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Kañch

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The All India Glass Manufacturers' Federation

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Quarterly Journal of **The All India Glass Manufacturers' Federation**

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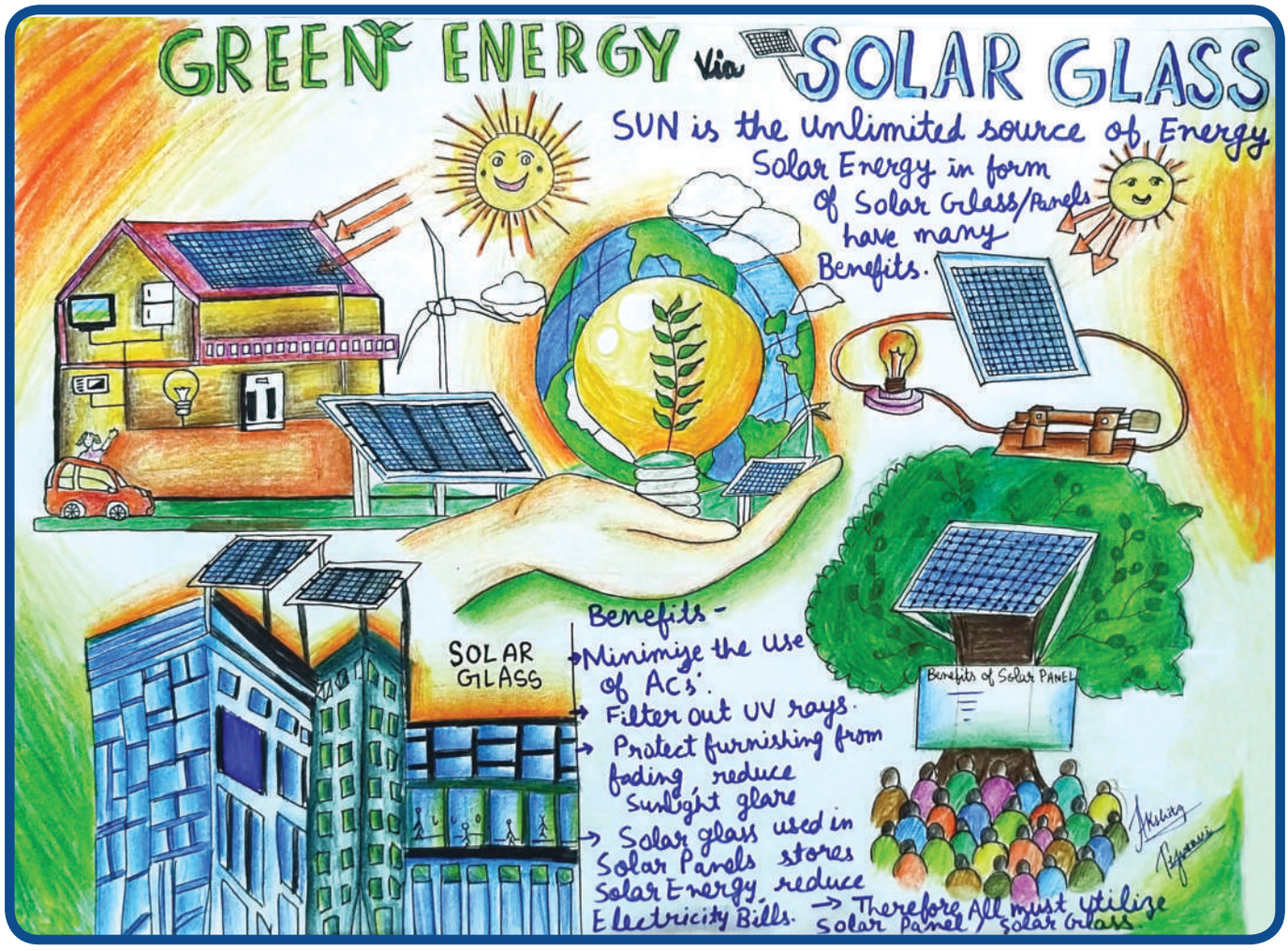

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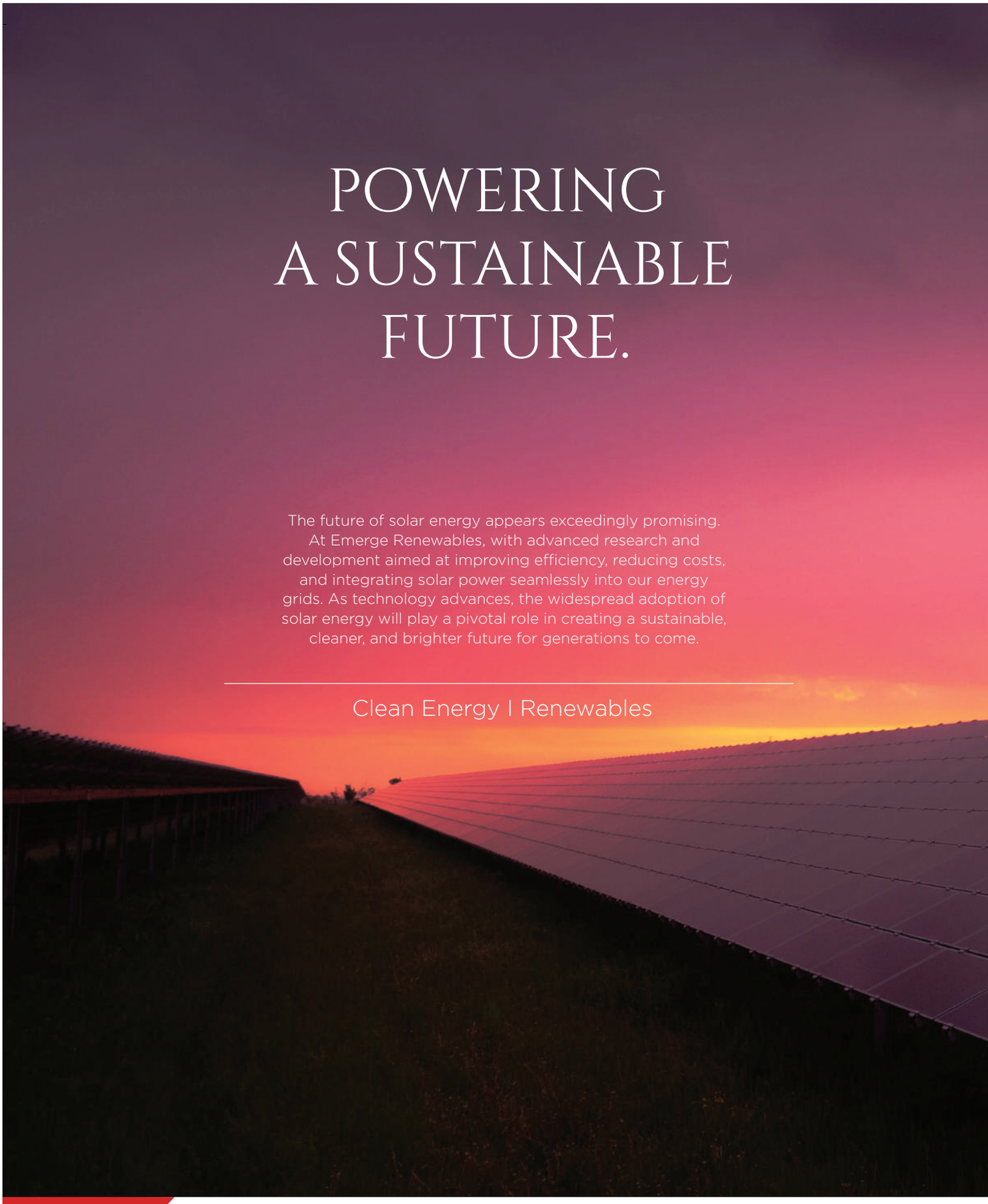

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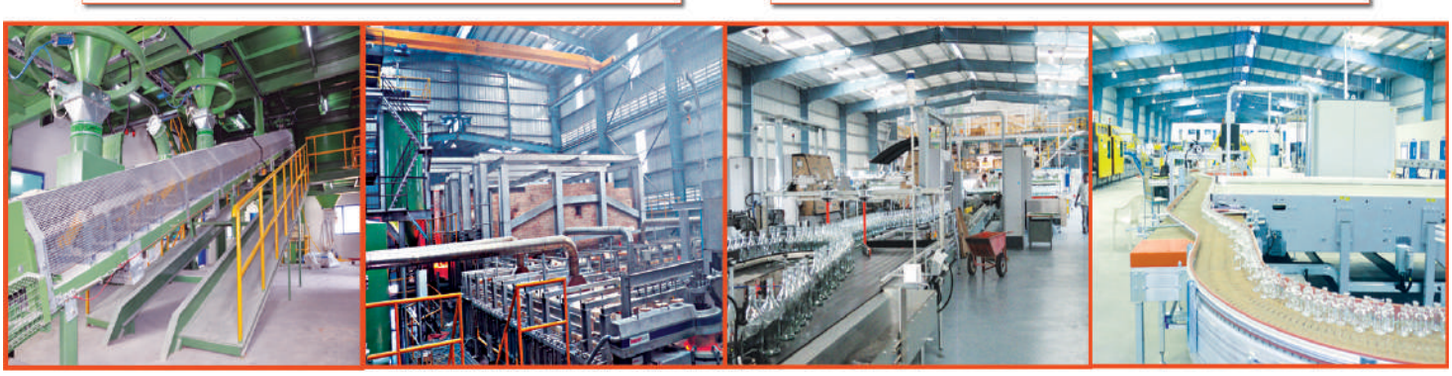

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Quarterly Journal of **THE ALL INDIA GLASS MANUFACTURERS' FEDERATION**

Vol. 11 | No. 4 | January-March 2024

Contents

heye international

SMARTLINE 2

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From President's Desk

At the AIGMF initiated event, the signing-up ceremony of MoU between DTU (Delhi Technological University) and GGKF (Glass and Glazing Knowledge Forum; with AIGMF as one of its prime members) to setup a skill center at DTU Campus Rohini, DELHI was held on Feb 6. To start with, two courses would be initiated i.e. for students and professionals. DTU has already started taking lectures for 2 hours per week for B.Tech students of DTU under National skill policy. And the other session will be for the Industry Professionals to be run by GGKF.

On March 4, Mr. Basudev Agarwal, founder of Surya Roshni Ltd., who built 3 Glass furnaces for the lighting industry, passed away. Mr. Agarwal had set up an incandescent lamp shell manufacturing facility named Ribbon Technology at Malanpur (MADHYA PRADESH) Lighting Plant for captive use, PAN India and foreign markets. A prayer meeting was held at the Executive Committee at Hyderabad in remembrance of Mr. Agarwal.

Parallel to the Executive Committee Meeting on March 16 at Novotel HYDERABAD, technical sessions on Robots and Raw Materials in Glass Manufacturing were organized by The All India Glass Manufacturers' Federation.

The meeting was hosted by AGI Greenpac Ltd., under its business unit AGI glaspac (Innovative and Eco Friendly Glass Packaging Solution Company). The meeting was supported by President Mr. O P Pandey of the South India Glass Manufacturers' Association (SIGMA)- HYDERABAD garnering elite participation of members from the southern region.

A presentation on Role of Container Glass on the World Consumer Rights Day was given by Mr. Rajesh Khosla, Sr. Vice President AIGMF and CEO / President AGI Greenpac. A technical presentation on Robots in Glass Manufacturing (offering technical solutions for the glass industry) was delivered by Er. Pulkit Gaur (Chief Technology Officer of Gridbots Technologies Pvt. Ltd.) and recipient of CK Somany Glass Award 2023 for Innovation and Technology.

The concluding session saw presentations and display of various raw materials for glass manufacturing (samples of Quartzite, Silica sand, Glassomite Slag, Iron Chromite, Alumina Hydrate, Soda Ash, etc.) by Mr. Aurindam Dey, Director of IMR Resources India Pvt. Ltd.; Mr. Dharmendra Baid, General Manager of Karneet Enterprises India Pvt. Ltd., and Mr. Pratik Joshi, Director of Eco Clay Solutions Pvt. Ltd.

The meeting was attended by over 50 participants mostly from the southern India region as well as PAN India glass manufacturers, suppliers, consultants for the glass industry. All segments of glass participated via Hybrid mode. The sessions were interactive and were appreciated by everyone.

At the relieving of Prof. V K Singh of BHU IIT, Varanasi and in order to carry forward our decade's long relationship, it was decided to appoint Mr. Dave Fordham as a Member Editorial Board of KANCH, as former publisher of Glass Worldwide magazine and by considering his extensive experience in Glass Publications ■

Sanjay Agarwal
President AIGMF and
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GLASS News

NN GOYAL RETIRES AFTER 56 GLORIOUS YEARS OF SERVICE IN THE GLASS INDUSTRY

Mr. Narendra Nath Goyal, Executive Committee Member and Hon. General Secretary of the Northern India Glass Manufacturers' Association (NIGMA) retired from U P Twiga Fiberglass Ltd., on March 31, 2024 as Director Operations after a career spanning more than five decades of distinguished service.

Mr. Goyal is a Mechanical Engineer from IIT Kanpur and has worked with industries like Fiberglass Pilkington Ltd., Binani Glass Fiber and U P Twiga Fiberglass Ltd.

Mr. Goyal started in 1968 as Management Trainee with Fiberglass Pilkington Ltd., rising to the position of Vice President (Works) before joining U P Twiga Fiberglass Ltd., in 1991 as General Manager (Works), leaving for a short stint with Binani Glass Fiber and rejoining U P Twiga in 1996 as Vice President (Operations).

Since then, Mr. Goyal has played a stellar role in the success of U P Twiga over the years and is seen as a pioneer in building Fiberglass Insulation Industry in India. His greatest contribution has been in building world class future-ready technology plants well ahead of its time in India, which has helped position Twiga as a high-quality brand not only in India but also in international markets in South East Asia. He has also mentored and trained strong leaders and teams at the plants who will carry his legacy forward.

AIGMF wishes Mr. Goyal and his family peace and harmony with good health in future.

KAPOOR GLASS RECEIVES 'MAHARASHTRA STATE EXPORT AWARD'

On Feb 8, 2024 in an event organized by the Directorate of Industries, Government of Maharashtra, Kapoor Glass India Pvt. Ltd., received the 'Maharashtra State Export Award' in the Gold category from Mr. Uday Samant - Minister of Industries, Govt. of Maharashtra in the august presence of Dr. Harshdeep Kamble IAS, Principal Secretary (Industries); Mr. Deepender Singh Kushwah IAS, Development Commissioner (Industries) and other dignitaries from the District Industries Centre (DIC).

Kapoor Glass initially started its operations via a single machine producing less than 40,000 pieces of ampoules per day. Now, Kapoor Glass produces 1.5 million pieces a day with a product mix of glass ampoules, vials, cartridges, test tubes, perfume samplers and HPLC vials. The company recently expanded its portfolio and also provides glass components to the Indian Defense sector. Kapoor Glass exports almost 90% of its production spread over 38 countries with the majority of its exports terminating in Western Europe and Americas. In its list of satisfied customers Kapoor Glass also caters to the needs of some of the top 10 Pharmaceutical companies in the World.

Kapoor Glass has been present in Raigad (MAHARASHTRA) District since 1972 and is amongst the first few units to establish a manufacturing footprint in this region. The company has 2 fully automated facilities and a modern unmanned warehouse. Each production line is equipped with multiple cameras for inspection and also AI guided robots to carry out critical pick and place operations with robotic packaging. Highlights of the automation is that the entire modernization has been carried out

in house by integrating components from leading manufacturers across the globe. Company is poised to set up yet another ultra-modern vial manufacturing unit in close vicinity capable of producing one million tubular vials per day. Once again even the high-speed energy efficient vial forming machines have been developed and produced in house. Kapoor Glass takes pride in stating that it is the first company in the world to produce SafeOPC ampoules which are a delight to the medical fraternity. Ampoules produced using the SafeOPC technology have very uniform depth and length of the scratch thereby resulting in uniform breaking pressure along with very precise alignment between the dot and scratch. SafeOPC generates minimal glass particles at the time of opening by the doctor compared to its global peers. In addition to this Kapoor Glass also offers ampoules using the Dimension+ and Innova Surface+ features.

