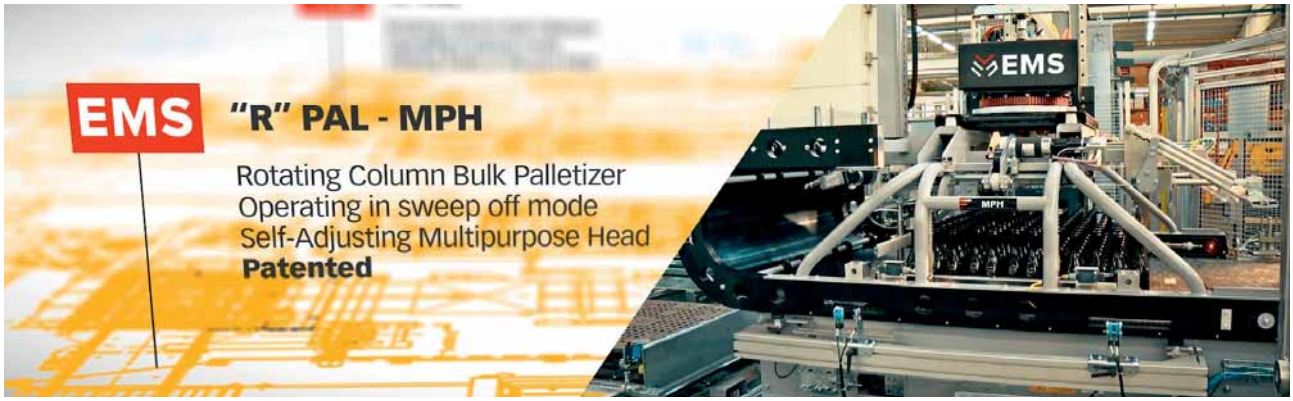
- progressive and extremely accurate movements;
- speed variations based on production lines;
- reduced wear of components installed as there are no vibrations or stress;
- absolute delicacy in products handling and maximum precision in the pallet filling.

IS THIS PALLETIZER MADE IN DIFFERENT VERSIONS?

EMS Group: Yes, the R-PAL can be manufactured with different levels of automation, as well as in many types of general layout.

R-PAL has a modular design with the advantage of allowing to initially install a semi-automatic machine (which involves the manual execution of some operations: insertion of layer separators, loading of empty pallets, etc.), and increase the level of automation during the following phases by adding additional modules.

The modularity of R-PAL also ensure the highest level of flexibility with regards to the layout configuration, along with reduced footprint, and therefore able to adapt to the different the plants in which the system is to be installed. Available areas, already existing in most cases, are always different and have



obstacles to consider: the modular layout of R-PAL meets each and every need.

The TAI sheet insertion column rotates to move to the pickup points of flaps, trays and caps; with two basic construction types: 'Twin-Boom' and 'Two-Boom'.

- Twin-Boom: the sheet insertion column is installed on the same slewing ring as that at the base of the palletizing column. This results in extremely reduced overall dimensions of the system, without compromising its operations.
- Two-Boom: the sheet insertion column is installed on a slewing ring that is independent from that of the main column. This version, which has two columns that operate independently, allows to reach higher production levels compared to the previous version, without significantly affecting the footprint at ground level.

This means that we can provide customers with the configuration of system perfectly corresponding to their needs, being aware that we can offer consolidated reliability and technology in step with the times.

Our work is, and has always been, the result of constructive synergy with customers. The Customer First approach that we have means knowing how to listen to propose effective and efficient solutions for specific needs.

WHICH UPDATES HAVE BEEN MADE OVER THE YEARS TO IMPROVE THIS PRODUCT?

EMS Group: The patent for our MPH (Multi-Purpose Head) is definitely one of the most important implementations.

R-PAL was already able to palletize diverse type of products using the most suitable pick-&-place head, such as: vacuum head, finger head, bell head, etc..

The universal MPH was developed to respond to the requirements regarding the palletization of particularly unstable shapes and formats, which need sweep-off functions. This head has head with a retractable surface capable of handling almost all types of items – from small pharmaceutical vials up to magnum-sized bottles for wine – also without space between the necks. The design of the retractable top has been perfected so as to ensure seamless movement of the containers, both during loading on the preparation table and during unloading on the target pallet (zero jump).

This patented head allows to carry out format changeover completely automatically from the operator control panel.

Moreover, the considerable flexibility of the MPH also allows to palletize both bulk bottles and vases, as well as boxes and bundles, making it the ideal solution for combined cold-end lines.

In glassworks in North America and Mexico, for example, articles are often palletized in bulk or in boxes according to the needs of

the final bottling customer.

The ZET-APP interactive supervision system is one of the latest upgrades. This tool, which has been developed entirely in-house thanks to our know-how, facilitates system management, ranging from the simplest to the most complex, thanks to a complete and user-friendly operator interface.

The control of every single component of the system, unlike the past, now easy for our customers, even from tablets or smartphones, by means of an APP that can be downloaded onto iOS or Android devices.

Generally speaking, ZET-APP supervision represents a remarkable evolutionary step in the automation of transport and palletizing plants, immediately recognized and appreciated by the market.

WHICH NEW IMPLEMENTATIONS ARE FORESEEN FOR THE NEAR FUTURE?

EMS Group: The R-PAL palletizer, along with all other EMS Group products, is continuously monitored by our I&D Department with regards to the development of upgrades: cutting-edge components for performance optimization, modules for the completion of available machine configurations, general usability of the systems.

For example, the implementation of tools to facilitate technical interventions and maintenance activities such as:

- AR (augmented reality) glasses that allow employees to establish a two-way audio-video communication to solve problems through images and instructions shared in real time;
- the MaintenEasy 3D interactive manual providing direct online access to technical documents with video tutorials, QR code reading for the immediate identification of spare parts to be ordered, monitoring of the system in real time, and, last but not least, error reports.

In addition, the new tray former and the new line of carton packaging machines are also in the pipeline, which will enable us to provide an even wide and more flexible range of products to the market with regards to the configuration of complete palletizing systems.

Our mission is to become the Unique Handling Partner for all our customers, developing handling, palletizing and storage solutions with them, and that best meet their needs.

WHAT IS BEHIND THE SUCCESS OF R-PAL, AND WHAT WILL ITS FUTURE BE?

EMS Group: Market trust with regards to plant engineering is gained machine by machine from a technical point of view. In sectors such as glassmaking, where plants must never stop for 365 days a year, important results are the consequence of competitive-, reliable- and technically performing products, as well as prompt and efficient service and assistance.

Having supplied more than 1,000 R-PAL pallettizers to the most important glassmakers in almost 100 countries around the world – is a clear demonstration of how our passion and efforts over the years focused on developing complete machines from all points of view, and reliable for 24/7 operations, have reached the goal.

The fact that there are R-PAL palletizers still up and running after 30 years of 'hard work', and the renewed requests for R-PAL models by those who already have several units in their factories, we comfort us about the future of this solution.

R-PAL is already one of the best options on the market today, and we believe that thanks to the integration and daily commitment of the people who are part of the family of our group, this type of palletizer will continue to be a reference product, leader in performance, available services and variety of solutions offered, and will contribute in making EMS Group the ideal partner for all customers. ■

EMS

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CONDAT launches Lubriscore® eco-designed lubricants

Condat shares the conviction that the company can be a wonderful lever of innovation to respond to contemporary challenges: climate change, diminishing resources, pollution. Supporting customers and partners towards responsible performance, that combines social and environmental issues, is a main objective for the company.

Initiated several decades ago, the responsible commitment regarding innovation in response to climate change is based on one of the Condat Group's fundamental values: 'Build to Last'. Guided by this historical value, the company has, since 1854, been pursuing a long-term strategy that contributes greatly to its longevity. It was therefore one of the forerunners to develop industrial lubricants and other speciality products with a reduced environmental impact, without compromising either their performance or the safety of users. As an example, the company launched its first biodegradable lubricants 20 years ago.

CSR COMMITMENTS AND ASSESSMENTS

Since publication in 2010, the guidelines of the ISO 26000:2010 standard has been a guide for Condat decision-making and actions. Although this standard does not lend itself to certification, it provides the right guideline to all companies being aware that social responsibility and environmentally friendly behaviour are key factors for success.

In 2018, Condat took a step further in its CSR policy by joining the international Ecovadis platform. Its CSR performance is assessed annually by an independent body according to 21 criteria divided into four themes: Environment – HR and Human rights – Business ethics – responsible purchasing policy.

In 2020, Condat was awarded Silver level by Ecovadis, recognizing its far-reaching sustainability and CSR policy. This achievement places Condat among the 25 per cent of the best rated global companies by Ecovadis and among the top six per cent of companies in this economic sector/lubricants.

LUBRISCORE®, A SELF-SCORING SYSTEM FOR ECO-DESIGNED PRODUCTS

In 2020 Condat established the innovative Lubriscore® in order to provide customers better readability and total transparency on their products. The Lubriscore® is Condat's self-scoring system

that weight the product properties based on life cycle criteria: Raw materials and design/ Production/Transport/Use/ End of life. This rating includes impacts on people and the environment, and takes into consideration the state of the knowledge at the time of assessment, along with changes to regulations. A bonus is applied in the case of compliance with a label or certification; as for example for an Ecolabel certified product.

Based on a point system and on the answers given to about 20 questions, the Lubriscore® grants, or not, the product with an associated number of stars. The more eco-designed a lubricant is, the higher the number of stars it gets, with ratings ranging from one to three stars.

The Lubriscore® rating is available for a wide range of Condat lubricants, including metalworking fluids, wire drawing soaps, cold heading oils, hydraulic oils, die lubricants, cooling lubricants, hardening/quenching fluids and maintenance lubricants.

CONDAGLASS 400 SWABBING GREASE WITHOUT GRAPHITE

Part of Condat's eco-designed product offer, Condaglass 400 is a brand-new dedicated swabbing grease without graphite, an important feature in glass bottle manufacturing. Indeed, removing graphite and the black aspect of the grease can lead to less transfers on glass ware (bottles, glass containers for food or cosmetics), thus reducing automatic rejects after greasing. As a result, glass manufacturers generate less waste and obtain immediate productivity gains.

Without graphite also means a cleaner working environment for operators in the gob forming area. They do not handle graphited and blackened products when swabbing the blank, blow and neck ring moulds. And the same improvement can also be seen in the mould workshop.