"Founded in 1962, Kapoor Glass is now managed by the 3rd generation of the Kapoor family and we are delighted to receive the recognition on behalf of every Kapoor Glass team member. We would also like to thank the Govt. of Maharashtra by providing us with necessary infrastructure and policy changes to boost efficiencies."

"We are in discussions with the Government of Maharashtra to expand our presence in the region with the production of new novel drug delivery systems for the first time in India by an Indian Company, and contribute in our way to the growth of local community", said Mr. Dhruv Kapoor, Commercial Director of Kapoor Glass India Pvt. Ltd.

DAVE FORDHAM APPOINTED AS MEMBER EDITORIAL BOARD OF KANCH AND GLOBAL ENGAGEMENT LEAD FOR GLASS FUTURES (UK)

At the relieving of Prof. V K Singh of BHU IIT, Varanasi and in order to carry forward AIGMF's decade's long relationship, it was decided to appoint Mr. Dave Fordham as a Member Editorial Board of KANCH, as former publisher of Glass Worldwide magazine and by considering his extensive experience in Glass Publications.

Earlier, Glass Futures (UK) announced the newest addition to its team: Mr. Dave Fordham, as its Global Engagement Lead. With a rich history spanning over three decades in the glass industry, Mr. Fordham brings with him unparalleled expertise and an unwavering passion for innovation and sustainability.

Mr. Fordham's journey in the glass sector commenced in 1993 when he became a part of Glass International magazine. Since then, he has played a pivotal role in shaping the industry landscape. One of his significant contributions includes co-founding Glass Worldwide in 2005, a platform that has facilitated insightful discussions and collaborations within the global glass community. Moreover, Mr. Fordham has chaired numerous glass conferences worldwide, cementing his reputation as a thought leader in the field. Notably, he is also recognized as a Liveryman of the Worshipful Company of Glass Sellers of London, a testament to his dedication and impact within the industry.

Reflecting on his journey, Mr. Fordham shares, *"Since first being party over ten years ago to the discussions that evolved into the creation of Glass Futures, I have remained a firm supporter of its goal to establish glass as the low carbon material of choice and am therefore delighted now to officially join the organization at such an exciting time in its development. I am very much looking forward to collaborating with Glass Futures' expert team and its ever-growing membership, as well as partnering with stakeholders from across the world for mutual benefit".*

"At Glass Futures, our commitment to driving innovation and sustainability in the glass industry is unwavering. Mr. Fordham's wealth of experience and insights will undoubtedly bolster our efforts in furthering this mission. His vision aligns seamlessly with our goal of establishing glass as the low carbon material of choice, and we are eager to leverage his expertise to push boundaries and shape the future of glass manufacturing."

Mr. Richard Katz, CEO Glass Futures adds, *"Dave Fordham's position at the heart of the international glass community will be a tremendous asset to Glass Futures and his appointment places us in an even better position to deliver industrial decarbonization across the world."*

"We extend our warmest welcome to Dave Fordham as he embarks on this new chapter with us. Together, we are poised to lead the charge in revolutionizing the glass industry and ushering in a new era of sustainability and innovation. Join us as we embark on this exciting journey towards a brighter, greener future for glass."

Secretary AIGMF Mr. Vinit Kapur commented, *"AIGMF has been friends*

Mr. Dave Fordham at the 14th AIGMF International Conference on "Decarbonization for the Sustainable Glass Industry" organised jointly with Glass Worldwide at glasspex exhibition on September 15, 2023 at Mumbai.

with Mr. Dave Fordham for many decades and is a preferred partner since 2011 for its publications; participates jointly at glasstec and glasspex exhibitions in Germany and India respectively. In 2021, Glass Worldwide was accorded Honorary Member of AIGMF status for the excellent relationship via Mr. Fordham's extraordinary support."

"AIGMF activities were reported globally via Glass Worldwide articles by spreading knowledge in the form of Factory Spotlights, Spotlight features on India, Personality Profiles, Online Library, Collaborative events and initiatives."

Mr. Kapur further added, *"we are optimistic that AIGMF would bring more direct benefit to its members with the help of Mr. Fordham in his new roles with AIGMF and Glass Futures (UK) which is a global not-for-profit research and technology, membership organisation that connects the glass industry with academia to demonstrate disruptive technologies that will make glass and other materials zero carbon and sustainable".*

"Having had the honour of partnering in countless ways with the AIGMF since the inaugural AIGMF International Conference in 1995, I am very much looking forward to continuing the successful collaboration and am grateful to the President, Ex-Com, Secretary and Members for their ongoing trust and support", said Mr. Dave Fordham.

TEACHING YOUNG INDIA- AN INDUSTRY INITIATIVE

On Feb 21, 2024 under the initiative of teaching Young India undertaken by The Confederation of Construction Products and Services (CCPS), Ms. Sheetal Khanna, General Manager Specifications, Branding and Project Sales at Gold Plus Glass Industry Limited gave an insight on Glass Manufacturing process and Glass Processing & Applications at the Vastu Kala Academy, College of Architecture, NEW DELHI.

The session was coordinated by their faculty Member Ar. Sheily Srivastav which saw a participation of over 45 students. Ar. Shhilpi Sinha, Director at Vastu Kala Academy gave the opening address.

The sessions covered the importance of Glass as green building material being 100% recyclable. Coating process and the benefits of the solar control range of glasses were also explained.

As the students were from Architectural Stream – Glass Selection Parameters were explained and topics on energy efficiency and environmental impact were also discussed by citing suitable case studies.

SORG STRENGTHENS EUROPEAN MARKET POSITION BY ACQUIRING TECHGLASS

SORG and the shareholders of Techglass Sp. z.o.o. have signed a share purchase agreement contract for the acquisition of all Techglass shares.

Techglass is a leading glass plant manufacturer, particularly active in the construction of glass furnaces, forehearths, batch plants and related services. Founded in 1990, the traditional family business employs more than 120 people across two sites in KRAKOW and WARSAW.

"As well as increasing our workforce, our acquisition is part of a sustainable growth strategy to further develop the Polish market and build on SORG's excellent reputation in Europe."

"By combining the complementary competencies and sales channels of SORG and Techglass, we are strengthening our position as the leading European manufacturer of glass furnaces," said Mr. Alexander and Mr. Michael Sorg, Managing Partners. *"This means we are ideally placed to overcome existing and future challenges as we successfully meet the demands of our customers."*

Mr. Andrzej Skowiniak, Managing Director of Techglass, will remain in his current role to help ensure a seamless transition process: *"This acquisition by the market leading SORG Group not only validates the hard work and dedication of our team, but also secures a promising future for our company. We look forward to achieving new milestones together."*

The transaction is expected to close by the end of the first quarter of 2024, subject to the fulfillment of contractual closing conditions.

GLASTON AND HEGLA FORMING PARTNERSHIP IN THE ASIA-PACIFIC REGION

Glaston and HEGLA, both leaders in their respective areas of business in the glass machinery industry for architectural and automotive glass applications, have entered into an exclusive partnership covering the majority of the Asia-Pacific region.

The goal of the partnership is to strengthen the offering of both parties for the benefit of customers.

With the complementary product offering, both companies can meet glass processors' growing demand for automation and integration providing comprehensive solutions, faster response and services to the customers, thanks to the broader network in the region.

Effective March 2024, HEGLA's sales and distribution activities in the area will draw upon the resources and network of Glaston Group. The partnership covers the whole region except for JAPAN, SOUTH KOREA and CHINA.

"In HEGLA, we have the ideal partner as their complimentary offering will provide a perfect addition to our product range. Glaston is now able to offer the full product range to those customers who want to combine our heat treatment and insulated glass production with highly automated shop floor logistic solutions thereby substantially increasing efficiency and productivity. We are excited to start this new co-operation," comments CSO Mr. Sasu Koivumäki at Glaston Corporation.

"With Glaston, we are able to provide highly customized solutions for clients including the integration of Glaston's heat treatment and insulating glass production into our highly automated and integrated shop floor logistic solutions in one of the largest and fastest growing regions of the world", says Mr. Bernhard Hötger, CEO of HEGLA Group.

About HEGLA Group: Founded in 1976, HEGLA is renowned for high-quality, high-performance machines and systems for flat glass processing. The company is one of the market and technology leaders for highly automated and integrated shop floor solutions and services covering glass storage, loading, cutting, remnant sheet handling and sorting as well as laser marking and processing machines providing for bird protection and mobile friendly glass. In addition, HEGLA is a growing supplier of advanced IT and ERP-systems to operate and monitor production facilities and activities.

About Glaston Group: Glaston is the glass processing industry's innovative technology leader supplying equipment, services and solutions to the architectural, mobility, display and solar industries. The company also supports the development of new technologies integrating intelligence to glass.

Glaston is committed to providing its clients with both the best know-how and the latest technologies in glass processing, with the purpose of building a better tomorrow through safer, smarter, and more energy efficient glass solutions. Glaston operates globally with manufacturing, services and sales offices in nine countries and its shares (GLA1V) are listed on Nasdaq Helsinki Ltd.

BIS, CSIR-CGCRI AND GSI ORGANISED THE NATIONAL CONFERENCE ON INDIAN STANDARDS FOR GLASS AND GLAZING

The 1st National Conference on Indian Standards for Glass and Glazing was organised by the Bureau of Indian Standards (BIS), CSIR – Centre for Glass and Ceramic Research Institute (CGCRI) and Glazing Society of India (GSI) on March 18, 2024 at CSIR – CGCRI in KOLKATA. The objective of the conference was to make aware and train the entire construction value chain on the new and revised Indian Architectural Glass standards and to support them for the implementation of these standards in the buildings.

Dr. (Ms.) Suman K. Mishra, Chairperson, Sectional Committee of Glass and Glassware (CHD 10), BIS and Director, CSIR – CGCRI, during her Chief Guest address noted that standards played a crucial role nurturing our economic and sustainability goals; and that new standards on glass and glazing would support industry (particularly construction), academia and other technical organisations to enhance performance. She also highlighted the collaborative efforts of various players in implementing the goals.

Mr. Ajay K Lal, Head, Chemical Department, BIS delivered the theme address and highlighted the lead being taken by BIS in bringing out new standards and revising the existing standards for glass and glazing, in line with the changing trends. He mentioned that the glass standards are at par or better compared with the international standards and was being continuously revised and improved.

The conference was addressed by other eminent speakers from Industry and Bureau of Indian Standards including Ms. Sheetal Khanna, General

Manager, Gold Plus Glass Industry; Mr. Hatinder Vohra, National Head – India and South Asia, Vetrotech Saint Gobain; Mr. Tushar Zope, Vertical Head, Asahi India Glass Limited; Mr. Amit Choudhary, Scientist D, CMD 2, BIS and Mr. Mohit Garg, Member Secretary, CHD 10, BIS.

More than 100 participants from Government including officials from PWD, Kolkata Municipal Corporation, etc., Industry representatives including glass manufacturers, processors, fabricators, window manufacturers, etc., scientists and scholars from technical institutions including CSIR – CGCRI, Jadavpur University, etc, architects, structural engineers, experts and professionals from glass construction sector participated at the conference.

There was an engaging interactive session with the participants from industry, government and academia to take their inputs and feedback on the new and revised standards and to understand the latest trends and needs for making new standards for glass and glazing in India.

Dr. K Annapurna, Chief Scientist, CSIR – CGCRI made the welcome address and Mr. G N Gohul Deepak, Executive Director, GSI delivered the vote of thanks.

BASUDEV AGARWAL- A TRUE VISIONARY

In the grand tapestry of time, Mr. Basudev Agarwal emerges as a visionary luminary, crafting the narrative of Surya's ascent to prominence within the Steel & Lighting industry. His seminal contributions began with the establishment of the Steel Pipe plant at Bahadurgarh (HARYANA) in 1973 and thereafter Lighting plants in Kashipur (UTTRAKHAND) in 1984 and Malanpur, Gwalior (M.P.) in 1991. Under his stewardship, Surya transformed into a national icon of Steel Pipes & lighting excellence, illuminating homes and streets across the country.

At the helm of the Kashipur plant, Mr. Basudev Agarwal laid the groundwork

Basudev Agarwal
June 3, 1929 - March 4, 2024
Surya Roshni Limited

for Surya's expansion with two G.L.S and two F.T.L. assembly chains. These humble beginnings belied the magnitude of his vision, which encompassed not only manufacturing prowess but also comprehensive integration of **Glass Furnace's**, Tungsten filaments, Aluminum caps plants, and other critical components. Through his strategic acumen and unwavering commitment to quality, Mr. Basudev Agarwal propelled Surya to unparalleled heights, setting benchmarks that reverberated throughout the industry. Central to Mr. Basudev Agarwal ethos was the unwavering pursuit of excellence without borders.

His relentless quest for cutting-edge technology took him across continents, where he forged partnerships and acquired state-of-the-art equipment to ensure that Surya's products stood at the pinnacle of global standards. Yet, amidst his global engagements, he remained firmly rooted in the day-to-day operations of the plants, personally overseeing every aspect with meticulous care and attention. However, Mr. Basudev Agarwal impact transcended the confines of corporate corridors.

His leadership was imbued with a deep sense of compassion and empathy, as evidenced by his unwavering commitment to the welfare of Surya's employees. Initiatives spearheaded by him not only enhanced workplace conditions but also fostered a culture of camaraderie and mutual respect. Furthermore, Mr. Basudev Agarwal philanthropic endeavors extended far beyond the confines of the corporate world. As the Founder Trustee of the Basudev Gangadevi Agarwal Seva Trust, he extended a helping hand to the underprivileged, providing vital support for medical and educational needs.

His altruistic spirit also manifested in his role as the former Chairman of Hissar Improvement Trust, where he spearheaded transformative initiatives for local development. Additionally, Mr. Basudev Agarwal's commitment to healthcare and education was unwavering. His patronage of Maharaja Agrasen Hospital, DELHI, and involvement as a Trustee in the N. C. Jindal Charitable Trust, Hissar HARYANA, underscored his dedication to societal well-being. Similarly, his roles as Trustee in Maharaja Agrasen Technical Education Society, DELHI, and Trustee in Haryana Charitable Society Trust, KOLKATA, reflected his belief in the transformative power of education as a catalyst for progress.

Notably, Mr. Basudev Agarwal heart resonated with causes dear to his soul, as exemplified by his role as Chief Patron in Shri Krishna Gaushala, Bawana DELHI, where he championed the welfare of animals. His unwavering devotion, embodied in his status as a Life Member of ISKCON and Haryana Sewa Sadan, KOLKATA, transcended boundaries, embodying a spirit of service and compassion that touched lives far and wide.

In the fabric of our collective memory, Mr. Basudev Agarwal's legacy remains etched - a testament to the transformative power of leadership fueled by empathy, integrity, and an unwavering commitment to excellence. His life's work serves as a guiding light, inspiring generations to emulate his noble example and strive for greatness in all endeavors.

HIGHLIGHTS OF THE UNION BUDGET OF INDIA 2024-25

The Union Minister for Finance and Corporate Affairs Mrs. Nirmala Sitharaman presented the Interim Union Budget 2024-25 in Parliament on Feb 1, 2024. The key highlights of the Budget are as follows:

- One crore households to obtain 300 units free electricity every month through rooftop solarization.
- Encourage Cervical Cancer Vaccination for girls (9-14 years).
- Modified Programme for Development of Semiconductors and display manufacturing ecosystem.
- Housing for Middle Class scheme to be launched to promote middle class to buy/built their own houses.
- Certain tax benefits to Start-ups and investments made by sovereign wealth funds/pension funds, tax exemption of some IFSC units earlier expiring on 31.03.2024 extended up to 31.03.2025.
- For Corporate Taxes-22% for existing domestic companies, 15% for certain new manufacturing Companies.
- No tax liability for taxpayers with income up to Rs. 7 lakh under the new tax regime.
- Government to build 2 crore houses under PM Aavas Yojana (Grameen).
- Extension of health coverage under the Ayushman Bharat scheme to include all ASHA, Anganwadi workers, and helpers.
- Withdrawal of outstanding direct tax demand, with limits set at up to Rs 25,000 for issues up to FY10 and up to Rs.10,000 for FY11-15, benefiting around 1 crore taxpayers.
- Fast-tracking Saksham Anganwadi and Poshan 2.0 for improved nutrition delivery and early childhood care and development.
- Expanding existing airports and undertaking comprehensive development of new airports under the UDAN scheme.
- Implementation of three major railway corridor programs under PM Gati Shakti to enhance logistics efficiency and reduce costs.
- Establishment of a financial corpus of Rs 1 lakh crore that will provide low-cost or zero-interest loans for research and innovation.
- Nominal GDP growth seen at 10.5%.
- Provision of Rs.75,000 crore, as a 50-year interest-free loan, to support milestone-linked reforms by state governments.
- Commitment to meet 'Net Zero' by 2070 by viability gap funding for wind energy; Setting up of coal gasification and liquefaction capacity; Phased mandatory blending of CNG, PNG and compressed biogas; Financial assistance for procurement of biomass aggregation machinery.

भारत सरकार का केंद्रीय बजट: 2024-25

केन्द्रीय वित्त और कॉर्पोरेट मामलों की मंत्री श्रीमती निर्मला सीतारमण ने 1 फरवरी, 2024 को संसद में अंतरिम केंद्रीय बजट 2024-25 पेश किया। बजट की मुख्य बातें इस प्रकार से हैं:

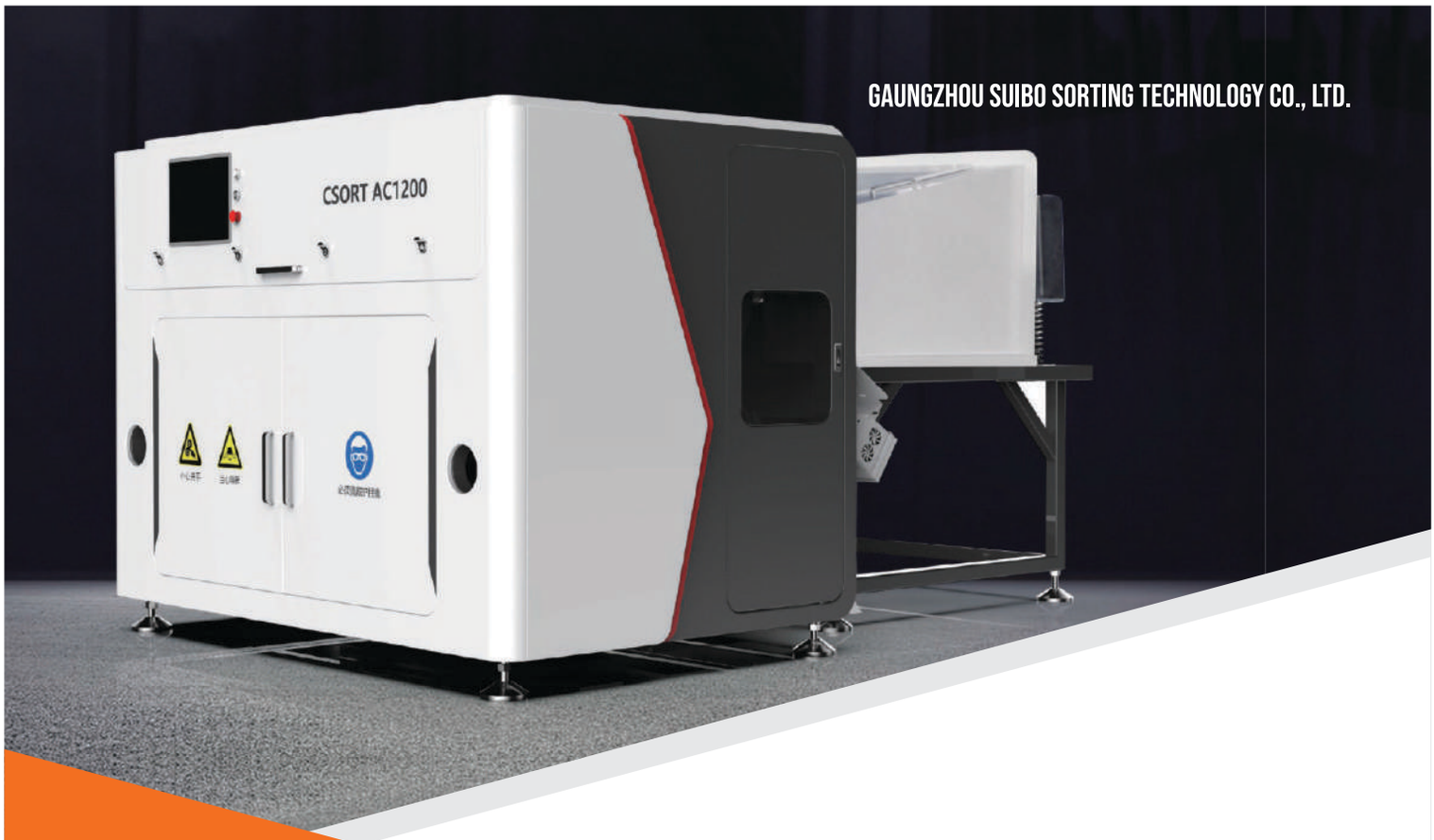
- रूफटॉप सोलराइजेशन के माध्यम से 1 करोड़ परिवारों को हर महीने 300 यूनिट मुफ्त बिजली मिलेगी।
- लड़कियों (9-14 वर्ष) के लिए सर्वाइकल कैंसर टीकाकरण को प्रोत्साहन।
- अर्धचालक और प्रदर्शन विनिर्माण पारिस्थितिकी तंत्र के विकास के लिए संशोधित कार्यक्रम।
- मध्यम वर्ग को अपना घर खरीदने / बनाने के लिए प्रोत्साहित करने के लिए मध्यम वर्ग के लिए आवास योजना शुरू की जाएगी।
- स्टार्ट-अप और सॉवरेन वेल्थ फंड / पेंशन फंड द्वारा किए गए निवेश के लिए कुछ कर लाभ, 31.03.2024 का समाप्त होने वाली कुछ आईएफएससी इकाइयों की कर छूट 31.03.2025 तक बढ़ा दी गई है।
- कॉर्पोरेट टैक्स के लिए - मौजूदा घरेलू कंपनियों के लिए 22 प्रतिशत, कुछ नई विनिर्माण कंपनियों के लिए 15 प्रतिशत।
- नई कर व्यवस्था के तहत 7 लाख रुपये तक की आय वाले करदाताओं के लिए कोई कर देनदारी नहीं।
- सरकार पीएम आवास योजना (ग्रामीण) के तहत 2 करोड़ घर बनाएगी।

- सभी आशा, आंगनवाड़ी कार्यकर्ताओं और सहायिकाओं को शामिल करने के लिए आयुष्मान भारत योजना के तहत स्वास्थ्य कवरेज का विस्तार।
- बकाया प्रत्यक्ष कर मांग की निकासी, वित्त वर्ष 2010 तक के मुद्दों के लिए 25,000 रुपये तक और वित्त वर्ष 2011-15 के लिए 10,000 रुपये तक की सीमा निर्धारित की गई, जिससे लगभग 1 करोड़ करदाताओं को लाभ होगा।
- बेहतर पोषण वितरण और प्रारंभिक बचपन की देखभाल और विकास के लिए सक्षम आंगनवाड़ी और पोषण 2.0 को तेजी से ट्रैक करना।
- उड़ान योजना के तहत मौजूदा हवाई अड्डों को विस्तार करना और नए हवाई अड्डों का व्यापक विकास करना।
- लॉजिस्टिक्स दक्षता बढ़ाने और लागत कम करने के लिए पीएम गति शक्ति के तहत तीन प्रमुख रेलवे कॉरिडोर कार्यक्रमों को कार्यान्वयन।
- 1 लाख करोड़ रुपये के वित्तीय कोष की स्थापना जो अनुसंधान और नवाचार के लिए कम लागत या शून्य-ब्याज ऋण प्रदान करेगी।
- नाम मात्र जीडीपी वृद्धि 10.5 प्रतिशत देखी गई।
- पवन ऊर्जा के लिए व्यवहार्यता अंतर वित्तपोषण द्वारा 2070 तक 'नेट शून्य' को पूरा करने की प्रतिबद्धता; कोयला गैसीकरण और द्रवीकरण क्षमता की स्थापना; सीएनजी, पीएनजी और संपीड़ित बायोगैस का चरणबद्ध अनिवार्य सम्मिश्रण; बायोमास एकत्रीकरण मशीनरी की खरीद के लिए वित्तीय सहायता।

(News Source:
AIGMF Research Team / World Wide Web)

Welcomes its New Members

Company	Products / Services
CORNING TECHNOLOGIES INDIA PVT. LTD. 2nd Floor, Pioneer Square CRPF Road, Sector 62 Gurugram-122005 (Haryana INDIA) Contact Person: Mr. Aman Gupta & Mr. Rohan Phanse +91 99711 86206, 85271 61777, 98168 39949 guptaa@corning.com, PhanseRP@corning.com	Manufacturing of Type I borosilicate glass tubing
GLASS TECHNICS INTERNATIONAL A-110 San Tropez, Madrid County Bhaily Station Road, Bhaily Vadodara-391410 (Gujarat INDIA) Contact Person: Mr. Ankit Luhar + 91 98980 24846 sales@glasstechintl.com	Consultancy, Agency/Machines/Refractories/Consumables/ Spare Parts/High-Tech Solutions for Container/Glassware Industry.
KARNEET ENTERPRISES (INDIA) PVT. LTD. No. 23/3, 3rd Floor, Hare Krishna Road Crescent Road, High Grounds Bangalore-560001 (Karnataka INDIA) Contact Person: Mr. Dharmendra Baid +91 99807 33114 dharmendra@mallinathgroup.com	Suppliers of raw materials- Soda Ash and other chemicals, etc.



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- Suitable for various harsh working conditions of cullett
- Working width : 1200mm
- Optimum sorting particle size : 5-60mm

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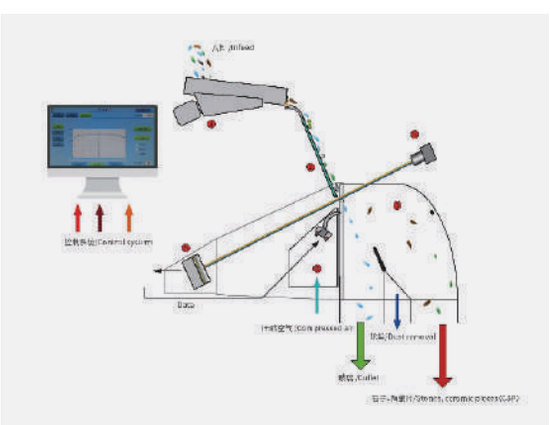

A-110, Madrid Country,
Bhaily Station Road, Bhaily,
Vadodara 391410, Gujarat - India

+91 98980 24846

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GLASS TECHNICS INTERNATIONAL

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World Consumer Rights Day celebrated by Glass Industry

Robots and best quality of Raw materials for glass manufacturing were discussed

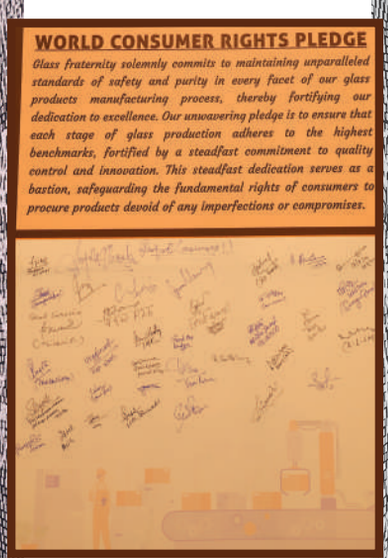
(March 16, 2024 HYDERABAD)

Parallel to the Executive Committee Meeting on March 16 at Novotel HYDERABAD, technical sessions on Robots and Raw Materials in Glass Manufacturing were organized by The All India Glass Manufacturers Federation.

The meeting was hosted by AGI Greenpac Ltd., under its business unit AGI glaspac (Innovative and Eco-friendly Glass Packaging Solution company). The meeting was supported by President Mr. O P Pandey of the South India Glass Manufacturers' Association (SIGMA)- HYDERABAD garnering elite participation of members from the southern region.

Over the last few decades, AGI glaspac linked with its growth and expansion has invested heavily in the field of environmental protection and other green areas; thereby benefitting consumers by providing the top quality of glass packaging.

The meeting was attended by over 50 participants mostly from southern India region as well as PAN-India glass manufacturers,



suppliers, consultants for the glass industry.

Welcome speech was given by Mr. Sanjay Agarwal, President AIGMF followed

by a presentation on Role of Container Glass in the World Consumer Rights Day by Mr. Rajesh Khosla, Sr. Vice President AIGMF and CEO / President AGI Greenpac.

Later a technical presentation

on ROBOTS IN GLASS MANUFACTURING (offering technical solutions for the glass industry) was delivered by Er. Pulkit Gaur (Chief Technology Officer of Gridbots Technologies Pvt. Ltd.) and recipient of CK Somany Glass Award 2023 for Innovation and Technology. Er. Pulkit Gaur drives the companies

Innovation and Technological advancements. An Engineer by education and the founder of Gridbots Technologies - Robotics is his passion. He has been building robots since his childhood.

The concluding session saw presentations and display of various

RAW MATERIALS FOR GLASS MANUFACTURING (Samples of Quartzite, Silica sand, Glassomite Slag, Iron Chromite, Alumina Hydrate, Soda Ash, etc.) by Mr. Aurindam Dey, Director of IMR Resources India Pvt. Ltd.; Mr. Dharmendra Baid, General

Remembering Mr. Basudev Agarwal who left for heavenly abode on March 4, 2024; founder of Surya Roshni Ltd., who built 3 Glass Furnaces for the lighting industry. Mr. Agarwal had set up an incandescent lamp shell manufacturing facility named Ribbon Technology at Malanpur (MADHYA PRADESH) Lighting Plant for captive use, PAN India and foreign markets.

Manager of Karneet Enterprises India Pvt. Ltd., and Mr. Pratik Joshi, Director of Eco Clay Solutions Pvt. Ltd.

All segments of the glass industry participated with great enthusiasm in the Executive Committee via Hybrid

mode. The sessions were interactive and were appreciated by everyone.

With love and affection, AGI Greenpac gifted a glass memento to each participant. Vote of thanks was given by Mr. Karinder Varma, General Manager of AGI Greenpac.

President AIGMF, Mr. Sanjay Agarwal

thanked Mr. Rajesh Khosla and the entire AGI team for their untiring efforts for making excellent meeting arrangements, sumptuous lunch; as well as pick and drop facilities for all participants at HYDERABAD ■

Select photos of the event and presentations are available at https://aigmf.com/past-events.php

AIGMF team at the City of Nizams; in front of the Charminar (four minarets) constructed in 1591.