Eliminating graphite has been only possible thanks to the high releasing performance of Condaglass 400. Condat R&D department worked on this new

formula for about two years and the challenge was to reach the same performances as the graphited products commonly used on blank mould applications, which are references on the market.

Moreover, since reducing environmental impact is a main issue for Condat, Condaglass 400 is made of a mix of renewable vegetable based oils and recycled refined oils. Particular attention was also paid on end-users when developing the product, and this is why Condaglass 400 Safety Data Sheet does not display any hazardous pictogram.

Last but not least, thanks to its high flash point, Condaglass 400 limits fire risk and ensures protection for equipment and co-workers, especially as swabbing compounds are generally applied on 450°C moulds.

Thanks to its responsible formulation, this lubricant obtained a 1-star score at the Condat Lubriscore® and perfectly illustrates the concept of Responsible Performance that the company targets.

SUCCESS STORY HIGHLIGHT

One European leader in glass manufacturing has already chosen Condaglass 400 for producing its cosmetics and perfumes articles made of Opal glass. The company saw impressive results when swabbing their cast iron moulds, as they were able to reduce their automatic rejects after greasing drastically. Using their previous graphited lubricant, the rejects were between three to four, whereas with Condaglass 400 they only set for two automatic rejects after greasing. The company thus experienced significant productivity increase and generated less waste. ■

CONDAT

Condat is an independent company with international presence, specializing in the field of industrial lubrication. For over 160 years, it has adapted its products to the specific needs of each market (drawing, cold heading, metal working, glass industry…) and has developed a wide range of soaps, greases, oils,… Condat lubricant range is recognized on the glass industry market, in particular for its wide range of lubricants. The company covers all glass processing needs, from glass container, flat glass to optical glass. It offers among others: shear spray oils, scoop oils, delivery coatings, graphited varnish for mould lubrication, graphite and graphite-free Swabbing mould compounds, IS machine maintenance oils and also float cutting oils, coolants cutting oils, flocculants for water treatment. Condat provides also lubricants for the maintenance of equipment such as hydraulic oils and greases, and suitable equipment to ease implementation of lubricants such as dosing equipment.

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SCHNEIDER ELECTRIC: Energy supply, cost, and decarbonisation potential – challenges and opportunities

This article takes a look at five key questions coming from the Paris Agreement made in COP21 in December 2015 from an energy and sustainability standpoint, and what they actually involve for the glass industry.

Gary Cafe -
Sustainability Expert
SCHNEIDER ELECTRIC, ENERGY AND SUSTAINABILITY SERVICES

We all know or have heard about the Paris Agreement made in COP21 in December 2015 but what does it mean for the glass industry, which has historically been almost entirely reliant on carbon emitting fossil fuels for the melting process? Does it mean that container glass customers will start to move towards paper, bio-plastics, aluminium or a low carbon glass melting process? What about flat glass and tableware?

Let's consider for a moment the decarbonisation trajectory that the Paris Agreement binds us to. In Figure 1, the Intergovernmental Panel on Climate Change (IPCC) has advised us that in order to avoid the worst impacts of cli-

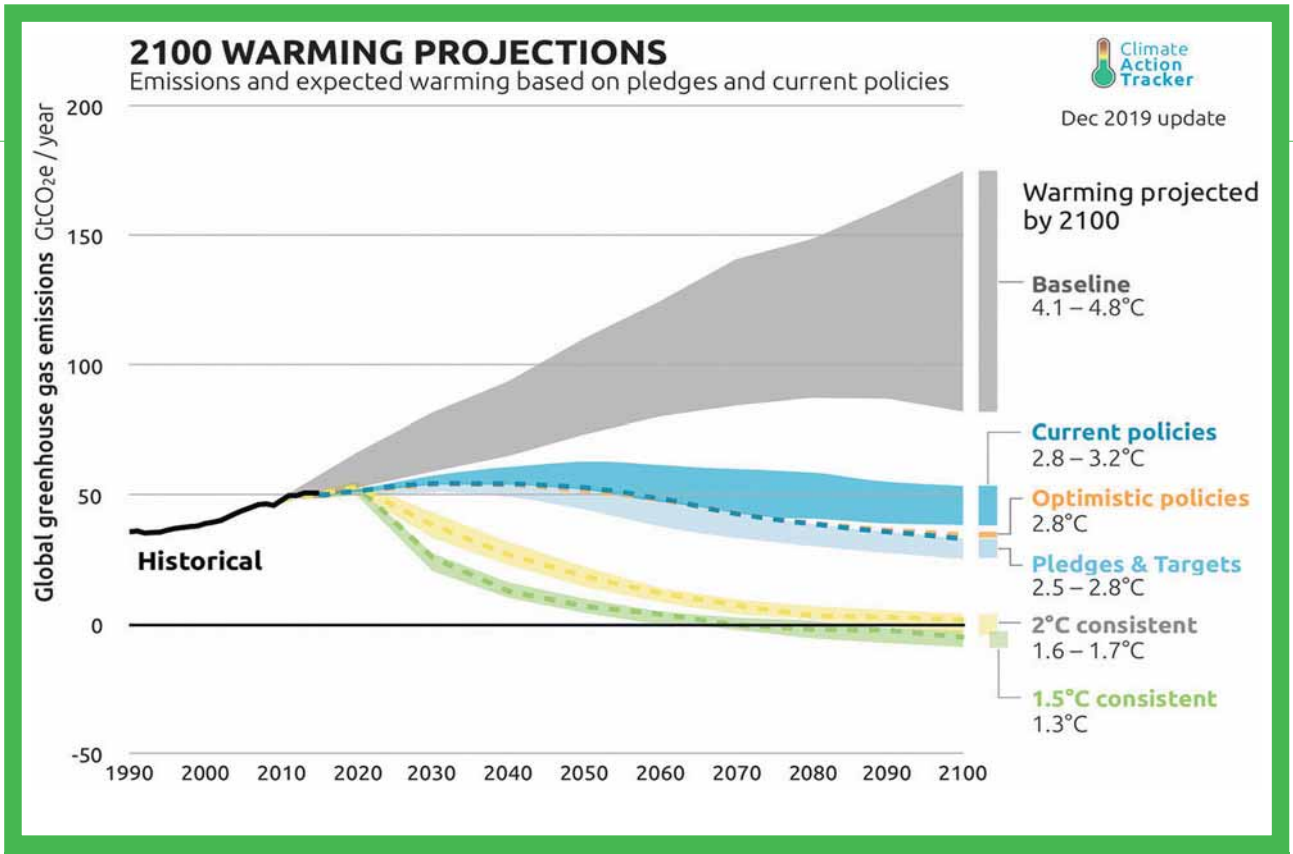


Figure 1. IPCC Dec 2018 update – With current efforts, global warming is likely to reach 1.5 degC between 2030 and 2050. How quickly it's reached is up to all of us

mate change, we must limit global warming to 1.5°C above pre-industrial levels, and this means starting NOW on a trajectory towards being carbon neutral by 2050.

Owens Illinois, NSG and Saint-Gobain have all made public commitments towards this goal by engaging with so-called Science Based Targets which demand a trajectory towards carbon neutrality by complete decarbonisation – not just burning fossil fuels here and planting trees there to compensate. This suggests that the biggest players in the glass industry are committed to turning their melting processes entirely away from fossil fuels.

This article aims to start to address five key questions from an energy and sustainability standpoint – or at least what you should consider when answering the challenge presented to our industry.

1. What are the options today and how do they compare on a pure unit of energy basis?
2. Why do we need to think about this differently than in the past?
3. How green are those options really?
4. What are the supply risks and cost sensitivities?
5. How do we quantify the risk and find opportunity therein?

WHAT ARE THE OPTIONS TODAY AND HOW DO THEY COMPARE ON A PURE UNIT OF ENERGY BASIS?

Of course, there are potentially many options and various 'flavours', but this article will focus on the four highest potential fuels available today. Natural Gas – the business as usual case. Hydrogen – a close cousin of Natural Gas. Hybrid electric and Natural Gas or Hydrogen – A familiar path simply wound up. All electric – the big step.

We can start to compare these at a high level by comparing the end-to-end energy flow. To enable this comparison I will unapologetically make some high-level assumptions in the 'back of an envelope' example calculation based on a typical container glass furnace. The exact application and technical nuances may differ depending on the specific technologies chosen for each fuel, but I would argue that the physics and ratios can broadly be applied – even when translated to other types of glass processes.

Starting from the right-hand side of Figure 2, we can see that a 330 T/day output is required from our theoretical furnace. Two key technologies are then chosen for the furnace; either a gas fired furnace or electric. The gas furnace has three input options; Hydrogen from a Steam Methane Reformer (SMR – the most common form of hydrogen production today), hydrogen from electrolysis, natural gas. Each of these options need 4 GJ/T to melt the glass on average but three times as much volume of hydrogen is needed per unit of energy compared to natural gas. Furthermore, current SMR and electrolysis processes have roughly the same energy losses