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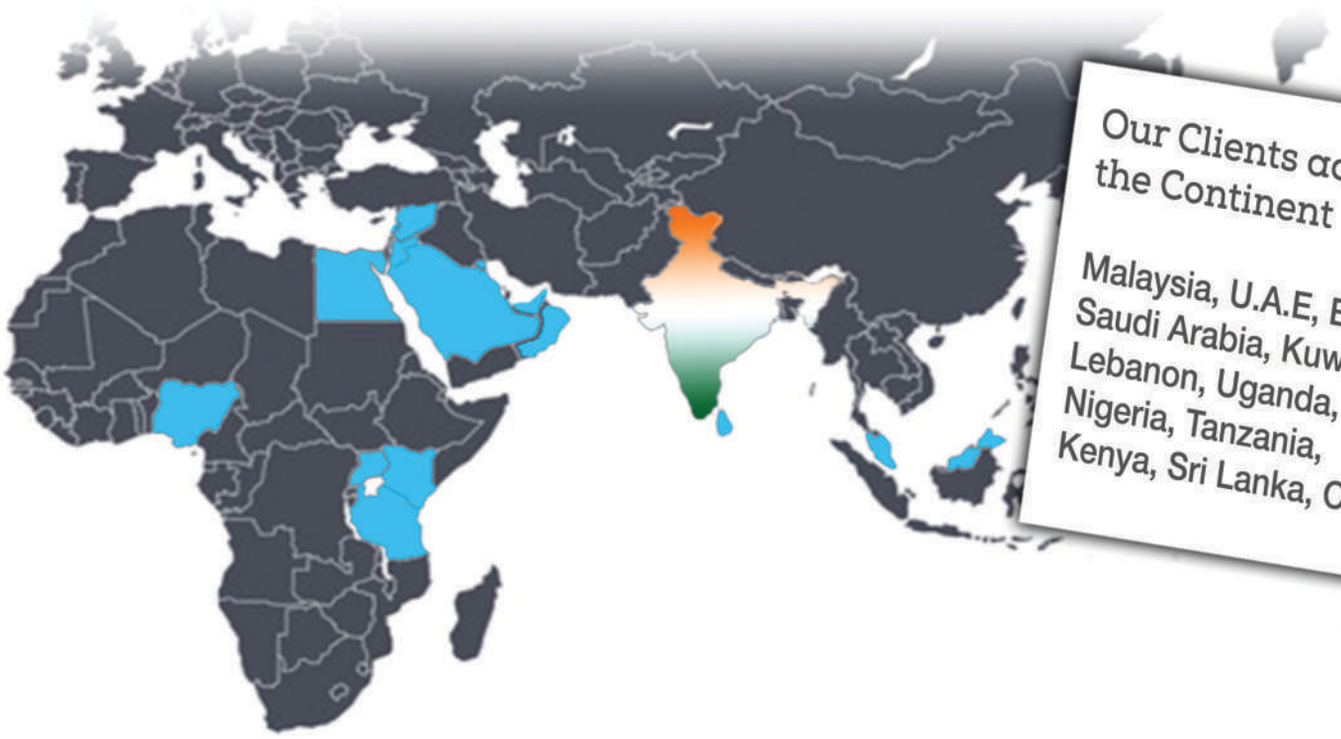

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Virtual water runs deep

Tobias Wachtmann from Siemens explained to *Glass Worldwide* how the company has paired its software solutions with expertise from industrial water systems specialist PVAG to design more efficient and sustainable cooling-water systems for the glass industry.

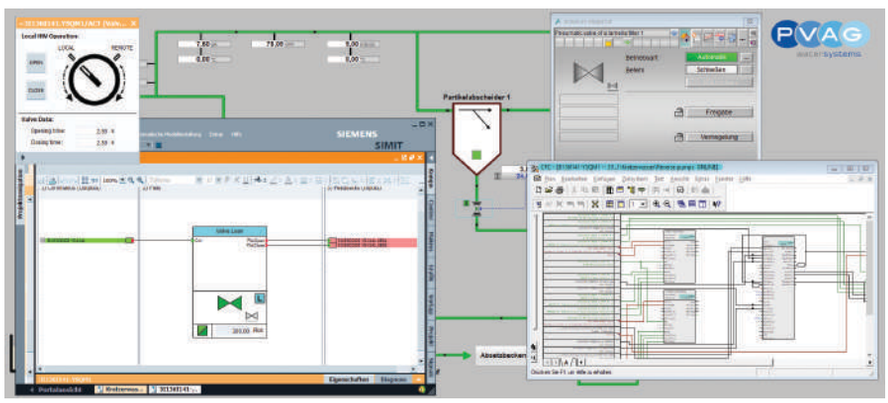
PVAG water systems GmbH, with headquarters in Jülich, Germany, stands for innovative solutions for industrial water systems. The special-purpose machine manufacturer follows a holistic approach to develop customised solutions that range from water treatment and cooling to process control.

PVAG's main areas of focus are shear spraying in glass factories, the treatment of cullet water systems, and the production of soft and osmosis water. "More than ever before, efficiency, safety and sustainability are playing a key role in all areas," says Dr. Daniel Schippan, PVAG's CEO. With its team of international experts, the specialty machine manufacturer covers all project areas in-house, whether it's renovations, repairs, or capacity expansions in glass factories – from design and 2D and 3D planning to delivery, installation and commissioning.

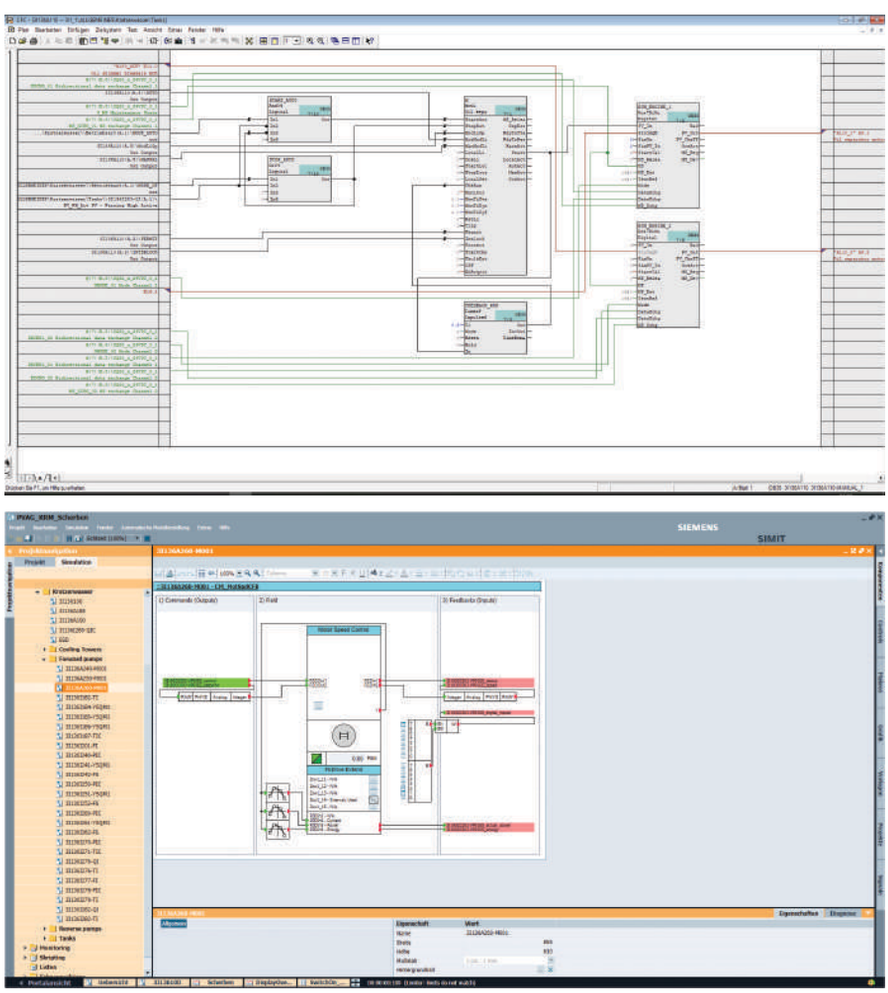
Simulation > testing

For more than five years, PVAG has been partnering with Siemens to design safer, more efficient and more sustainable water systems for the glass industry with the help of selected software solutions. "In order to provide our customers with data-based answers to their questions about the cost-effectiveness of upcoming investments, we don't just consult our own experience – we also rely more and more frequently on simulations. This saves more time, resources and costs for everyone involved," says Frank Winkels, a software engineer at PVAG.

Working with Siemens, PVAG implemented a solution that simulated a real cullet water system using the original operator displays and the original automation program. The PLC was emulated on a Windows system using the Simit Virtual Controller. Along with simulating field devices, a realistic behavioural model of the automation system (PLC and sensors/actuators) ▸



PVAG water systems GmbH, a company specialising in industrial water systems, relies on the Simit simulation platform to boost efficiency, safety and sustainability in water treatment plants, process water plants and cooling-water systems. Image source: PVAG.



Comparison of CFC (top) and Simit instance. Image source: PVAG.

Originally published in Glass Worldwide, preferred international journal of AIGMF

was created as a digital twin. The process model was generated in Simit using pipe and instrumentation diagrams from the corresponding Solution Water Library. The solution procedure (Flownet) calculates pressures, flows and temperatures based on the physical balancing equations, with the result that the process behaves realistically. This system was used to virtually commission the automation solution and simulation model and to evaluate the system process, including process control.

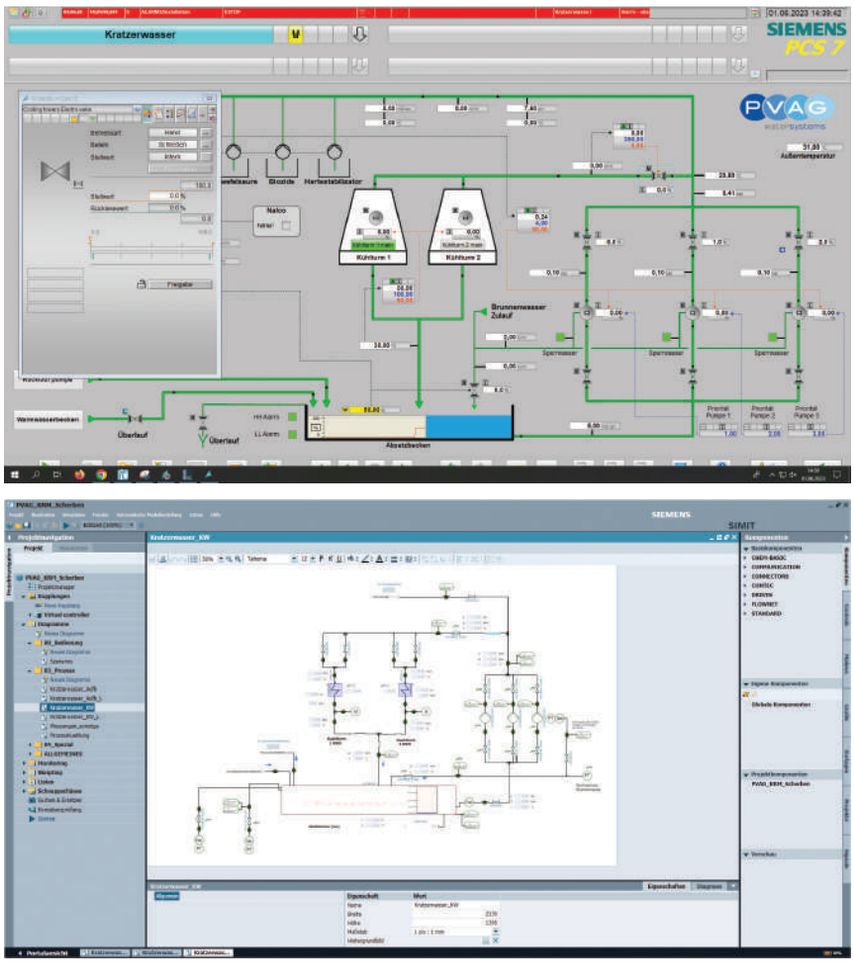
Benefits throughout a plant's entire lifecycle

"Simit simulates what Simatic automates," explains Mr Winkels. For years, his company has been developing automation solutions for its customers based on the Simatic PCS 7 process control system – or alternatively, it's used the TIA Portal for the discrete manufacturing sectors. Specifically, the Simit simulation platform performs comprehensive testing of the relevant automation applications and provides a realistic training environment for training plant operators before the real commissioning, making it possible to digitally verify the process control. This not only speeds up commissioning, it also significantly shortens the time to market.

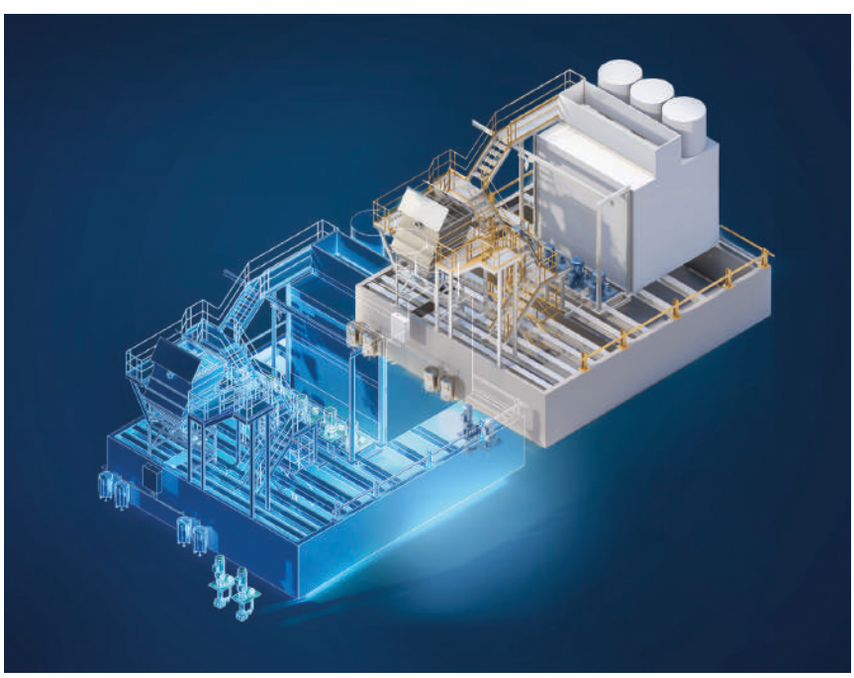
"The end result is a substantial boost in efficiency across all phases of a glass plant's lifecycle," says Mr Winkels. "Whereas we used to have to describe this to customers from our own experience, we now have it in black and white on our screens," he adds.

The digital twin of the process is created and validates the process and plant design. "We use data from existing plants and processes as input parameters. With the help of sensitivity analyses, we're then able to evaluate the most promising parameters ahead of time," Mr Winkels explains.

Once the optimal process design has been determined, the water system is designed and the digital twin of the plant is born. The planning information in the Simatic PCS 7 or Simatic PCS neo process control system can be reused in detail engineering. Simit can also be deployed as a digital twin for parallel tests. Another digital twin is generated in Simit to support



Process simulation in WinCC (top) and Simit. Image source: PVAG.



Thanks to a digital twin, cullet water systems can be commissioned virtually, operating personnel can be thoroughly trained before real operation, and automation solutions can be comprehensively tested using Simatic PCS 7. Image source: PVAG.

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the automation and testing of the future plant and for training purposes. This twin serves as a virtual model of the real plant and uses real or virtual controllers for acceptance tests and to virtually commission the control technology – which in turn speeds up the actual on-site commissioning. The digital twin can also be used during ongoing operation to validate changes in the control system ahead of time. The twin of the process (process simulation) with the focus on automation was generated using the Simit Solution Water Library and the Flownet solver. At the same time, the Simit Solution Device Library was used to generate the twin of the automation system. Finally, the controller code was emulated using the Simit Virtual Controller. The twin of the process can also prove its worth in real operation. Thanks to the connection to the real plant's automation and visualisation, optimisations or changes to the automation concept can be developed and evaluated right in ths automation program without interrupting or jeopardising operation. Following a successful evaluation, the changes can then be uploaded to the real plant quickly and at no risk.

Efficiency and sustainability

How about some specific examples? "When it comes to water systems, we believe that digital twins have the greatest impact when the goal is to minimise the amount of sewage and therefore the cost of disposal," says Mr Winkels. At the same time, nature is grateful when water is conserved. This includes reducing the consumption of drinking water. As a general rule, optimal planning, pre-simulation and targeted improvement measures enable a reduction in the use of hazardous materials for process fluids, and they also make it possible to minimise emissions to the environment, often without a high financial burden. Another gain for sustainability: to a significant degree, improvements to plants include optimised energy consumption, which can also be calculated in advance.

Safety and ruggedness

Especially given the growing shortage of skilled workers and high employee turnover, it's no secret that training on the virtual object improves safety and plant efficiency. Simit has more than proven its worth as a virtual training environment. "Targeted training reduces costs, because plant operators are better able to identify maintenance intervals and repairs can be performed correctly. It also improves the safety of plant operation in general," reports Mr Winkels. Even before the plant is commissioned, teams of operators can be trained on original operator displays and automation programs.

Inexhaustible source

"We're extremely satisfied with our collaboration with Siemens. We're working together to advance the digitalisation of the glass industry, because simulations have an almost inexhaustible potential for improving industrial water systems," concludes Mr Winkels. ●

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What does the future of glass melting look like?

Evaluating the viability of mooted de-carbonising options, Stuart Hakes explained to *Glass Worldwide* how F.I.C.'s experience in float furnace electric boosting has led the company to advocate a hybrid approach for larger glass manufacturers, and to introduce the concept of superboosting as an interim step.

Stuart Hakes, CEO of F.I.C.

F.I.C. is a member of Glass Futures.

I think it is clear that over the last few months we definitely have [experienced] climate change, and according to the scientists all of this relates directly to the amount of CO_2 in the atmosphere. The glass industry is recognising this reality and there are a number of projects around the world looking at various options to reduce our carbon footprint.

Most notably, the Glass Futures Scheme is an embodiment of the commitment by the international glass community to investigate as many of these options as possible with a pilot plant. The initial undertaking is to build a fairly conventional 30tpd pilot furnace that will enable it to undertake some work on alternative fuels as well as the capability to investigate different and new refractories, new raw materials and establish some base information. This furnace will be oxy-fired and have facilities for electric boost. This is a far-reaching project and it is expected that the second phase will investigate some more radical options.

In the meantime, a number of glass plants are planning to conduct their own experiments on alternative fuels such as bio-fuels and hydrogen as well as other projects worldwide, but particularly in Europe, looking at various de-carbonising options including full hydrogen, superboosting and hybrid furnaces. However, it is very important to 'clear the fog' that is rapidly accumulating.

Bio-fuels are a non-starter

Since the accumulation of carbon dioxide in the atmosphere increases the absorption of heat and thus represents a major driving force behind climate change, I would suggest that any solution that looks at bio-fuels, which when burnt release CO_2, is basically a non-starter. Whilst it is argued that if you take a fuel which is renewable and burn it and just release the same amount of CO_2 as you initially consumed, then it is carbon-neutral, I strongly believe this is a false dawn. Why would you cut down a tree, for example, that has taken 30–40 years to grow, to then turn it into a bio-fuel producing heat for three minutes [and] releasing CO_2? Similarly, why would you take CO_2 to make a synthetic fuel, which then only [produces] the same amount of CO_2 that you took to initially make the fuel. Although it is carbon-neutral, it is not helping the planet. I therefore believe that bio-fuels or anything producing carbon dioxide is going to be unacceptable in anything other than the short term. I don't believe our customers, or indeed the public at large will accept this as being an option.

Oxy-fuel firing

We therefore need to look at other gases such as hydrogen or ammonia. It is quite clear from existing legislation relating to waste gases that NOx is going to continue to be a major issue and any combustion system should address this problem. It is quite likely, therefore, that there will be a dramatic move in furnace design to oxy-fired furnaces.

The reason for this is that there are efficiency gains to be had by using oxy-fuel firing, provided, of course, that the cost of electricity becomes more economic – more on this later on. It is therefore anticipated by the author that most new firing systems using any kind of fuel will see a likely move to more oxy-fuel firing. This is certainly borne out by the experience of F.I.C., talking to its current customers.

Hydrogen

Let's look at hydrogen first as an option because ammonia is made from using hydrogen in a Haber-Bosch process where it is combined with nitrogen separated from the air. Hydrogen is often talked about as being an easy option. In simplistic terms: we have natural gas now and a distribution set-up, and all we have to do is to make green hydrogen ▸

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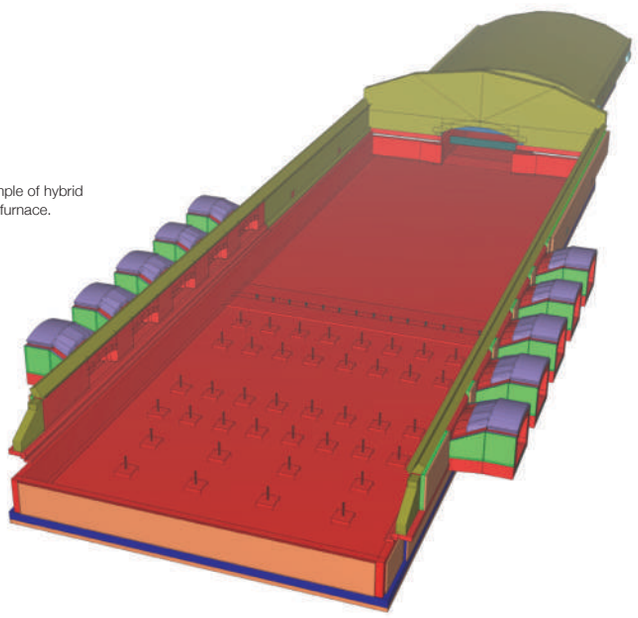
glass WORLDWIDE

and reticulate it through the same system. However, it is not as simple as this, as most of us know. The simple fact is that [with] hydrogen being a lighter element, we need three times the volume [that] we currently use for natural gas. This will obviously require a considerable investment in the existing distribution network. As it is a lighter element, and the pressure will need to be increased, this adds to both difficulties in transportation and safety. These issues are not to be dismissed with superficial plausibility.

There are a number of challenges that need to be recognised in going to hydrogen firing, notwithstanding the initial limited trials that have been "successfully" carried out on either mixing hydrogen with natural gas [in] the furnace, or trials of hydrogen on a complete port, as well as flame trials at various institutions such as the Glass Futures flame test rig and the DNV rig in the Netherlands amongst others. Colleagues from our sister company FlammaTec (www.flammatec.com) actually were the first to develop a Hydrogen Oxygen burner, already tested for the first time in 2020. There are a number of trials proposed in Europe for full hydrogen firing supported by various government funds, some of the results of which are to be released in the public domain as they involve subsidies. It will be interesting to see how these go, but broadly speaking the following issues need to be recognised and addressed:-



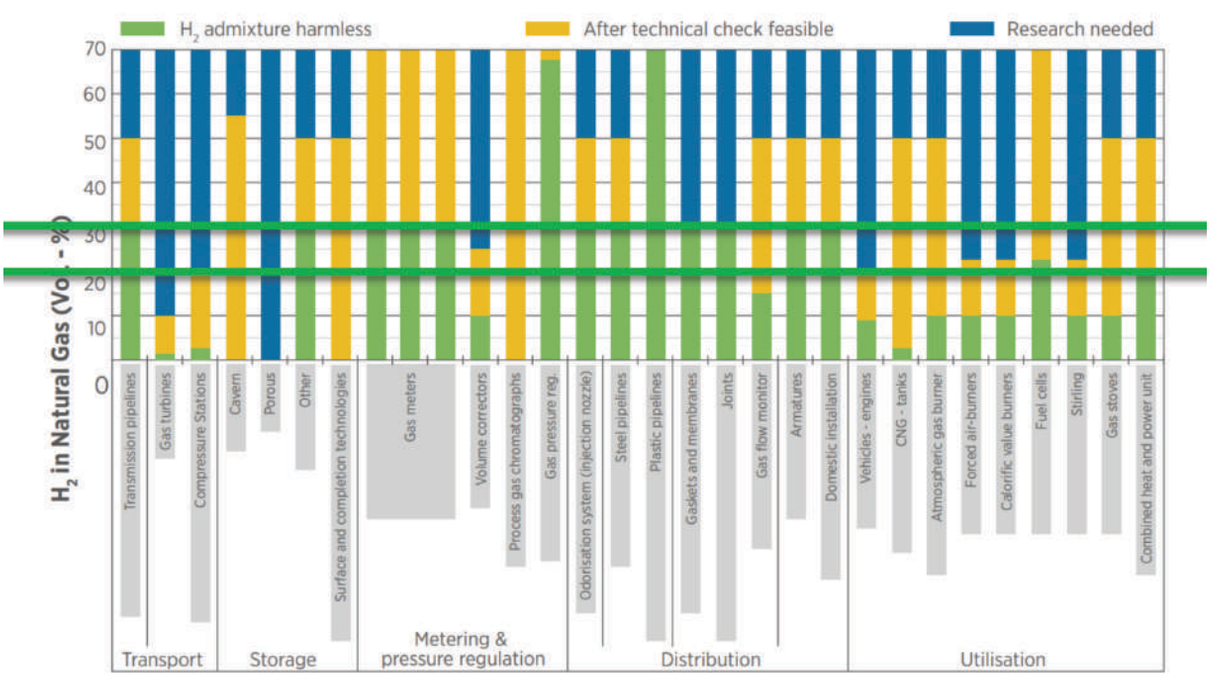
Example of hybrid float furnace.

Foam, refining and effect on refractory

Although the hydrogen flame is invisible, all trials so far show that we can expect satisfactory heat transmission to the glass surface. There are known problems that using hydrogen will affect the refining of the glass as well as the inherent water vapour on the glass surface contributing to increased levels of foam. It is currently not thought that either of these two issues are show-stoppers, however the ▸

Decarbonising the gas grid

In the short term, the injection of hydrogen from renewable power into the gas grid represents a potential upside revenue to improve power-to-hydrogen's economics. In the long term, it holds the promise of storing large amounts of renewable power, while decarbonising demand for natural gas. Existing studies show that, generally, at relatively low hydrogen concentrations (up to 10–20 % in volume), blending may not require major investment or modification to the infrastructure and can be carried out in a safe manner (IEA, 2015; DNVGL, 2017; NREL, 2013; National Research Council Canada, 2017). The most critical applications with respect to blending shares are gas turbines, pore storage, compressor stations and compressed natural gas tanks.



Hydrogen tolerance on infrastructure components – shown by the green lines. Source: IRENA Media.

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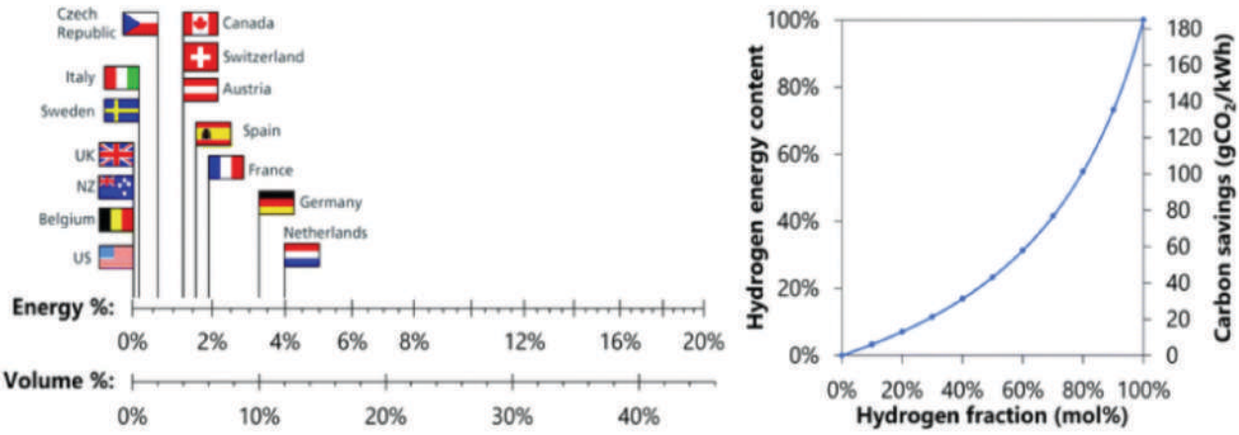

Effect of hydrogen blending into the natural gas network.

ability to see the flame and ensure that the flame alignment is satisfactory is slightly more challenging.

One other issue that is yet to be properly recognised, in the opinion of the author, is that we currently do not have refractories that can withstand the effect of super-heated steam in the superstructure. A hydrogen flame is a higher temperature and the product of combustion is water vapour. This super-heated steam in an oxy-fuel fired environment is going to be a major challenge.

Sourcing

It can well be argued that these issues of foam, refining and effect on refractory are relatively easy to overcome, however there is one other elephant in the room and that relates to a) the availability of green hydrogen and b) the demand from industry and others. Let's first look at production of hydrogen – one of the biggest problems facing the future is the cost of electricity and this is especially so in the production of hydrogen. Electricity pricing is generally coupled with the price of natural gas as the majority of electricity around the world is produced from fossil fuels in one form or another. However, the move to renewables and in particular solar and wind has brought the cost of generating electricity by these means down considerably but in order to assist the production of renewables, the electricity price has not been reduced to reflect this. Most governments recognise that long-term this has to change in order to encourage the move to CO_2 reduction. The cost of electricity generated by wind and solar is typically a third to a half of that generated by fossil fuel but obviously varies enormously from country to country.

Obviously green hydrogen can only be made if we use green electricity made from renewable sources such as photovoltaics, wind-generated or nuclear. The most obvious way to make hydrogen is the electrolysis of water but what is not appreciated generally is that the water needs to be relatively clean. In other words, we just cannot use any water lying around. Most water has to be treated prior to the electrolysis and making oxygen with hydrogen at the same time is obviously a big advantage to the glass industry. This approach has zero carbon emissions. The use of pink, purple, red or yellow hydrogen produced respectively by either nuclear power or grid electricity is obviously an option. Black or grey hydrogen is made from steam methane reforming using natural gas as a feedstock, 95% of current hydrogen is made by this process. It requires a catalyst to produce the hydrogen and carbon monoxide and carbon dioxide.

F.I.C. designs and manufactures electric melting systems for conditioning and boosting in a wide range of glass types and manufacturing processes.

The steam reforming is endothermic and that heat must be supplied for the reaction to proceed. This process is estimated to be at best 65–75% efficient but as stated earlier there are significant quantities of CO_2 produced which needs to be captured. In this case it is often called blue hydrogen. Other forms of hydrogen are so called white hydrogen, which is where hydrogen is produced as a by-product of industrial processes or turquoise, where hydrogen is produced by thermal splitting of methane (methane pyrolysis) and instead of CO_2 being produced, solid carbon is the end product. None of these are really significantly produced currently.

Industry demand

Obviously, hydrogen is of significant interest in many industries, particularly those that require a flame such as cement production. If the manufactured cement has to [be]decarbonised, a flame is required and obviously hydrogen is a good option, but this is going to be expensive, not least because it starts in its cheapest form from pure electricity and then if it is to be transported by pipeline or bulk delivery to industry whether glass or cement and then burnt, the overall efficiency is going to be approximately 28% which is less than the overall efficiency currently of about 33% for natural gas firing. This means that it would be a) an expensive option for glass furnaces and b) we would be competing for supply for other reasons. There are other industries as well as cement such as shipping and steel production that have difficulties using electricity so they will be prioritised for supply. It is on this basis that I think hydrogen is part of the journey to decarbonisation, but do not believe it will be a significant requirement going forward. The DNV [Det Norske Veritas engineering group] in the Netherlands predicts hydrogen will only play a role of 0.5% until 2030 and 5% until 2050. Global costs of producing hydrogen until 2050 will be (US) $6.8 trillion with $180 billion on pipelines (source DNV).