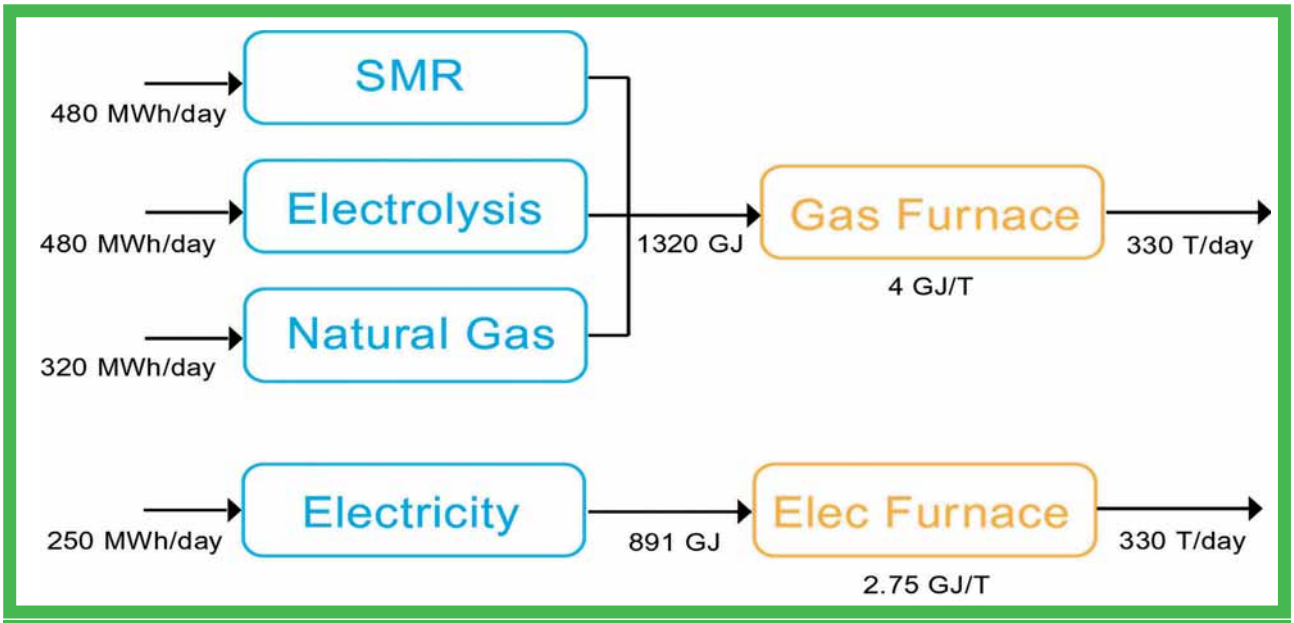


Figure 2 – Back of the envelope calculation of the energy required for each solution

as each other, meaning that both processes need 30 per cent more energy to melt the glass than burning the natural gas in the first place. SMRs are a mature technology and therefore unlikely to get significantly more efficiency in the future, but electrolysis – whilst not yet commercially proven – is witnessing significant investment resulting in breakthroughs in technology and efficiency gains of up to 50 per cent.

By comparison, the same amount of glass produced from an all-electric furnace is subject to a significantly more efficient process, needing only 2.75 GJ/T and no further conversion from the energy grid. This is then around 22 per cent more efficient than a natural gas furnace and nearly 50 per cent more efficient than its green alternative: electrolysis.

WHY DO WE NEED TO THINK ABOUT THIS DIFFERENTLY THAN IN THE PAST?

Historically, energy cost was simply relegated to a single line or two in the business case presented to management for a new furnace. The same business case that devoted 200 lines or more to the Capex breakdown. It can be surmised that with only one fuel to choose from, it made no sense to model this out further. We'd manage it as best as possible but in reality, our competitors were exposed to the same market forces and our customers knew that, and therefore had to accept price adjustments accordingly.

Now we have multiple different variables in the equation; natural gas, power, carbon and renewable electricity. Each of these have different fundamentals and are independently impacted by sovereign risk that varies between countries.

Consider now that tweaking that one energy line on the 200-page business case by just 10 per cent can make a bigger USD/T difference than that of a 50 per cent change in Capex. Said another way; one could work incredibly hard to reduce the Capex of a natural gas furnace design only to have those savings completely wiped out compared to a competitor who chose an all-electric furnace driven by fixed price renewable electricity in a country that implemented a carbon tax that drove the cost of natural gas up by 10 per cent. Complex, and hard to capture and quantify in just one line of a spreadsheet, right?

HOW GREEN ARE THOSE OPTIONS REALLY?

Let's start with the three most challenging fuel sources to decarbonise; natural gas, hybrid electric/natural gas and SMR-originated hydrogen. All of these need a breakthrough in Carbon Capture and Storage or Usage technologies or biogas.

CCS or CCU. Many attempts have been made to get a large number of CCS/CCU pilot projects off the ground in this space spread across all types of needs from SMR to concrete to steel and beyond, yet only a handful manage to get government subsidy and even fewer have worked let alone show potential for commercial application. Even if a breakthrough is made, which it could be argued is really needed to facilitate a low carbon future, it makes the energy equation from the first question look even more inefficient given the energy required to drive the

additional CCS/CCU process. Biogas is potentially even more challenging to achieve due to the scale required and land availability from a growing population.

Hybrid electric with green hydrogen from electrolysis can indeed be carbon neutral when powered by renewable energy. A scenario could also be envisaged whereby the extra energy and technology cost of the hybrid approach versus all electric could be worth it due to technical advantages such as pull through rates. I'll leave that debate to the future and to better informed people on those trade-offs than I. I'm simply stating that they should be considered.

All-electric can certainly be powered by renewable electricity in many grids across the world today and therefore be considered carbon neutral when coupled with certificates deeming that electricity to be of renewable origin – even though the grid is far from carbon neutral today. We'll explore how this works in the last part of this article but for now let's say that either the all-electric or electrolysis driven hydrogen solutions can be deemed carbon neutral.

WHAT ARE THE SUPPLY RISKS AND COST SENSITIVITIES?

All these solutions are great in theory but can the energy actually be delivered in a safe reliable form we've grown to expect from our good friend natural gas? Well actually, let's start with our old friend. Will it still be available? I'm not talking physically as there is likely plenty of availability but will the world be able to allow it? It may seem crazy today but if the EU Green Deal passes into law, fossil fuels will effectively be illegal in 2050 for the vast majority of users. That's right, illegal – at least so economically punitive it might as well be. That means SMR-based hydrogen is also out.

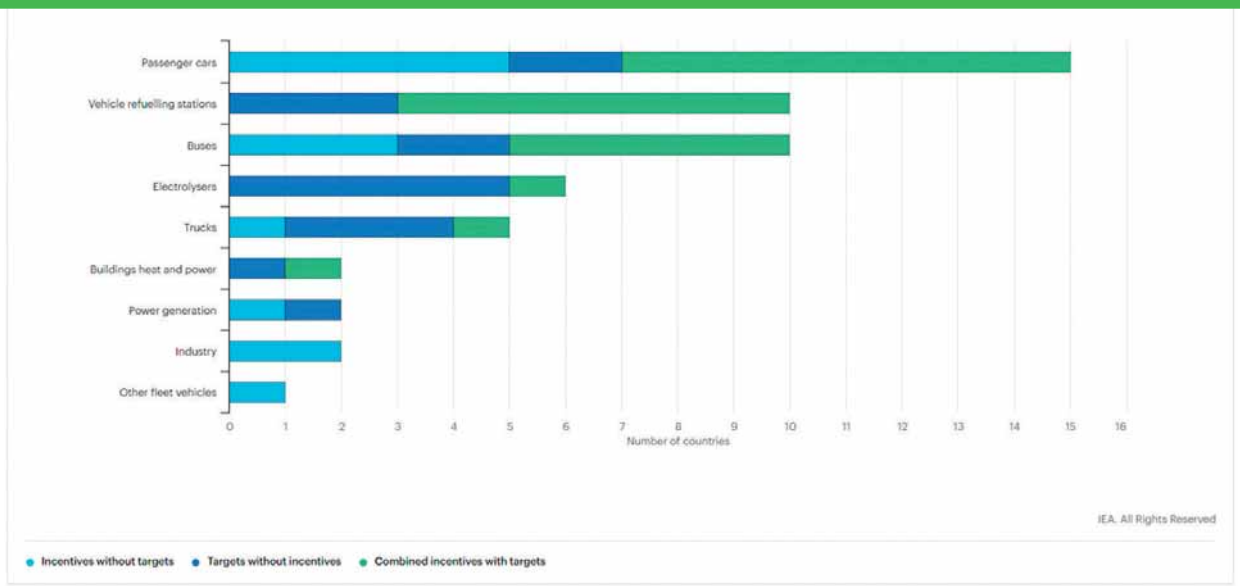
There will then be a huge demand for green hydrogen. That means a massive ramp up from the four per cent it occupies today and by the looks of current government policy as depicted by the IEA in Figure 3, industry will be a long way down the queue from transport and where does glass sit in the industrial queue? Likely behind the likes of steel for instance, right? I fear a significant supply/demand crunch which makes the green hydrogen solutions challenging at best.

Our other option is all-electric. Electricity grids are well established, but with increased electrification from industry, households and electric vehicles, significant investment is required to ensure the power can be delivered. Interconnectors between markets are also needed to ensure that when it's windy in one region, that energy can be transferred to where it's not, or stored in batteries, molten salts or hydrogen. The latter is where the seasonal storage potential of hydrogen can, and likely will, play a role in the future energy world.

HOW DO WE QUANTIFY THE RISK AND FIND OPPORTUNITY THEREIN?

So, with all these varying fundamentals at play, it is crucial that senior managers of glass firms are well informed and understand where the risks and oppor-

Figure 3 – Current policy support for hydrogen deployment, 2018 – Hydrogen for industry appears a long way down the queue of governmental priorities.



tunities lie. Solid 10+ year outlooks on carbon, gas and power from professional organisations are key to building potential scenarios. I use the term scenarios because no one has the ability to predict the future and there are large variables at play. The best we can do is build scenarios and perform rigorous sensitivity analysis to show what can happen and therefore what the best- and worst-case scenarios might be. Only then can our management teams move with confidence into this brave new world.

One lever to reduce these market risks is using renewable energy as it has essentially zero marginal cost of production and can therefore decouple itself financially from the energy market. Renewable electricity from technologies such as wind and solar are also dropping in cost and rising in availability. Australia, the US and increasingly, Europe (see Figure 4), are hot beds for so-called corporate Power Purchasing Agreements because Commercial and Industrial buyers are seeing them as lower cost and lower risk alternatives to regular grey procurement strategies. It's not just the B2C or telco sectors who want to green their image either. Bluescope Steel, Ball Corporation and Cummins are just some examples of industrial players taking advantage of the opportunities.