Ammonia

If we look at ammonia, which is manufactured from hydrogen and nitrogen captured from the air, under extremely high pressures and moderately high temperatures, its main disadvantages are the high greenhouse gas emissions and high amounts of energy usage due to its operating pressure and temperature. It produces 2.7 tons of carbon dioxide emissions per ton of ammonia produced. Cost of building and operating ammonia terminals is predicted to be $530 billion (source DNV). On this basis I do not believe that ammonia is an option going forward, mainly due to cost and the overall efficiency.

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Carbon capture

So, next we need to look at carbon capture utilisation and/or storage (CCUS). Again, Glass Futures did a very comprehensive survey of the various systems currently available. By that it should be recognised that many of these are only at laboratory or pilot plant level and very few are commercially available. Of the more than 30 systems and variations, only one was of any real interest going forward mainly because the other gases formed in the melting process complicate the capture of the CO_2. Virtually all the systems investigated would add considerably to the cost of production. I really believe at this stage that CCUS is embryonic and that we have a long wait; however, having said that, with the urgency to remove CO_2 from the atmosphere, I am sure there will be considerable research efforts in this regard. Only time will tell, and in any fact we will have to wait a long time because there is nothing really currently available.

Electric melting

That leaves electricity as an option. We already know we can melt small tonnages up to 300tpd with an all-electric melter. The cold top, all-electric melting is a vertical melter and extremely fuel-efficient, getting down to around 2.6GJ/ton. Admittedly furnace life is shorter than current campaigns but I would suggest that a shorter campaign with a cheaper furnace allows the industry to catch up with technology on a more regular basis, and in any case it is extremely difficult to forecast our markets more than two years ahead, let alone 15 years out, so a shorter campaign with shorter rebuild times and lower capital costs should be a distinct advantage.

Above 300tpd, it is interesting that virtually all furnace design and build companies, as well as electro-heat specialists have all eventually agreed with F.I.C.'s original proposal of a hybrid furnace with 80% electrical energy in-glass and 20% energy required above glass. This additional 20% heat could be by electrical heating or could be by hydrogen or other fuels. This is mainly for refining. There are examples of this being adopted with government assistance but [it] obviously relies on electricity being decoupled from the gas price. As stated earlier, this looks to be in process now; only time will tell.

F.I.C. (UK) Limited was the first to show that we can use conventional horizontal melting for furnaces larger than 300tpd. This means we can use almost the same footprint for the furnace as existing melters, which considerably reduces the costs. F.I.C. initially proposed this hybrid approach in 2017, based upon our extensive experience of electric boost in float furnaces over the last 30 years, with nearly 100 installations and extensive modelling. We realised that this was an enormous step change for the industry so we introduced the concept of superboost as an interim step. We are currently discussing this with a number of companies with furnaces in the range of 500–1,000tpd. They have confidence in our abilities due to our track record with systems already working with up to 6MW. Modelling shows 10–12MW is possible with many existing furnaces. ●

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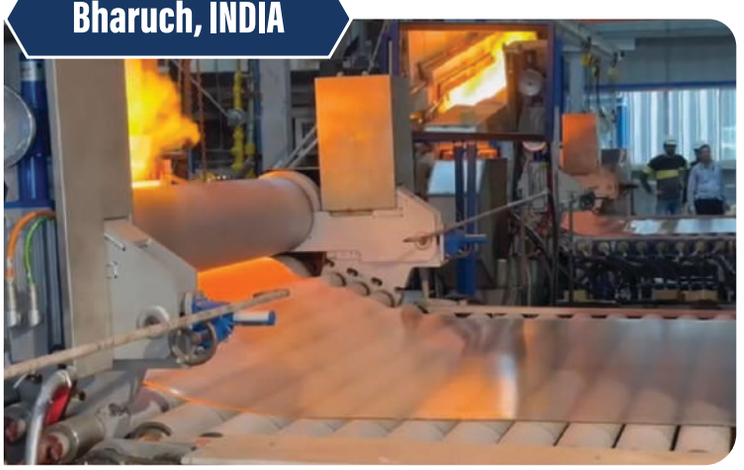
With the commissioning of its Furnace # 3 having a capacity of 550 tons per day at Bharuch, Gujarat, Borosil Renewables Ltd's manufacturing capacity in INDIA has increased upto 1000 Tons per day.

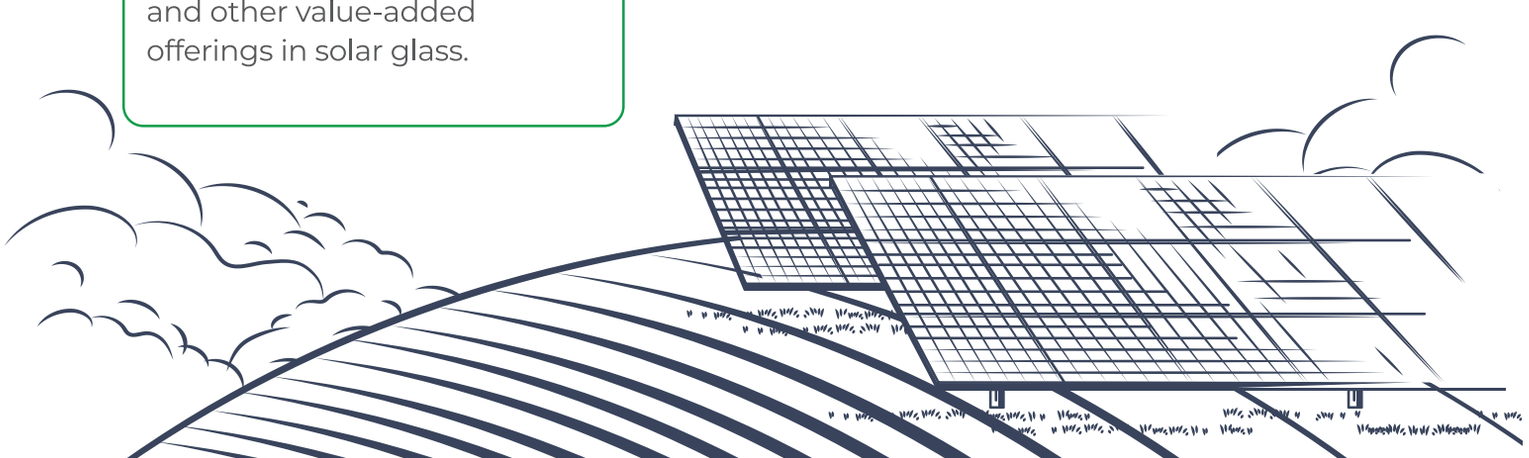
Our Solar Glass manufacturing capacity at GMB Glasmanufaktur Brandenburg GmbH in Tschernitz, GERMANY has now also been enhanced to 350 tons per day after a recent rebuilt of the furnace.

As such, our combined solar glass manufacturing capacity has reached to 1350 tons per day, (equivalent to around ~8 GW). With these increased production capacities, we will be able to serve effectively, our domestic and overseas customers in various glass sizes, glass thicknesses, and other value-added offerings in solar glass.

Bharuch, INDIA



Tschernitz, GERMANY



27th International Congress on Glass (ICG 2025)

The CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI) INDIA, will be hosting the XXVII ICG Glass Congress in KOLKATA, from January 20-24, 2024 under the aegis of the International Commission on Glass (ICG).

This will be preceded by the 3rd ICG-CGCRI Tutorial on Glass during January 17-19, 2024.

The ICG is a non-profit international society of various national scientific and technical organizations with particular interests in glass science and technology (https://icglass.org/). The aim of ICG is to promote and stimulate understanding and cooperation between glass experts in science and technology, art, history, and education.

The CSIR-CGCRI has been a national council member of the ICG since the 1980s and organizes various national and international events related to glass science and technology in INDIA in association with the ICG.

The ICG glass congress will be organized by CSIR-CGCRI in INDIA for the second time, after 39 years in association with the Indian Ceramic Society (InCerS), The All India Glass Manufacturers' Federation (AIGMF), and the Glazing Society of India (GSI). It would be a great opportunity for Indian glass industries, R&D organizations, and academic institutions to go hands-on with the global glass community for the betterment of society. CSIR-CGCRI will be organizing ICG-2025 to bring eminent international and national experts together to deliver lectures on innovative as well as cutting-edge topics in the field of specialty glass, highlighting recent technological advances. This is to promote a thorough exchange of ideas, knowledge, and experience among participants to delineate the futuristic issues and challenges facing glass technology. These events will benefit mostly the Indian glass community, which comprises faculty, researchers, students, industry personnel, etc. It will also lead to fruitful interactions with several Institutes, Universities, and Industries in India and abroad for collaboration on a few contemporary areas of innovative R&D work for futuristic applications and contributing to building a sustainable society. The year 2025 is of great significance to CGCRI since it coincides with its 75th anniversary, i.e. Platinum Jubilee. Thus, it will be befitting to host such an important event at the same time, with the valuable participation of a galaxy of glass scientists and technologists worldwide and their advice for fostering further growth in this field.

The ICG 2025 Kolkata Glass Congress theme is "Glass: A Smart and Indispensable Material for Sustainable Society," focusing on emerging technologies that can bring an unprecedented transformation in the use of glass products in various fields. Along with the Congress and the 3rd ICG-CGCRI tutorial on glass, a mega exposition of glass and allied materials has been planned to showcase the products of different industries and research institutes across the globe.

In the conference, 12 symposiums (Approx. 40-45 sessions) are planned on different thematic areas covering almost all aspects of glass, such as:

1. Glass Science: Physics and Chemistry
2. Glasses for Optics and Photonics
3. Sustainable Glass Manufacturing and Processing
4. Modeling and Molecular Dynamic Simulation of Glass
5. Glass Surface Science and Coating
6. Glasses for Architectural, Energy and Environment
7. Glasses for Health Care
8. Glass and Glass-Ceramics for Emerging Applications
9. Glasses for Transport and Packaging
10. Additive Manufacturing and Novel Manufacturing Processes of Glass
11. Archeometry of Glass and Glass Education
12. Recycling of Glass

On behalf of the Director, CSIR-CGCRI, we would like to invite you all to the XXVII ICG Congress to be hosted by CSIR-Central Glass and Ceramic Research Institute, Kolkata, from January 20-24, 2025 to be held in KOLKATA. Mr. Sitendu Mandal, Chief Scientist and Head, Specialty Glass Division of CSIR-CGCRI, Kolkata and Dr. Atiar R. Molla, Senior Principal Scientist of the Specialty Glass Division of CSIR-CGCRI, KOLKATA are the President and the Organizing Secretary respectively who may be contacted for further details (icg2025-secretariat@cgcri.res.in, icg2025.secretariat@gmail.com) and the conference website (https://www.icg2025.co.in/) may be browsed for regular updates ■

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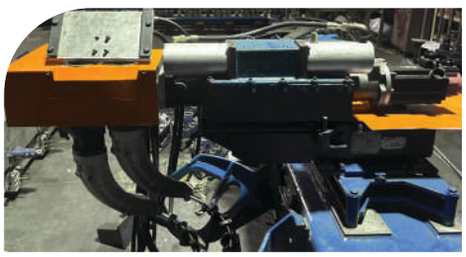
The new product line, promises to deliver a fusion of high performance and seamless integration.

Through meticulous research and development, Shamvik has pushed the boundaries of innovation, bringing forth solutions that not only meet but exceed the evolving needs of consumer and industry alike.

While trial under glass is already underway, Shamvik will complete additional new installations by Q2 2024 with a further 5 lines in the pipeline. Shamvik anticipates these to serve as the benchmark for the future of the Indian Glass Container Production Industry.



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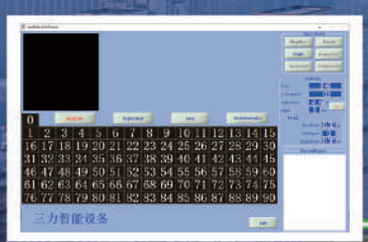

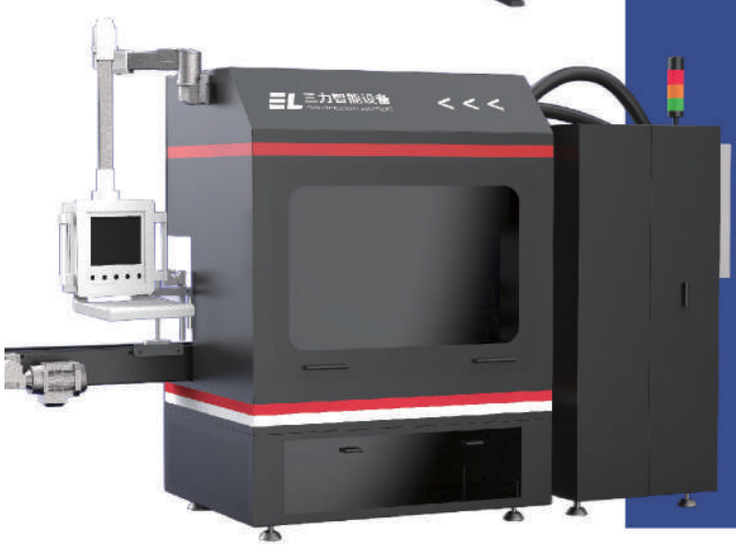

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Glass and Glazing Skill Centers for Students and Industry Professionals

Report by **Prof. A S Rao, HoD, Department of Applied Physics Delhi Technological University *and* Member Editorial Board KANCH**

The signing-up ceremony of MoU between DTU (Delhi Technological University) and GGKF (Glass and Glazing Knowledge Forum) to set up a skill center at DTU Campus Rohini, DELHI was held on Feb 6, 2024.

Prof. Arun Varshneya delivering his lecture on International Year of Glass (IYoG) at DTU on Nov 30, 2022.

In the UN declared International Year of Glass in 2022 where Secretary AIGMF duly represented as Coordinator with ICG/IYoG under the region RO17 (INDIA_IRAN_PAKISTAN); and with the kind support of International Commission on Glass, IYoG Council Members, Education Dept. of GNCTD, Glass Worldwide magazine, Society of Glass Technology, Delhi Technological University, Central Glass and Ceramic Research Institute, glass manufacturers/ suppliers, Govt. departments, thousands of school and college students for their active participation and other stakeholders; AIGMF was able to deliver more than 30 IYoG events from mid-2021 till Dec 2022. Brief reports along with select photos/presentations are available at www.aigmf.com

Under one of the main IYoG events in India, Dr. Arun Varshneya, President of Society of Glass Technology, UNITED KINGDOM and Member of the International Year of Glass 2022 held interactive sessions with the students of St. Thomas School and ***Delhi Technological University*** *on Nov 30, 2022 at DELHI. Prof. Varshneya interacted with the students showcasing the growing importance of glass and its popularity in packaging and building material. He covered the topics from fundamentals to advances in glass science and technology. Discussions were carried on the further technical cooperation and research*

collaborations in Glass Science and Technology with the support of AIGMF. To carry forward the momentum, a one-day national workshop on ascertaining a skill center for glass and glazing was organized by the Department of Applied Physics, Delhi Technological University at their campus on Aug 11, 2023 with an idea to bring Industry and Academia together which was initially discussed at the Glass & Glazing Knowledge Forum (GGKF) in early July 2023, where members were of the view to ascertain and establish a training center for Glass and Glazing at DELHI NCR.

GGKF represents following industry associations: FOSG (Federation of Safety Glass), GSI (Glazing Society of India), CCPS (Confederation of Construction Products and Services), UWDMA (uPVC Window & Door Manufacturers Association), Glass Academy and AIGMF (The All India Glass Manufacturers' Federation).

Post signing up of the MoU ceremony, 2 locations were visited where the skill center could be set up within DTU's campus.

Initially, two courses would be offered i.e. for students and industry professionals. DTU has appointed Dr. Sumandeep Kaur who is teaching the course related to "Glass Science & Technology" for B.Tech first year Engineering Physics Students in the capacity of "Contractual" position.

Dr. Sumandeep Kaur currently serves as an Assistant Professor (Guest) in the Department of Applied Physics

Dr. Sumandeep Kaur, Assistant Professor (Guest) in the Department of Applied Physics at Delhi Technological University (DTU).

at Delhi Technological University (DTU). Under the mentorship of Prof. A.S. Rao, she focused on the synthesis and characterization of Up-Conversion Nano-Phosphors for Bio-Photonic Applications, demonstrating a dedication to cutting-edge research while holding the position of CSIR-Research Associate from November 2020 to November 2023.

In the course meant for students, since Jan 2024, DTU has already started taking classes for 2 hours per week for their B.Tech students under National skill policy.

These courses are designed to expose students to the fundamentals of glasses, composition of glasses and their properties.

Course Topics would cover the following:

- Glassy state, types of oxide glasses, general properties of glasses, V-T diagram. Glass formation-Zachariasen rule's, Sun's single bond strength criterion, Dietzel's field strength criterion. Kinetic theory of glass formation, nucleation rate and crystal growth.
- Physical properties-Density, elastic moduli, hardness of glass, viscosity, refractive index, thermal expansion of glasses.
- Absorption and colors in glasses, role of transition metal ions and rare earth ions in glass.
- Chemical durability of glass, factors affecting chemical durability of glass, measurement of chemical durability of glass.

Mr. Amit Malhotra, President of the Confederation of Construction Products and Services (CCPS) and Managing Director of McCoy Silicon Ltd., presenting a Calendar Glass bottle 2024 to Prof. Prateek Sharma, Vice Chancellor of the Delhi Technological University (DTU), specially made by AGI Greenpac Ltd., for AIGMF.

Reference of Books taken for the course development:

- Fundamental of Inorganic Glasses: A K Varshneya
- Chemistry of Glasses: A. Paul
- Introduction to Glass Science: L D Pye

- Handbook of Glass Manufacture (Vol. I & Vol. II): Tooley
- Properties of Glass: Moorey

And the other Skill Centre would be for the Industry Professionals to be run by GGKF to train them further and hone their skills in Glass and Glazing installations.

The center for the Industry Professionals got operational by the Confederation of Construction Products and Services (CCPS) at the Gold Plus Glass Industry Ltd.'s Head office in Sector 9, Rohini, DELHI who kindly offered to use their surplus office space for setting up of the center for technical sessions under the aegis of Glass & Glazing Knowledge Forum (GGKF).

First Upskilling and Technical Enhancement Training Programme for unskilled and semi-skilled industry workers was organized on March 7, 2024 where 29 participants were trained about different types of glasses, glass handling, loading, unloading, measurements, window handling / installation, frameless glass doors/glazing, shop front installations, etc.

Mr. Sharanjit Singh, senior Member of the Federation of Safety Glass (FOSG) and Managing Director GSC Glass Ltd., Mr. Ali Kamil of Kaenat Glass, Mr. Bhanu Joshi of Ozone Overseas, Mr. Mario Schmidt & Ms. Shobhita of uPVC Window and Door Manufacturers' Association (UWDMA) along with Gold Plus technical team were among the trainers. All the trainees were given a tool kit by Gold Plus Glass and were also awarded with a certification of participation.

As a way forward, Glass Industry invites technical talks/interactive sessions/workshops from worldwide industry experts/ professionals and request their participation when visiting Delhi/ INDIA for the benefit of students and industry workers.

Ideas are also invited on the important topics that could be covered in the curriculum; including equipment or other techniques at drsrallam@dce.ac.in or info@aigmf.com ■

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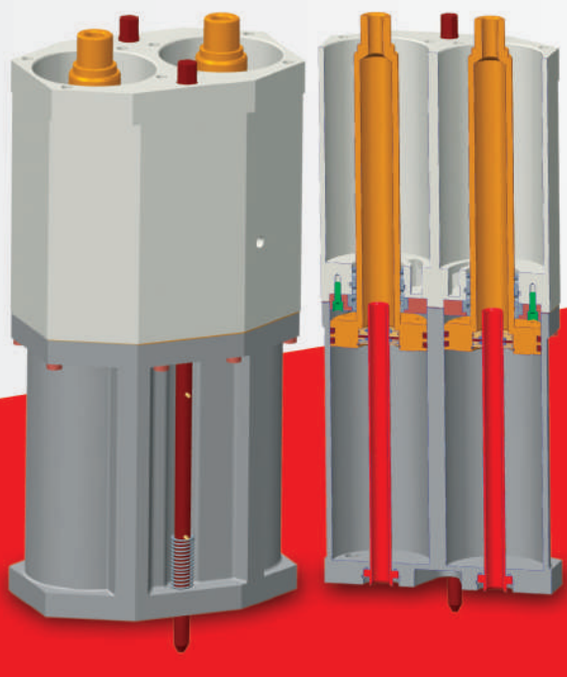

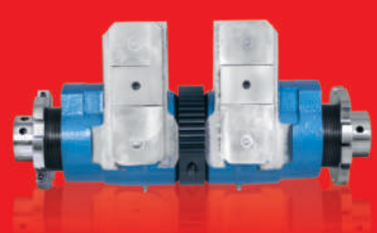

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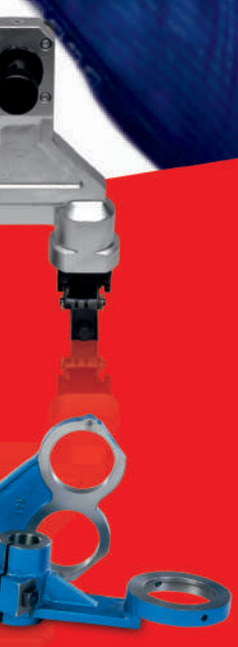

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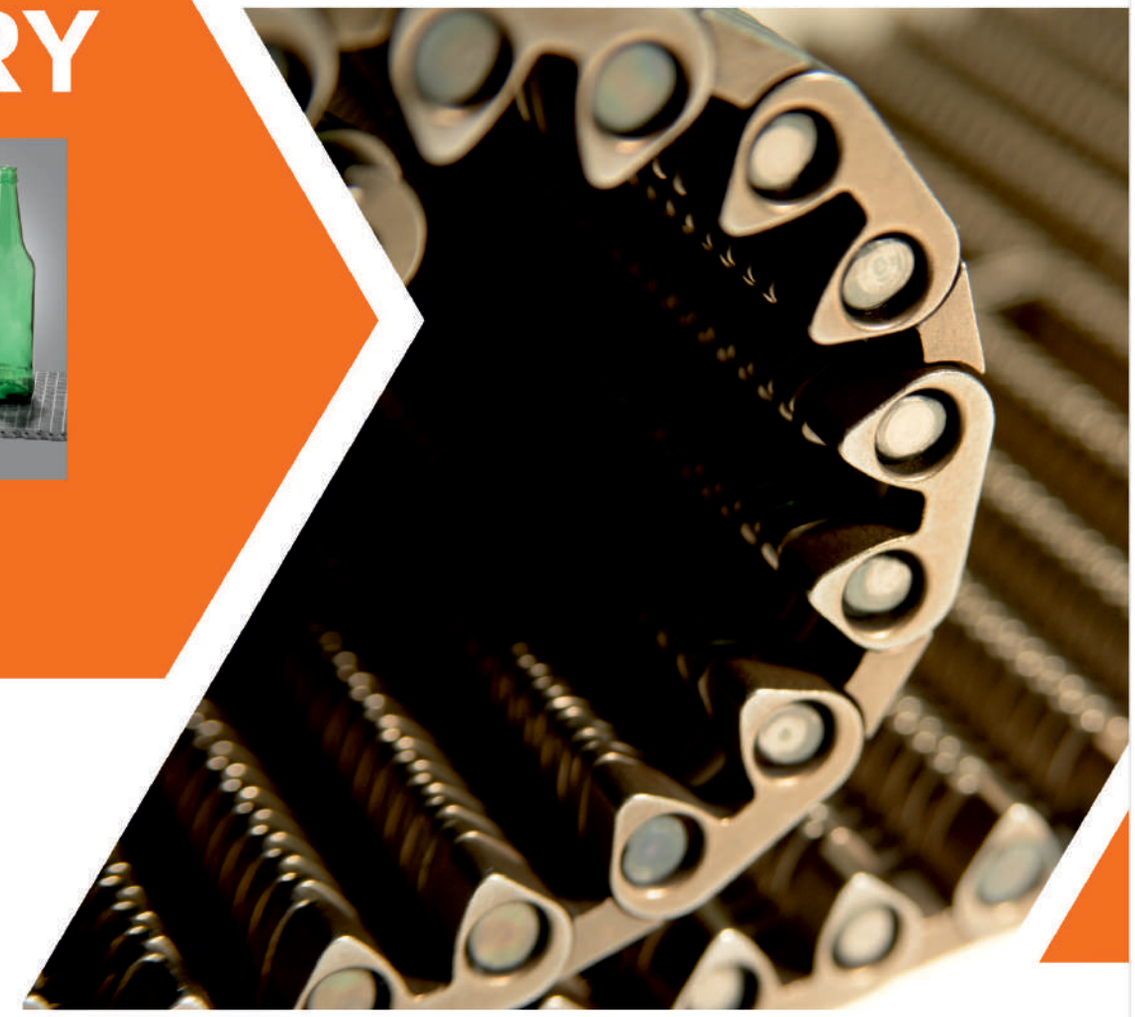

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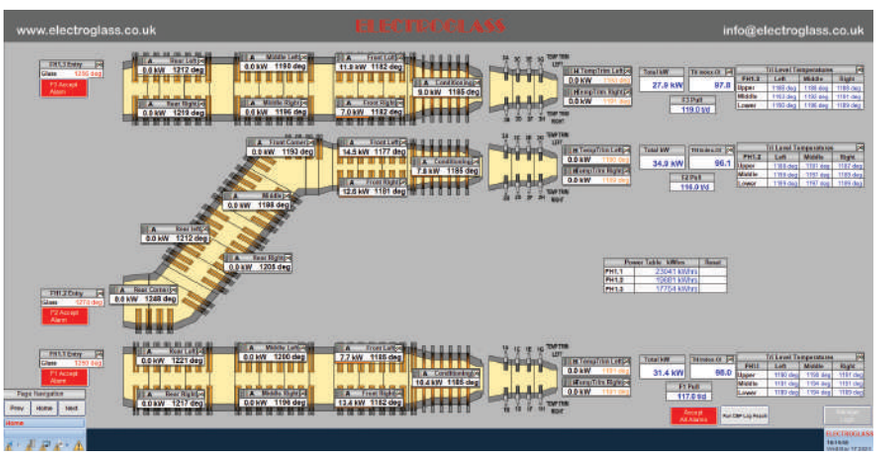
Understanding all-electric forehearths

Grahame Stuart from Electroglass detailed to *Glass Worldwide* the process of converting to an all-electric forehearth and outlined the benefits of the company's solutions for container glass manufacturers looking to reduce their carbon footprints and operating energy costs.

All-electric forehearths are not a new concept. Electroglass has been designing and supplying them for many decades. Increases in gas prices, a focus on renewable energy sources and the growing requirement to reduce harmful emissions means that now more than ever this technology is being adopted by sectors of the glass industry that historically relied on gas heated systems. Perhaps the most important of these is the container glass industry.

With this increased interest comes a need to understand the various concepts being offered. Not all designs are equal in terms of ease of operation, ease of maintenance, consistent glass quality and the thermal efficiency to greatly reduce both energy consumption and operating cost.



The operator interface for a system of three forehearths, each 48in wide.

Overall concept

The first of the factors to consider is the overall design concept offered. These fall into two broad categories:

1. Designs specifically developed for all-electric operation.
2. Gas heated designs heavily modified to run with heating elements, immersed electrodes or a mixture of both.

There are certain all-electric forehearth concepts that retain features traditionally associated with gas heated designs such as a few large damper openings, superstructure refractory design and insulation packages better suited to evacuating waste gases than they are to promoting efficient all-electric operation, forced air cooling systems and in some cases retained burner systems and chimneys for use during power failures.

Some of these designs employ immersed, dry type electrodes throughout the length of the forehearth, either as the primary means of heat application or supplementing radiant superstructure heating. When combined with the large damper openings and inefficient superstructure design localised cooling and reheating of the glass can lead to reboil and the glass defects related to it.

A further factor to consider with this type of all-electric forehearth is the design of the dry electrode. These can further compound glass quality issues in addition to those associated with reboil. In its simplest form a dry electrode can be made of two pieces of dissimilar metals, typically a piece of molybdenum connected via a thread to a piece of Inconel. This electrode is then sealed in the glass relying on the junction between the two dissimilar metals being positioned so that the molybdenum is not exposed to air in order to prevent oxidisation and the Inconel is not exposed to soft/molten glass.

The problems begin when the junction between the dissimilar metals is in contact with softened glass that is electrically conductive. Where this occurs a galvanic cell can be created leading to the generation of DC voltage and the creation of bubbles of pure oxygen. These bubbles not only impact on production yield, but also cause the molybdenum to oxidise creating molybdenum streaks in the glass and eventually, if left unchecked, lead to the failure of the electrode and damage to surrounding refractory.

In terms of controlled cooling of the glass, Electroglass' installations have long shown that a well-designed all-electric forehearth requires nothing more than passive radiation cooling through a series of relatively small, strategically placed damper openings along the centreline in the rear zones. Where forced air cooling is retained the passive nature of the cooling is lost, there is an increased risk of thermal shock failure to the heating elements and the accurate temperature control needed to operate the forehearth efficiently is negatively affected.

To fully benefit from the simple operation, minimal maintenance, high glass quality and low energy consumption potentially offered by all-electric forehearths it is essential to select a design that has been developed for this specific purpose, not one with compromises carried over from gas heated systems. It should be remembered that the purpose of the forehearth is to cool and condition the glass in a controlled manner so that when it arrives at the conditioning/equalising section it is thermally homogenous and at the required temperature for forming. Achieving this with minimal energy input and with only passive cooling is the goal in every Electroglass all-electric forehearth system and many factors within the design make this achievable.

Substructure and superstructure

The first consideration is the substructure and superstructure design. Unlike gas heated systems where there is a need to evacuate waste gases from the process, the all-electric forehearth should be designed to prevent excessive or unnecessary heat loss.

When designing any electric forehearth Electroglass uses the required maximum and minimum pull rates, entry temperature range and conditioning/gob temperature range to calculate the heat loss range required from the forehearth. From this the 'R' value of the substructure and superstructure materials and the required number of damper openings can be determined to ensure heat loss is not excessive and to ensure the forehearth remains as energy efficient as possible.

Heating elements

The next area to consider is the application of heat, to allow heat loss to be controlled while optimising glass quality and thermal homogeneity. How this is achieved depends on the forehearth width, glass type and the glass colour(s). As mentioned already,

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the application of electrode heating throughout the forehearth will often create glass quality issues due to reboil. A more reliable solution is to apply heat within the superstructure using some form of radiant heating element.

Heating element selection and power system design are critical for low maintenance operation and a long operating life, and a number of factors should be considered. First is the type of heating element. Is there a need for independent side to side control? Are certain areas of the glass surface across the channel width to be heated whilst other areas are cooled? Does the presence of bends or corners in the glass flow path require that the heat input needs to target a certain side of the channel? Electroglass considers each of these factors in every system.

Secondly, there is a tendency for the heating elements to increase in resistance as they age and this must be considered. The elements must be designed to allow for this ageing to ensure they do not fail prematurely and the power system, particularly the transformers used, must be designed to have a sufficient current and voltage range to deal with this increase in resistance over the operating campaign while maintaining full power input capability.

The element supports and guarding arrangements must be designed so that the elements can expand and contract freely during operation, to ensure they are protected from mechanical impact and that the operators are protected from the risk of electric shock.

Electrode heating

For most non-volatile glass types, the use of heating elements within the superstructure is sufficient to ensure high glass quality and good thermal homogeneity. But, in some cases, particularly where low transmission or dark glasses are to be conditioned, the application of some electrode heating using our Temptrim electrode heating system may also be advisable. This electrode heating should be low power, have the ability to operate in various firing patterns with some level of independent control and be limited to the conditioning zone only.