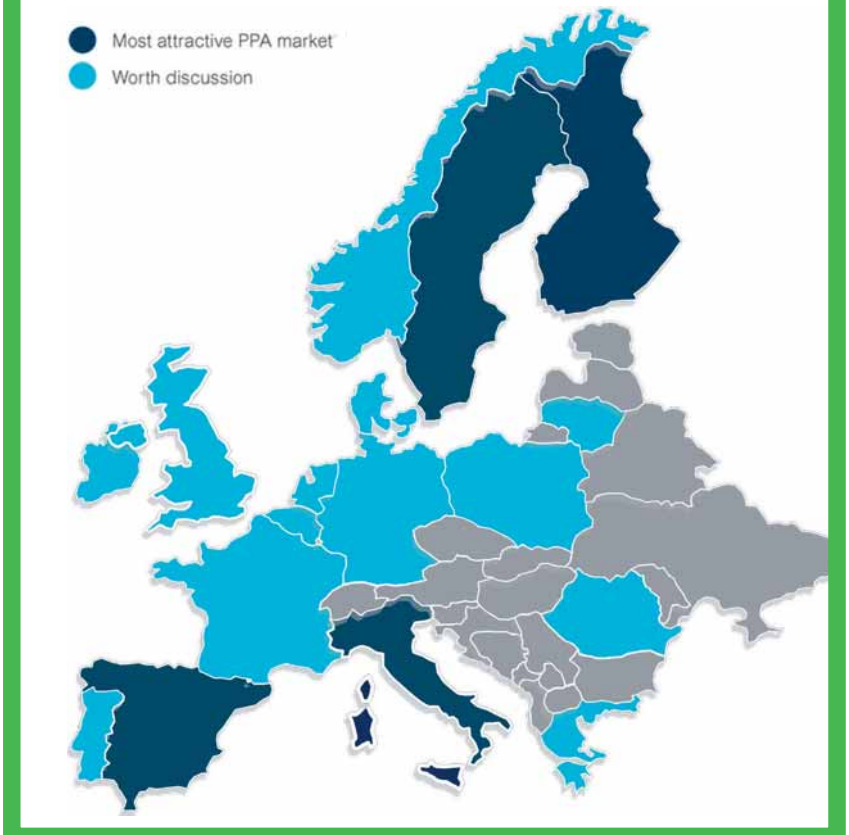


Figure 4 – PPA Pricing by Country in EUR/MWh from 'State of the European Renewable Energy Market 2019' – Europe is seeing significant growth in PPAs thanks to strong supply opportunities. Especially in Spain, Poland and the Nordics but others are fast catching up

CONCLUSIONS

Unfortunately, we are not in a position to predict the future, nor do we try, but we can take steps to understand the possibilities. The top takeaways recommended from this article are therefore:

1. ensure you build solid scenarios for your management using solid 10-year energy market outlooks;
2. start moving now to decarbonise your processes. 2050 is only two investment cycles away;
3. consider supply risks when choosing your energy source;
4. look at de-risking and greening your portfolio with renewable energy. ■

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GARY CAFE

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Primary glass packaging for high quality products from Vetropack

The Vetropack Group is an independent and family-owned glass-packaging producer in Switzerland. The 3000 employees company is a primary glass-bottle provider and their glass packaging products comply with the highest industry standards. Their products are all in glass, which is the best material to protect high-quality products in a reliable manner.

THE PÖCHLARN PLANT: RENEWING THE WHITE GLASS LINE

The renewal of the white glass line at the Pöchlarn plant enhances line utilisation and expands white glass production capacities as well as providing improved ergonomic conditions for the line staff and increased occupational safety.

In order to make maximum use of the Pöchlarn and Kremsmünster white glass furnace, a brand-new operation for the white glass lines was developed so to optimise line utilisation at both plants. A triple-gob production was additionally added in Kremsmünster, so that items with large batch sizes can now be relocated from Pöchlarn to Kremsmünster and the Pöchlarn white glass line has been redesigned so that in return, suitable items can now be relocated from Kremsmünster to Pöchlarn. These changes allow for the company to better meet the increasing demand for white glass.

ALL-ENCOMPASSING RENOVATION

The large-scale restoration work on the white glass line in Pöchlarn began in September 2020 with the demolition of the entire infrastructure as well as the fire-resistant material on the feeder. The fireproof material was fortified with the higher tonnage required. The line's machine bed was lowered, which also adjusted the incline of the annealing furnace. Working on the line is now much more ergonomic for the employees.

The Pöchlarn plant is the first in the Vetropack Group to be equipped with this safety system. The newly fitted lubricating robot is the newest of its kind.

Additionally, the installation of a blank side barrier system drastically lowers the risk of reaching into the station while it is in operation.

Four new Symplex testing machines have a barrel camera that recognises the code of the glass containers. This way, pleats and bubbles on the glass container are easier to detect and any mould-related errors are reported using real-time images. Finally, four glass orientators and new glass scanners at the packer to detect shards of glass on the pallet complete the new infrastructure on white glass line.

VETROPACK NEW DESIGNS

Zdravo Organic - Where health meets style

Health consciousness has grown immensely in recent years, a phenomenon mirrored in the success of container producers who focus on making natural products. One of these is Zdravo Organic. With Zdravo meaning

"healthy", it does exactly what it says on the glass.

The company only uses the highest-quality local fruit and vegetables for its juices, conserves, pickles and ajvar sauce, avoiding the use of additives and preservatives. The best packaging for products like this is glass, which is why Zdravo Organic only uses glass bottles for its juices.

The gentle curves of the white 200 ml bottles by Vetropack Straža create a sophisticated look, which allow the customer to see the best of the Zdravo Organic Natural Juices.

The centrepiece of bottles made by Vetropack for Zdravo Organic is the new 200 ml juice bottle with twist-off cap. It is just as chic and solid as its older, larger siblings, the 314 ml jar and 750 ml bottle, but its gentle curves give it a particularly sophisticated look. In fact, the Zdravo bottles are used around the world and can be found as far as Canada and China.

Azienda Agricola Caudrina - Pleasure of life

Azienda Agricola Caudrina offers famously top quality Piedmont wine. Winemaker Romano Dogliotti specifically works with Vetropack Italy because he particularly values having aesthetically pleasing packaging for his fine wines.

The fertile region of Piedmont is widely known as an exceptional area for Muscat grapes. Here, near Asti, is where Romano Dogliotti works. His collection is famous for the Moscato d'Asti La Caudrina and Asti Spumante La Selvatica DOCG.

Vetropack Italia's Milan glass works has produced 750 ml custom bottles for Azienda Agricola Caudrina for nearly 20 years. The cuvée coloured bottle is perfectly elegant, featuring balanced proportions and is beautifully decorative. The special detail of this product is that each part of the design comes together to form a beautiful frame for the attractive label, designed by Alessandro Lupano and Romano Levi.

Vincentka - A match made in heaven

Vincentka healing water was bottled in ceramic vessels until 200 years ago, when it switched to glass. To celebrate this anniversary, Vincentka has created a very special, limited edition bottle.

Vincentka is not just regular mineral water. This high-quality product is actually a medic-

inal healing water. The water originates in Moravia, in the largest and oldest spa town of Luha ovice, where ten natural healing springs attract visitors from all over the world.

The relationship between this special water and glass is therefore now 200 years old, so Vincentka is celebrating this anniversary by working with Vetropack Moravia Glass to manufacture an anniversary edition bottle. This version is considerably darker and greener compared to the traditional bottle. Around 400,000 anniversary bottles have been produced to rejoice the natural pairing of healing water and glass, as both are synonymous with health and premium quality.

Vetropack Gostomel - Liquid gold

Vetropack Gostomel is demonstrating just how much a bottle can mirror the image of a brand with its glass packaging for Aznauri brandy.

The name Aznauri derives from an ancient honorary title, awarded for special merits. Equally renowned and noble is the brandy of the same name, distilled by the Ukrainian company Global Beverage. In keeping with the world of nobleness, the brand's image is characterised by majestic lions. Vetropack Gostomel made a very special bottle for a very unique drink.

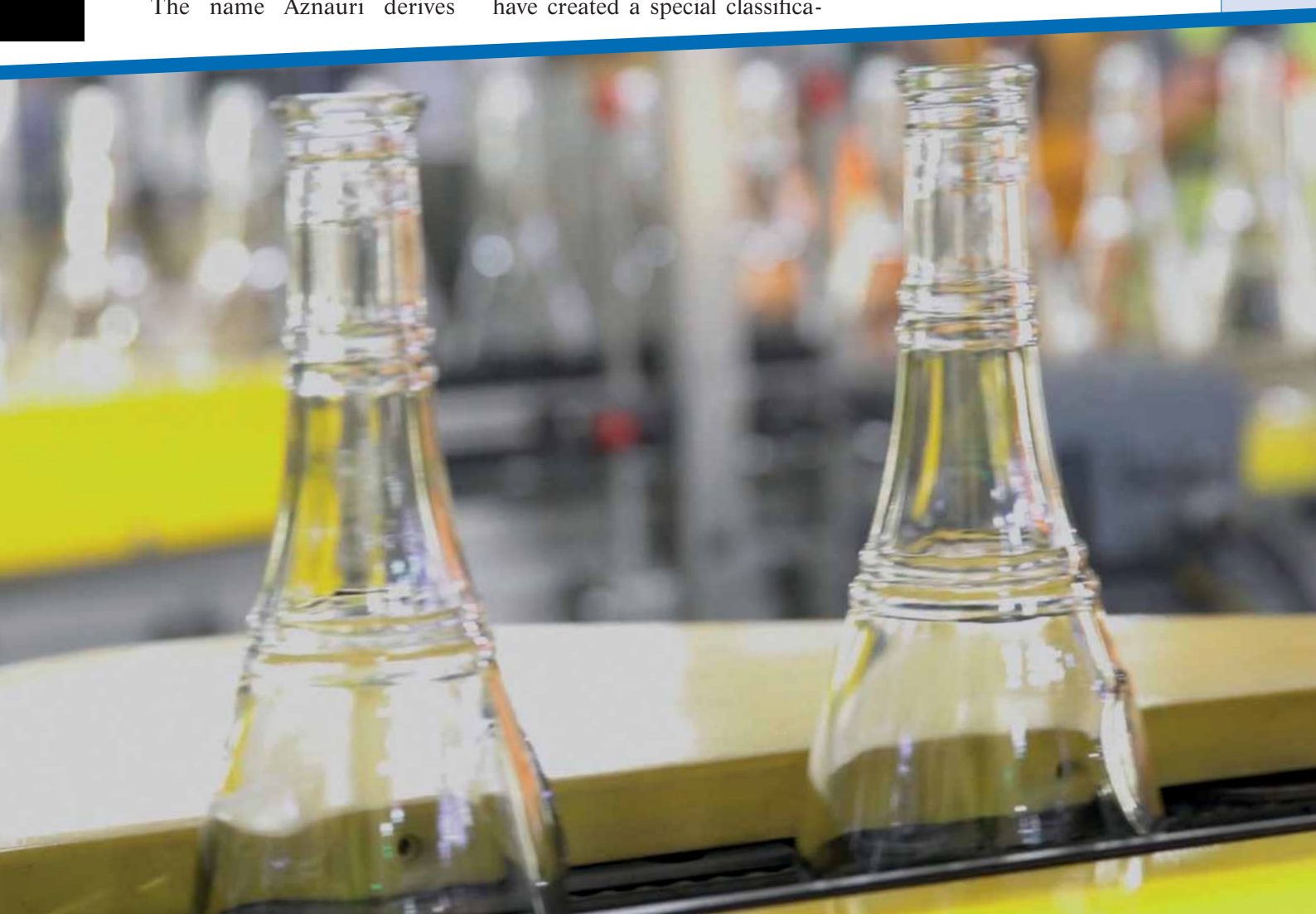
To accentuate the dark gold, shimmering colour of the brandy, the 0.25-, 0.5- and 0.7-litre bottles are made of thick, colourless glass. The combination of the curves and curled engraving at the front is splendid and the two grand lions holding a crown above the letter A reflect the nature of the drink: strong and proud, as well as inimitable and self-reliant.

"Erste Lage" - The best of the best

The wineries that are part of the "Österreichische Traditionsweingüter" association have created a special classification. Vetropack Austria produces the highly tailored bottles for the "Erste Lage" wines.

The varying soil compositions and microclimates in Austria mean that even neighbouring vineyards can produce very different wines. Members of the "Österreichische Traditionsweingüter" association have placed a great deal of passion and skilled knowledge into defining the tiny details of their vineyards, which influence the quality and identity of their wine. The association distinguishes between "Klassifizierte Lage" (similar to appellation controlée), "Erste Lage" (similar to Premier Cru) and "Grosse erste Lage" (similar to Grand Cru).

Vetropack Austria has developed high-quality unique Rhine wine bottles for the "Erste Lage" group. Their logo is made in glass relief, while the shoulder area of the bottle is an elegant cuvée colour. The different wineries can pick between a swiss type thread



or cork finish – because with fine wines, it's always "to each their own".

"The Busker" - Genuine and bold

Vetropack Italia designed the exquisite bottles for the outstanding, award-winning whiskey produced by Ireland's Royal Oak Distillery, which because an astonishing product deserves an astonishing look.

The Royal Oak Distillery produces only handmade whiskey. It makes all four Irish varieties of the spirit under the "The Busker" label: single grain, single pot still, single malt and blend Triple Cask Triple Smooth. The intense essences and sweet aftertaste of the whiskeys recently earned the company recognition at the renowned L. A. Spirits Awards.

The distillery's guarantee to combining tradition with exploratory new directions can be seen in the bottles for the "The Busker" range. Their clean lines and minimalist regular shape embody the Royal Oak Distillery's genuine, no-nonsense approach, while the strong shoulder of the bottles highlights the company's resolve to follow its own path.

> The quality of the oil may depend on the olive tree, but glass plays a part in preserving its quality while in storage

MARKET: WHY GLASS IS THE BEST PACKAGING FOR OLIVE OIL

High-quality olive oil and glass packaging go hand in hand. Glass is one of the best packaging materials for protecting quality products, as it conserves the unique flavour of delicate olive oil.

Olive oil is an iconic European product, labelled "liquid gold" by the ancient Greeks, as it is considered a fundamental of the healthy Mediterranean diet.

The differences between olive oils derive from the type of olives used and the oil extraction process. The term "extra virgin olive oil" is used exclusively to describe pure olive oils whose juice comes directly from the fruit harvest. Only the first harvest of the year can be called "extra". The pure olive oils must be cold pressed in order to retain their natural flavour. This oil is free from any chemical additives and is produced and stored to the highest quality standard. No packaging material would protect the oil better than glass, as it prevents any transfer of aromas and preserves the taste, smell, colour and texture of the oil.

Glass is pure. It does not react with other materials and can be recycled without any difficulties. The products that come into contact with glass do not change. This is a strong aspect in its favour when it comes to packaging delicate aliments such as olive oil, in fact glass forms an almost complete barrier that prevents any deterioration in quality.

Olive oil in glass contains the lowest number of peroxides compared to olive oil in other packaging, proving that glass packaging prevents oxidation. Dark glass is often chosen for high-quality olive oils, as the darker the glass, the better the light protection.

A survey conducted by Friends of Glass in 2020 showed that around 60 per cent of consumers in Europe prefer oil in glass bottles these days. ■

vetropack

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MORDOR INTELLIGENCE

Glass bottles and containers market – growth, trends, Covid-19 impact, and forecasts (2021-2026)

The Glass Bottles and Containers Market is segmented by End-user Vertical (Beverages, Food, Cosmetics, Pharmaceutical), and Geography. The report offers market size and forecasts for Glass Bottles and Containers in production units volume (in billion units) and revenue (USD billion) for all the above segments.

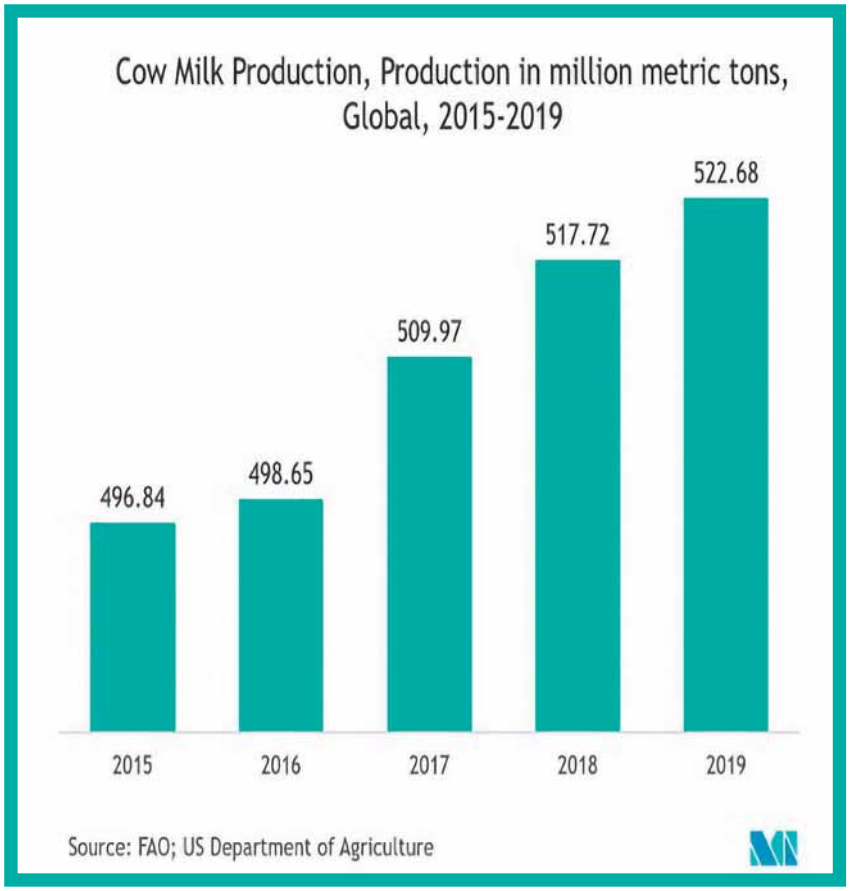
MARKET OVERVIEW

The Glass Bottles and Containers Market, with a production of 689.94 units in 2020, was valued at USD 58.64 billion in 2020, and is expected to be valued at USD 78.41 billion, and reach 922.43 billion units by 2026, registering a CAGR of 4.18 per cent, during the forecast period 2021-2026. The COVID-19 outbreak created a growing necessity for industries in the F&B sector to focus more on hygiene and sanitization and given the current situation, people, nowadays, are opting for a healthy and sustainable lifestyle. As most of the products in this sector are included in essential services, it becomes crucial for the packaging sector to follow conservative practice.

- Glass packaging is 100 per cent recyclable, which makes it a desirable packaging option from the environmental point of view. Six tons of recycled glass directly save six tons of resources and reduce the emission of CO2 by one ton.
- One of the main factors driving the growth of the market is the

increase in beer consumption worldwide. Beer is one of the alcoholic beverages that use glass bottles for packaging. It is packed in dark-coloured glass bottles to preserve the contents, which are prone to spoilage when exposed to UV light. Additionally, according to the NBWA Industry Affairs, 2019, the US consumers who are 21 years and older consume over 26.5 gallons of beer and cider per person annually.

- Owing to its many benefits, glass packaging is on the rise for both the cosmetics and fragrance industries. Moreover, emerging economies are anticipated to create a favourable demand for cosmetics and perfume products and their packaging. India is one of the fastest-growing markets for cosmetic consumption and production.
- Additionally, the increasing banning initiatives by the government and the related regulatory bodies for using the PET bottles and containers for drug packaging and delivery is expected to see its consumption taking a hit. This is expected to boost the demand for glass bottles and containers over the forecast period.
- Glass packaging is considered for premium products and a gold standard in various industries such as pharmaceuticals, food and beverages, cosmetics, and liquor packaging. The beverage industry holds a prominent share of the global packaging demand for glass. The outbreak of the COVID-19 liquor industry is observing a significant drop in demand as it not be deemed as an essential industry by governments.
- In the case of the pharmaceutical industry, major suppliers of ingredients and generic drugs suppliers are China and India. Factors, such as the lockdown placed in India and production halt in China during the months of February and March, have negatively impacted the supply chain in the industry, which is, in turn, affecting manufacturing facilities in both North America and Europe.



SCOPE OF THE REPORT

Glass bottles and containers provide an ideal way to keep the consumables safe, fresh, and healthy for a longer period and ease of transport. Glass bottles and containers are majorly used in the alcoholic and non-alcoholic beverage industry, due to their ability to maintain chemical inertness, sterility, and non-permeability. As part of the scope of the market, key end-user industries, such as beverage, food, pharmaceutical, and cosmetics, have been considered. The beverage segment is further divided into liquor, beer, soft drinks, and milk.

KEY MARKET TRENDS

Milk is expected to account for significant market share

- The global dairy industry has been witnessing a backward shift from plastic to glass bottles. Driven by consumer demand for environmentally friendly milk, many small dairy market players choose to sell their products in reusable bottles. The demand for glass bottles in the milk industry has been increasingly more in Europe, when compared to other regions.
- DiaryDrop, based in Alderly Edge, which has 3,000 customers in Cheshire, announced a significant reversal in the glass milk bottle delivery trend. Another Cheshire-based milk supplier, Creamline Dairies, witnessed an increase of 85 per cent in the number of people getting glass bottles delivered since last year.
- Moreover, with companies, such as A.B. Munroe Dairy United States, taking several initiatives to encourage people to use glass bottles by providing door-to-door delivery of fresh milk bottles, the market studied, especially in the sub-urban regions of the United States, is expected to grow over the forecast period.
- Dairy firms across the United Kingdom have witnessed a surge in demand for milk in glass bottles. About 17 out of 20 dairy businesses, researched by BBC News, have observed a surge in sales of glass milk bottles to homes and businesses amid concern over plastic waste.
- The Pan-UK company, Milk & More, and East-London dairy giant, Parker Dairies, have found a substantial increase in the demand for glass bottles. Most of the dairies from London mentioned that most of the change is from their younger consumers whose families seem more than willing to pay a little extra for the service rather than the plastic, in their efforts to help the environment.

Asia Pacific is expected to hold the largest market share

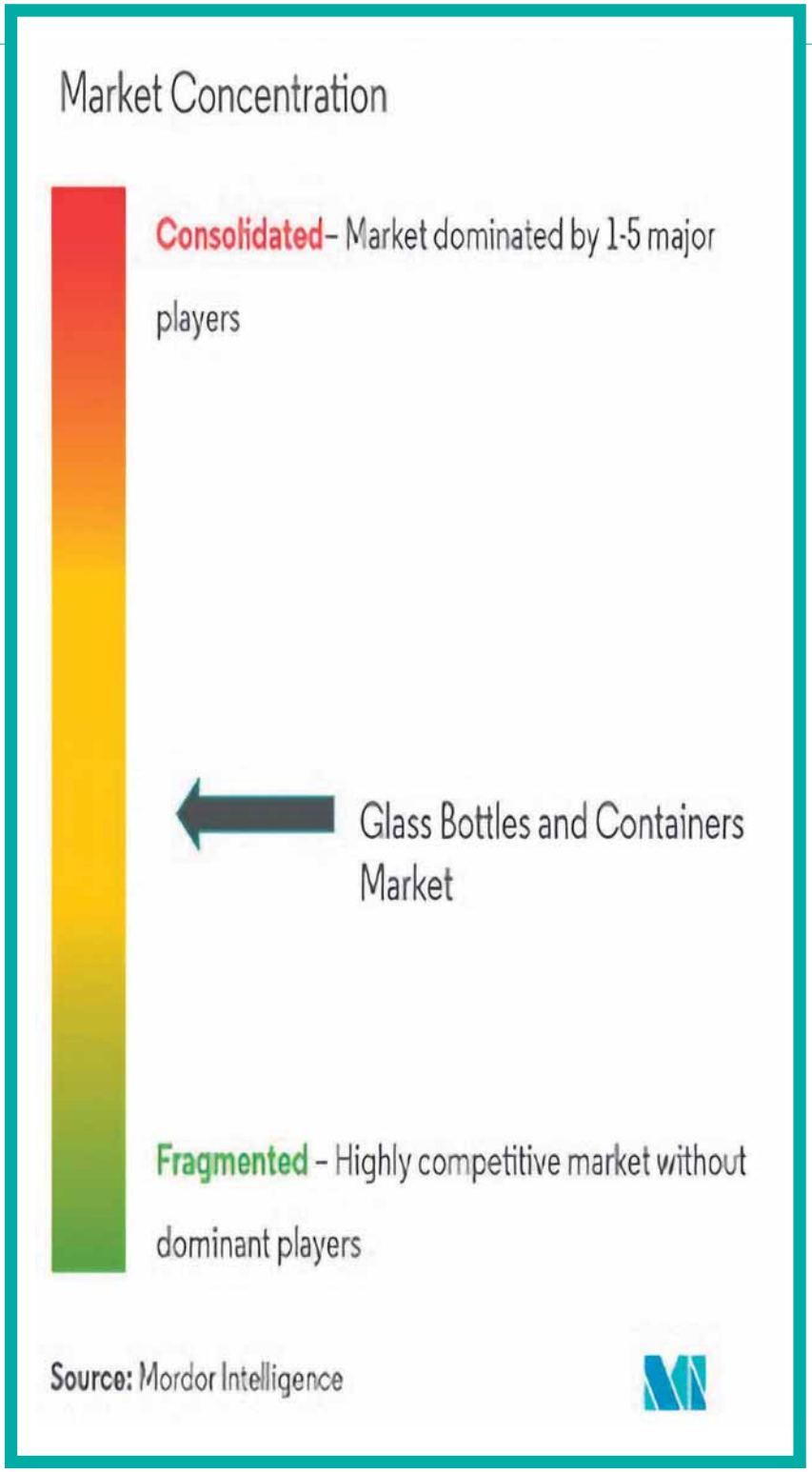
- The Asia Pacific region is expected to register a significant growth rate compared to other nations owing to an increase in demand for pharmaceutical and chemical industries, which prefers glass packaging because of the inert nature of glass bottles. China, India, Japan, and Australia among others are the prominent nations majorly contributing to the growth of the Asia Pacific glass packaging market.
- The pharmaceutical and healthcare sector in China is one of the largest markets in the world, mainly driven by its ageing population. Due to the recent regulatory changes in the country, the foreign pharmaceutical companies are facing difficulties in conducting business, especially when it comes to market entry and price control. Hence, there is a potential growth opportunity for the domestic players as they might experience an increase in demand for glass bottles and containers from these companies.
- In India, only the reusage of glass packaging solution, especially bottles, is increasing.

As the Indian consumers are emphasizing on health, they are showing preference toward glass packaging over other options, as it prevents leaching from its surface. Also, the country comprises many companies, including Hindustan National Glass and Asahi India Glass, offering glass packaging solutions across the industries.

- Japan boasts of one of the fastest-growing pharmaceutical industries after the United States, and is continuously focusing on strong innovation and patent drugs. The Government of Japan is also contributing to the growth through deregulations for international companies to invest, thus driving the pharmaceutical market in the country.
- Additionally, international companies are extensively investing in pitching to the Chinese market. For instance, Givaudan has invested USD 100 million for forming its new production hub for its fragrance business. The plant is expected to start operation by 2020.

RECENT DEVELOPMENTS

- November 2020 – A subsidiary of Vidrala SA and leading glass container manufacturer, Encirc, lit its new industrial furnace at its plant in Elton, Cheshire. The giant oven, which can process up to 900 tonnes of container glass per day, is the largest in the world.
- October 2020 – Owens-Illinois Inc. and Krones AG, which is a German company, registered a strategic collaboration to increase innovations in its glass packaging segment. The collaboration aims to improve glass filling, packaging speed line and efficiency with enhanced agility, flexibility by introducing sustainable glass systems and digital solutions such as the direct to glass printing technology.



INDIA'S CONTAINER GLASS SECTOR
Focus on the beer industry

Rajeev Jetley

THE INDIAN CONTAINER GLASS INDUSTRY

India has nearly 25 large-, mid- and small-scale container glass manufacturers. A few of these are dedicated to pharmaceutical glass, while the rest cater to the container glass demand of alcoholic and non-alcoholic beverages, food, and cosmetics & perfumery sub-segments. Most of these non-pharmaceutical glass manufacturers supply container glass to beer producers in the country.

Led by Hindustan National Glass Industries (HNGL), AGI Glasspac and Can-Pack India, Indian container glass manufacturers have been experiencing steady growth rates in recent years. Rising consumption of beverages (both alcoholic and non-alcoholic) has helped Indian container glass manufacturers to undergo a number of capacity expansions over the last ten years.

The spread of COVID-19 has severely impacted container glass businesses for producers of the beer industry. There has been severe disruption to regular busi-

India has emerged as one of the largest beer markets in Asia in the last two decades. The country's container glass industry has registered massive gains due to the rising consumption of beer in the country during these years. In fact, beer has become the most important sub-segment for the country's container glass manufacturers. Glass Machinery Plants & Accessories gives a detailed account of the Indian container glass industry catering to the country's beer industry and major glassmakers in this feature.

ness operations due to lock-down, disruption in transportation, supply chains and other emergency measures in the Indian container glass industry. With the exception of pharmaceutical glass manufacturers, most container glass manufacturers were forced to operate their production plants with curtailed production and manpower as per requisite permission from local administration. As a result, volumes for the quarter ending June 2020 were severely impacted. However, during the quarter ending September 2020, container glass business of most glassmakers showed signs of recovery compared to the quarter ending in June 2020.

THE INDIAN BEER INDUSTRY

Beer is one of the most important demand drivers for the container glass industry in India. The Indian beer industry has registered robust growth in the last one and a half decades. From a total consumption of about 100 million cases in 2005, consumption surpassed 300 million cases in 2019. The current industry size is estimated to be over 320 million cases per annum. A case of beer in India means 12 bottles of 650 ml. Three leading players contribute over 85 per cent of total industry sales. And since glass is the most preferred packaging format for beer packaging in the country, container glass manufacturers have registered huge profits from the proliferation of the beer industry in the country. The country's beer market has been strengthening on account of higher disposable income, rising preference for low alcohol beverage and gradual social acceptance. These factors are expected to lead to huge growth in the coming years.

The country's largest brewer, United Breweries Limited (UBL), which owns the popular Kingfisher brand of beer, is expecting further acquisitions and entry of new players in the Indian beer market, despite disruptions due to COVID-19 and higher taxes by some states.

Per capita beer consumption here is still very low compared to other countries in the Asia Pacific region and, therefore, the market could witness huge growth in coming years, which would be a

very positive outcome for Indian container glass producers.

Growth in beer (and container glass) consumption for the subsegment would be led by factors such as the shift from hard liquor to beer consumption by consumers in India, increase in disposable income, change in societal perspective and others. Attitude towards alcohol consumption is evolving particularly amongst youth, working women and other urban population who are gaining an appetite for beer as social drinking has become a more adaptable lifestyle in metros and tier-2 cities.

Over 30 per cent of the total population in India comprises young people, and beer consumption is increasingly becoming part of their social interactions. Beer is gradually becoming a perfect after-work companion for corporate India as well.

However, there are a number of challenges in the Indian beer industry. For example, distribution of beer in India is still largely controlled by the state or state-owned corporations, resulting in stricter regulations across various states so as to have better control over prices, consumption and excise duty.

In fact, this regulation is the largest challenge for brewers in the country. In 2020, the state of Andhra Pradesh introduced a new alcohol policy, which cancelled existing bar licences and reduced the number of retail outlets by about 40 per cent. Such a conservative and anti-industry approach in a few states poses a challenge for the beer industry and indirectly for container glass producers.

MAJOR CONTAINER GLASS SUPPLIERS TO THE BEER INDUSTRY

A number of container glass manufacturers supply glass bottles to the Indian beer industry, such as Hindustan National Glass, Can-Pack India, AGI Glasspac.

Hindustan National Glass

Incorporated in 1946, Hindustan National Glass Limited (HNGL) is the container glass leader for beer industry. The company has over 40 per cent of market share in the Indian container glass industry. It caters to all end user segments – Liquor, Beer, Pharmaceuticals, Processed Food & Cosmetics through seven state-of-the-art container glass manufacturing facilities spread over India.

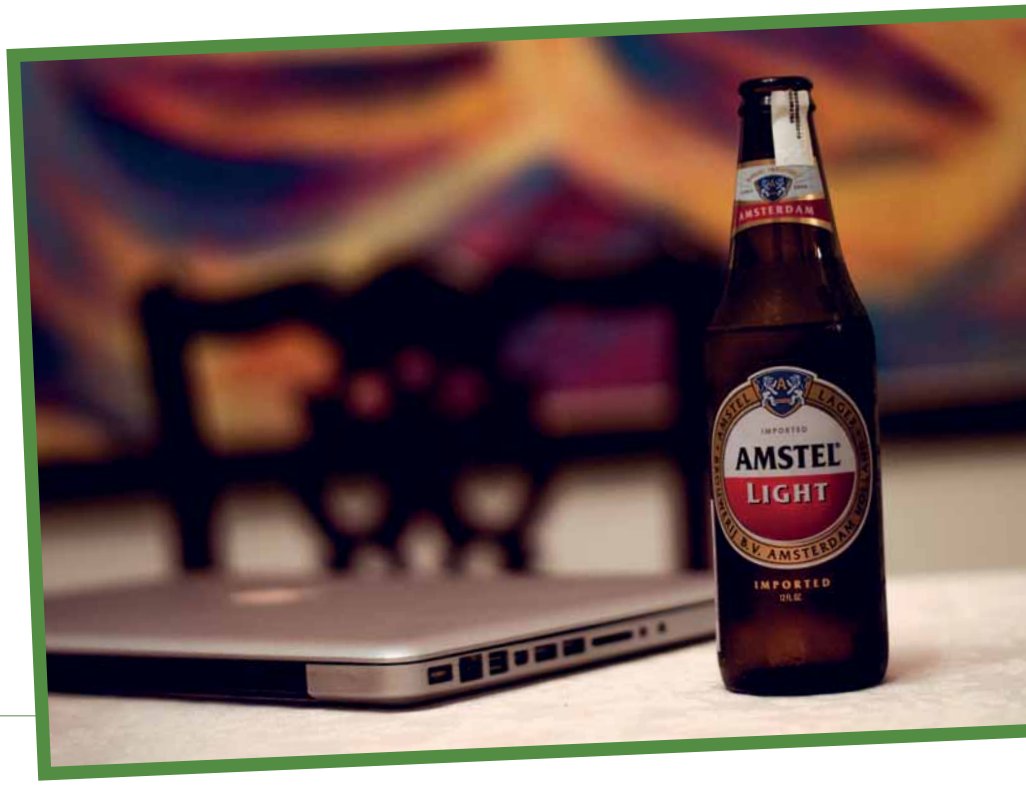
HNGL started with a 30 TPD container glass furnace at Rishra, in the state of West Bengal in 1952. Over the years, the company grew organically and inorganically to the current installed capacity of about 4300 TPD with group turnover of INR 23 billion (USD 315 million) for the financial year 2020.

In the north of the country, HNGL has production bases in Neemrana, Rishikesh and Bahadurgarh. In the Southern region, the company has production bases in Naidupeta and Puducherry. The company's production bases in West in Sinnar and Rishra in East provide a pan-India presence. HNGL operates a total of 13 furnaces, 62 AIS machines and 17 printing lines; open access power in most of the plants, with furnaces equipped to run on all three types of fuels – solid, liquid and gaseous.

AGI Glasspac

AGI Glasspac is among the top three manufacturers of beer bottles in India. The company has two container glass manufacturing facilities, one at Moti Nagar Hyderabad and the other at Bhongir, both engaged in the manufacture of glass containers for the packaging needs of food, pharmaceuticals, soft drinks, spirits, and other beverage industries.

With an in-house design facil-



TOP 10 BEER BRANDS IN INDIA

ity, mould manufacturing and ACL (Applied Ceramic Labelling) facilities, AGI has fully integrated operations. With the Hyderabad and Bhongir facilities put together, AGI today melts around 1,600 tonnes of glass per day, from 80 tonnes per day capacity in 1972.

AGI glaspac provides bottles to some of India's best known brewers, and supplies many brewers with quality glass beer bottles throughout India. The company's beer bottle range comprises mainly of 330ml and 650ml AIBA bottles, along with other patented designs which are meant for select customers. The company also produces beer bottles in 500ml size, as per select international customer requirement.

Can Pack-India Private Limited

Polish based Can-Pack Group operates a state-of-the-art container glass plant in the beer capital of India – the city of Aurangabad – in the state of Maharashtra. Aurangabad has largest concentration of breweries in India. Sixteen major breweries manufacturing some of the most prominent beer brands in India such as Kingfisher, Carlsberg, Foster, Heineken, etc., are located in the Aurangabad district. The city accounts for about 14 per cent of the beer produced in India.

The huge demand for glass bottles from city based brewers, encouraged Can Pack India to embark on the construction of a container glass plant soon after the commencement of its aluminium operations. Can-Pack Group has made an investment of over INR 5 billion in the plant, which has an installed production capacity of 328,000 tons of glass containers per year. The company has a total of two furnaces and seven production lines. It is equipped with state-of-the-art plant machinery and equipment from international suppliers.

Haldyn Glass Limited

Incorporated in 1991, Haldyn Glass Limited (formerly known as Haldyn Glass Gujarat Limited) is a major supplier of glass bottles to the Indian beer industry. HGL is promoted by Haldyn Corporation limited which holds 53.53 per cent in the company. HGL's manufacturing plant is located at Vadodara, Gujarat, and currently has a total melting capacity of 360 tons per day comprising of two glass melting furnaces (200 + 160 tons per day capacity) and eight IS machines manufacturing a very wide range of containers from 1ml to 2500ml. The IS machines are capable of producing about 1.5 million high quality containers every day. ■

TABLEWARE

LA OPALA: Lifestyle enriching products as company mission

THE COMPANY

Established in 1987, La Opala RG Limited was the first to introduce opal glass in India. The company is engaged in the manufacture and marketing of opal glass tableware and 24 per cent lead crystal ware products. Over the years, the company has emerged as India's largest tableware and glassware lifestyle brand.

La Opala's widening distribution network has enhanced product accessibility. The company's extensive distribution network is spread across India, comprising more than 200 distributors and 12,000 retailers.

The company focuses on demand coming out of semi-urban India, addressing more than 600 towns with a population of 1,000,000+.

INDIA AND THE INTERNATIONAL MARKET

The company aims to address the India where there is an annual population increment that adds more individuals than anywhere in the world. As well as the India that is passing through a long-term growth in per capita incomes and is possibly the youngest country by median age (late 20s) and hence likely to

La Opala Rg. Limited is a primary marketer of life style products and manufacturer in the tableware sector. The company believes that the desire for beautiful things is universal, however, the dedication to enrich life with the brilliance of beauty is rare. Company mission is therefore to continuously optimize satisfaction of consumers through world-class products and services, ensuring consistent success for the company, shareholders and employees.

possess the largest economically productive population anywhere.

India is, in fact, already the world's fifth largest economy and likely to emerge as the world's third largest in a decade. It is possibly the fastest urbanising nation and likely to grow from a shade less than USD 3 trillion to around USD 5 trillion in half a decade, and possibly a USD 10 trillion economy in about a dozen years from now.

India is not just a country; it is the coming together of diverse cultures. In these cultures, habits and preferences remained unchanged for generations and centuries. Then something happened; people started migrating to different cities and started being exposed to different cultures. People started wearing different clothes and started consuming a diet they had not been raised on. And they also began to eat on crockery they had never been accustomed to.

This transpired because Indians were not just keen to earn more; they were also committed to live better. La Opala believes that this sweeping cultural transformation has only just begun; India is at the bottom-end of a sharp J-curve that is likely to endure across the decades.

The company already enjoys an international presence, exporting products to over 30 countries.

PROPOSED CAPACITY EXPANSION

La Opala is the opal tableware market leader in India, and despite the consumer sentiment appearing muted in view of the pandemic-induced lockdown, the company is proceeding with capacity growth. This growth will allow La Opala to widen distribu-

tion, enhance brand investments and reinforce the commitment with which the company initially went into business.

PRODUCTS

The company enjoys a strong market positioning through three brands to cater to different customer segments.

- La Opala is the flagship brand of the company and caters to entry-level dinner sets, plates, bowls, coffee mugs and other products. La Opala offers two well crafted collections - Melody and Novo.
- Diva offers a premium range of products under five collections – Classique, Ivory, Cosmo, Quadra and Sovrana. La Opala collaborated with renowned Indian fashion designer Manish Malhotra to design and curate its premium range of opalware under the brand Diva.
- Solitaire markets crystal glassware.

PERFORMANCE DURING 2019-20

La Opala reported INR 270.01 Crore in revenues in 2019-20, a 2.91 per cent decrease over the previous financial year. They reported INR 84.27 Crore in profit after tax in 2019-20, a 13.82 per cent increase over the previous financial year, and ended the year under review with INR 258.80 Crore cash on their books as at 31 March 2020.

The principal development during the year under review transpired at the far end, when India was locked down following the outbreak of the Covid-19 pandemic. The company lost almost 10 days of off-take and since this was the last week of the year, usually the most productive week through the year, the revenue 'loss' was estimated at around INR 15 Crore.

SUSHIL JHUNJHUNWALA, EXECUTIVE VICE-CHAIRMAN ON THE COMPANY'S PERFORMANCE IN 2019-20

• *How would you review the performance of the company during the year under review?*

The year under review was challenging from a demand perspective. As the Indian economy slowed, there was a decline in disposable incomes, which, in turn, affected the off-take of our products. Besides, a slowdown in the country's real estate sector affected apartment sales and deliveries, which, in turn, affected the off-take of tableware. And lastly, sales were affected during the last ten days of the financial year under review, equivalent to a notional sales loss of around INR 15 Crore. Against this backdrop, the company reported a 2.91 per cent decline in revenues and a 13.82 per cent increase in profit after tax.

• *How was the overall positioning of the company's brand affected during the year under review?*

A number of shareholders will seek to know whether the proposed capacity expansion was at all necessary.

The brand of the company remained protected during the year under review. At La Opala, we believe that this was one of our most important achievements: at a time when markets and consumer sentiment were weak, it would have been easy to reduce our sticker prices with the objective to sell a large quan-

tity. The management resisted this temptation to seek a short-term benefit at the expense of a long-term asset. The company retained the price integrity of its products and protected its brand salience during the year under review. The result is that when consumer sentiment revives, we expect that the appeal of our products will have been retained.

• *How was La Opala positioned during the year under review?*

La Opala was positioned like it has always been: a superior tableware brand over conventional alternatives. We believe that La Opala does not provide a functional convenience: it enhances the user's pride. Besides, it does so at one of the most attractive price points, a reality that has endured across the decade. La Opala plays two concurrent roles: enhancing pride for all those who use our products in addition to carrying a concurrent responsibility to widen the market.

• *How do you explain the responsibility to widen the market?*

India is the second most populous country. A large part of the country continues to consume metal and legacy tableware. During the last decade, we accelerated a shift towards the consumption of opalware through superior quality (following our technology-driven expansion in 2007) and a superior price-value proposition. By keeping our sticker prices attractive and affordable, we did not just service an existing market: we helped widen the market as well. The result is that in a number of semi-urban and rural communities, La Opala has graduated from just another tableware brand to a 'must receive' gift during marriages; it is generally the most preferred gifting item on social occasions as well.

• *How did the company transform this into a competitive entry barrier?*

The company did not just price products affordably for the vast bulge of India's aspiring middle-class: concurrently the company continued to expand its manufacturing capacity. The result is that with each successive increase in production capacity at a relatively modest capital cost per tonne, the company possessed a larger financial room to keep sticker prices steady. The result of this combined action – larger capacity and affordable sticker price – translated into an effective competitive advantage.

• *What is the implementation schedule of the company's next expansion round?*

The company intended to expand its manufacturing capacity – by setting up a greenfield plant at Sitargunj by the end of the second half of the current financial year. The impact of the pandemic induced lockdown has affected sales prospects during the current financial year. The result is that the company has chosen to defer the expansion by around six months into 2021-22, which provides it with more breathing room with respect to a revival in consumer demand. We believe that while the larger installed capacity will warrant a deeper responsibility to market an additional quantum, the expansion will also provide the company with higer flexibility: from two furnaces comprising five manufacturing lines in our showpiece Sitargunj facility, we will have increased our capacity to three furnaces across eight manufacturing lines. We believe that this configuration will make it possible for us to address changes in the marketplace with increased responsiveness.

When we embarked on capacity expansion a year ago, we were already operating our manufacturing facility at 85 per cent capacity utilisation. If we had not expanded at that point, the growth of the market would have provided an opportunity for prospective competition. By announcing an expansion when we did, the company enhanced the morale of our distribution partners that they would get an abundant supply of products to help

LA OPALA - COMPANY OVERVIEW

La Opala RG Limited is the largest player in the Indian opalware sector with a dominant market share. The opalware category is fast gaining consumers' attention, resulting in enhanced traction from diverse categories of consumers. The company has two manufacturing units, one at Madhupur (Jharkhand) and the other at Sitarganj (Uttarakhand). The company deepened its distribution network and brand recall. The company is a recipient of Top Export Award & Trophy from EPCH (Export Promotion Council for Handicrafts) and CAPEXIL (Chemical and Allied Export Promotion Council).

build their markets. Besides, we believe that the proposed capacity expansion will strengthen our capacity to increase our procurement economies.

• *How is the company positioned to survive the impact of the pandemic induced lockdown?*

The company is comfortably positioned to survive the full impact of the lockdown for some good reasons: the company does not have debt on its books, having net cash of INR 258.80 Crore as at 31 March 2020 and addressed the entire requirement of its INR 140 Crore investment outlay out of net worth. Net worth increased from INR 529 Crore as at 31 March 2019 to INR 545 Crore as at 31 March 2020, compared with the equity share capital of INR 22 Crore. The result is that the company's Balance Sheet remained robust to weather the impact of the lockdown. This perpetuates an ongoing competitive advantage: the largest tableware capacity addition undertaken in the country at the lowest financing cost (net worth) with a wider equipment configuration.

• *What is the company's priority during the current financial year?*

The company was fortunate that one of its furnaces was under refurbishing in the last quarter of the financial under review; this refurbishment was extended and the furnace remained deliberately inoperative through the first quarter of the current financial year, moderating our manufacturing costs and inventory holding costs. The furnace will be brought back on stream as soon as the demand outlook revives. Meanwhile, the company will continue to engage deeper with its trade partners to explore ways of addressing consumers. Besides, the company will focus on shrinking its receivables cycle during the current financial year. At a time when the consumer outlook appears uncertain, the company will continue to strengthen the integrity of its Balance Sheet and prepare itself for a demand upturn.

LA OPALA BUSINESS MODEL

When La Opala ventured into the business, the opal tableware market in India was virtually non-existent. In the late 1980s, companies addressing the tableware market in India either imported products or worked with traditional materials (glass, bone china and metal). This provided an opportunity for the company to create aspirational products that would influence consumers to upgrade their lifestyles. The rationale continues to be relevant; over the past few years the market is being re-defined in various ways: rise in disposable incomes, growing urbanisation, increased exposure to global lifestyle trends on social media and greater home-pride. The company is not just addressing an emerging lifestyle revolution but making it happen as well. ■

LA OPALA®

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Renold
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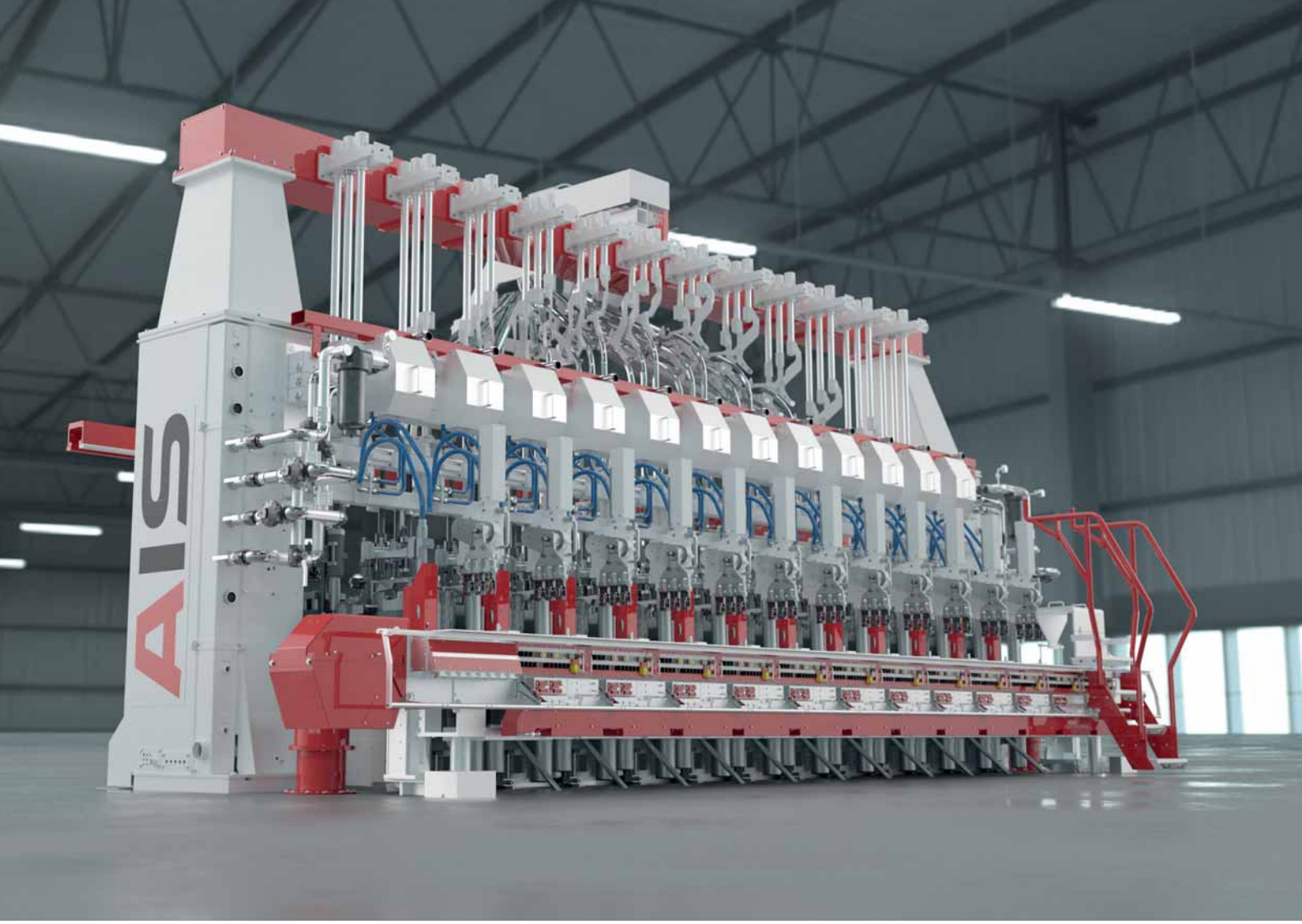

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