For many in the glass industry, the use of electrodes within the conditioning zone would cause concern and for some dry electrode designs these concerns are valid. This is particularly the case for the type of dry electrode already described above, where dissimilar metals can lead to quality issues and premature electrode failures.

Dry electrode design is therefore very important and a design where there is no dissimilar metal contact, without the increased risk of oxidisation is something that we have achieved with our Sheathed Dry Electrode. This design gives the glassmaker the confidence to install dry electrodes close to production knowing that the risks to glass quality can be avoided. Electroglass manufactures a large number of dry electrodes each year. Many are replacements for other dry electrode types in customers' existing systems designed and supplied by others and where issues have been experienced with glass quality and electrode failures.

Capital cost and energy saving

Considering these aforementioned points when selecting an all-electric forehearth design will help to ensure high glass quality, energy efficiency and simple operation are achieved. The majority of the all-electric forehearth projects Electroglass undertakes are for customers looking to convert existing gas designs to all-electric in order to help reduce their carbon footprint and to also reduce their operating energy costs. With such projects it is important that the conversion can be completed quickly, with minimal disruption to production and with minimal ▸

A typical Electroflex all-electric forehearth.

modifications to the existing forehearth layout, gob drop points, support steelwork and casing arrangements. In our initial assessment of any project we will identify the forehearths that will be most beneficial to the customer, meaning those that will save the most operating energy cost to help free up funds for other carbon reduction and energy-saving projects.

With this in mind, we have developed a system that allows us to evaluate the operating cost savings and capital investment costs quickly and easily. This system requires minimal information from the glassmaker on their existing forehearths such as dimensions, pulls, operating temperatures, energy consumptions and energy prices. In most cases this is done by completing a very simple questionnaire. For larger systems, or where the distributor is also being considered for conversion to electric, then additional information may be needed.

It is not unusual for us to receive information for multiple forehearths from several furnaces. With the energy consumption and operating cost calculation system we have in place we can usually give initial capital cost and energy saving estimates in just a few days.

Installation timeline

Forehearth operating energy cost savings of between 60% and 80% are typical and it is not unusual for customers to see energy cost savings of up to 90%. This can mean that carrying out conversion will be beneficial long before a scheduled furnace shutdown or repair is planned. Where this is the case, it is possible to install our design of Electroflex forehearth during a short shutdown of individual forehearths, without waiting for the next major repair. Such an operation typically requires a forehearth stoppage of as little as 14 days.

In the week or so leading up to the stoppage, new power and control equipment will have been installed and the required thermocouple and power cables run. The Electroglass power and control system is a modular design whereby all control and communications are run via network cables from the power racks to the control panel. An internal main isolator and busbar systems mean only a single set of incoming power cables will be required. For single forehearths a blind interface allows the system to be viewed, monitored, and controlled over the factory network via a web browser. Where multiple forehearths are involved, or will be in the future, a new SCADA control system can be included. There is also the option of monitoring and controlling the forehearths on the customers' existing factory computer system.

Once the Electroglass power and control equipment has been successfully installed and tested the existing gas forehearth can then be stopped. The existing superstructure, insulation, glass contact and substructure material are then removed. The steel casings and spout remain in place and our new design will maintain the existing gob drop point. In some cases, it may not be essential to replace the glass contact and substructure refractories. This can be discussed when planning the forehearth replacement.

Certain modifications are then made to the casings to accept any superstructure steel, damper mechanisms and Temptrim electrodes required for the new build.

New substructure (where applicable) and superstructure materials of Electroglass design are then installed. Superstructure bracings, damper assemblies, and busbars are added.

Lastly, heating elements, thermocouples and safety guarding is installed making the forehearth ready for heat-up.

Heat-up times vary depending on glass contact material, but typically range from between four and seven days.

Optimised operation

Once back in operation, Electroglass engineers will carry out final commissioning, customer training and remain present for several days whilst the forehearth is brought into full, normal operation and the customer can begin benefiting from the significant energy cost savings, improved thermal homogeneity, simplified operation and minimal maintenance requirements of our Electroflex design as well as removing reliance on fossil fuels in this important area of their operation.

As demonstrated, there are significant and important differences in the concepts that various designers have used in their all-electric forehearths which can significantly affect operating cost, energy consumption, thermal homogeneity and operating stability.

As an example, a recent comparison between an Electroglass Electroflex All-Electric Forehearth and an alternative all-electric design showed the energy required for the alternative could be more than five times higher! ●

Modular power and control system design with individual zone racks and incoming main isolator.

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Circular Economy in the flat glass industry

ANYONE WANTING TO CHANGE STRUCTURES WILL HAVE THEIR "WORK CUT OUT"

In 2023 industry emissions fell by 12% against the previous year – as found by the current study "Agora Energiewende"[1]. A positive development at first sight, which is, however, largely due to declining production in the energy-intensive sectors driven by lower demand in a competitive environment made difficult by high energy prices. To the flat glass industry, the first Hot Topic at this year's glasstec (October 22-25, 2024 Düsseldorf) – Circular Economy – is one of the most important topics of the decade, both ecologically and economically: cullet returned into the cycle saves raw materials, lowers furnace temperature and saves valuable energy. At the same time, one kilogramme of float glass made of recycled glass emits some 0.3 kg less CO_2 than a glass batch consisting only of primary raw materials. The problem: there is too little cullet from demolished or dismantled old buildings and modernisation and the recycled material streams are not flowing back to the flat glass industry to the desired degree. This article analyses the different reasons for this and points to possible solutions.

One conclusion from the get-go: those wanting functioning cycles will have to fight embedded structural problems at many points involved in the process and have their work cut out convincing people. Even now, very little closed-

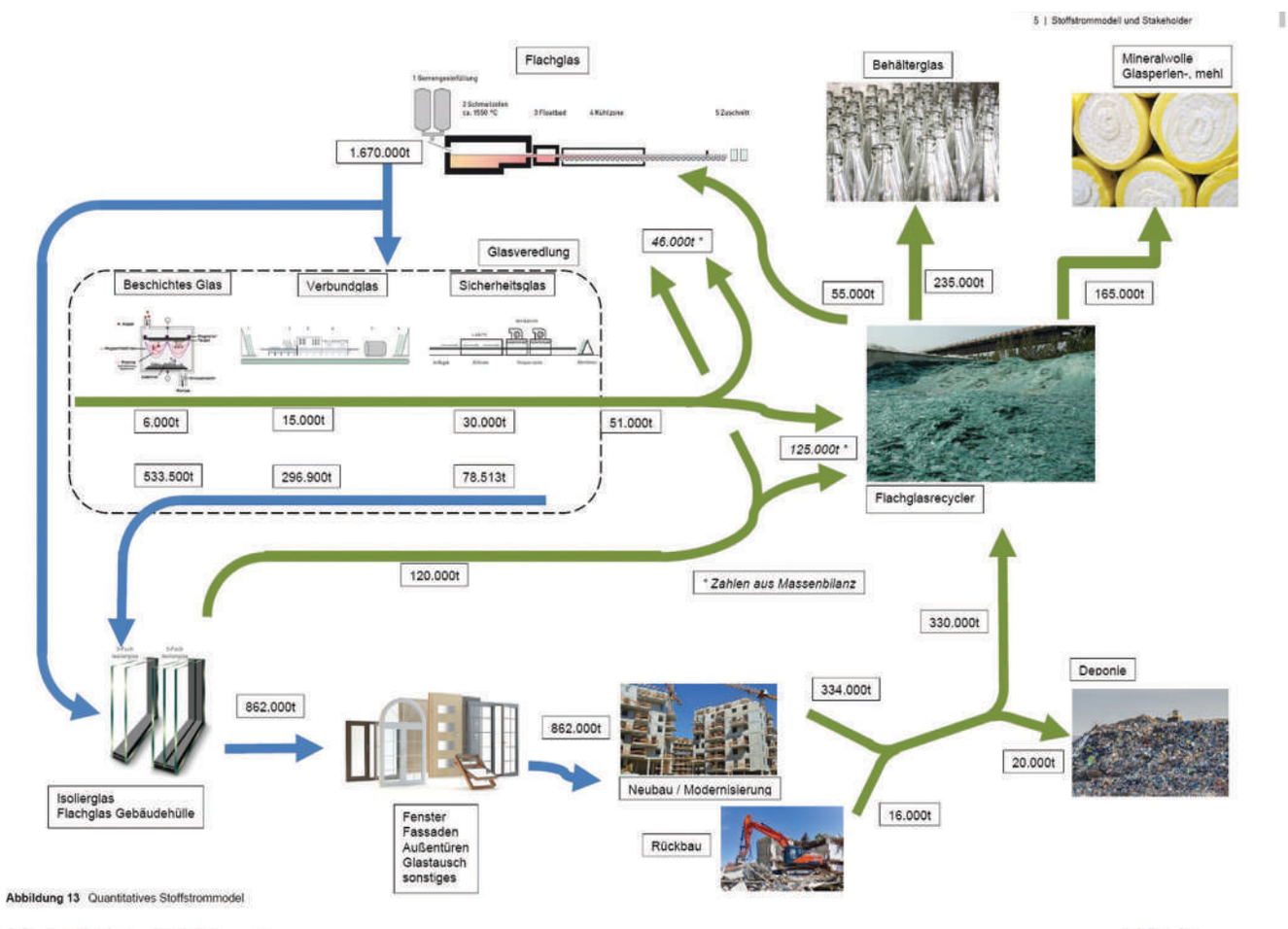
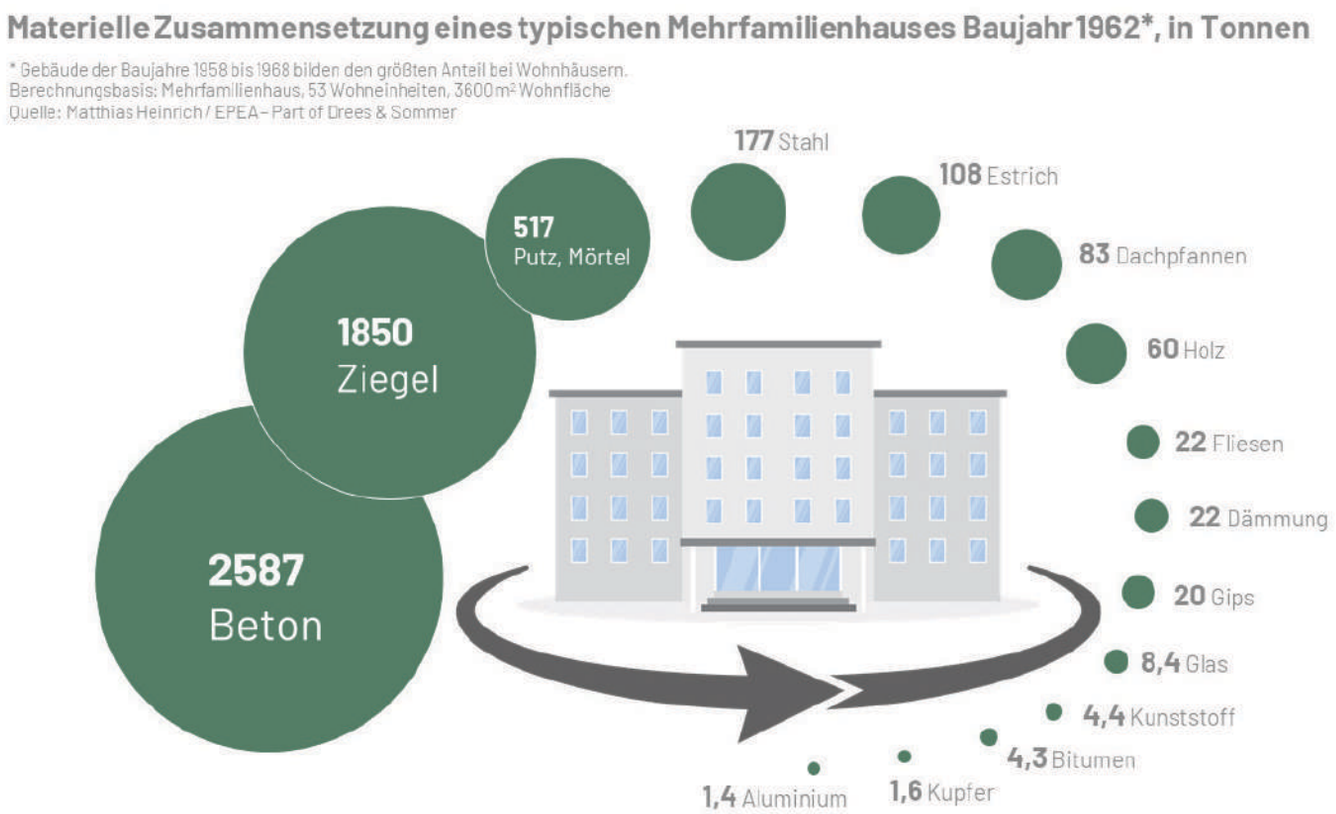


Abbildung 13 Quantitatives Stoffstrommodel

The material flows from glass production to recycling clearly show that the recycling of flat glass already works very well, but too little attention is paid to qualitative differences. This is why high-quality architectural glass is still rarely recycled into high-quality architectural glass.

Chart: Bundesverband Flachglas

[1] Agora Energiewende: Energy Transition in Germany: State of Affairs in 2023. Looking back at key developments and looking ahead to 2024



The material composition of a typical apartment block clearly shows how many raw materials could be recovered and reused or recycled. For a climate-neutral construction industry, existing buildings must be seen as material banks.

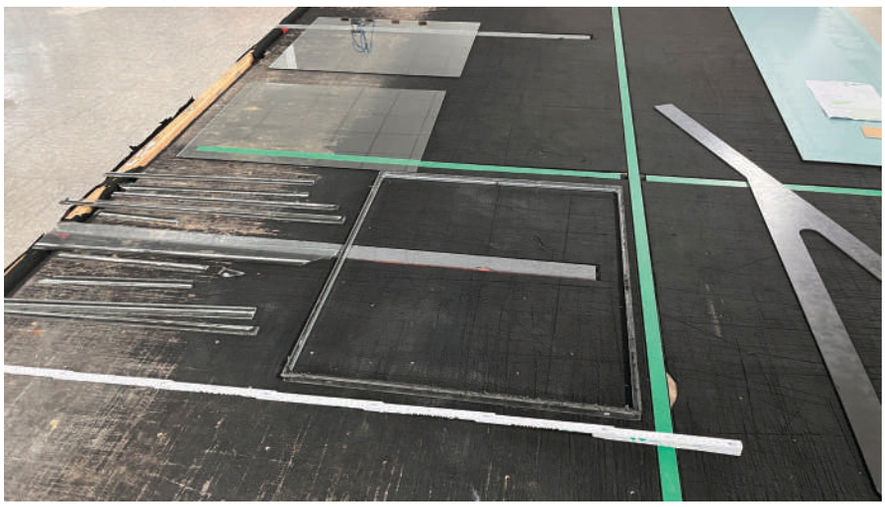
Chart: Matthias Heinrich / EPEA – Part of Drees & Sommer

loop material recycling is achieved when demolishing or modernising buildings. Which means glass from architecture is still all too rarely converted back into architectural glass again. Those involved in the recycling process include float glass producers and processors, window installers, the large-scale recyclers – and everyone who has ever used a reuse and recycling centre to return construction materials. A possible ideal scenario: A building with a digital Building Resource Passport (DGNB) reaches the end of its lifecycle, is carefully dismantled (not demolished), its materials are reclaimed and re-used. Where this is not possible, the raw materials are properly separated, transported to a recycling company that reworks them; the high-quality flat glass cullet is then returned to the producers' float glass melting units. Reality looks different though: When a building reaches its "end of life", usable materials still often end up as building rubble with recycling companies. Things look better when buildings are dismantled rather than demolished – here, the construction process is practically reversed in order to retain valuable raw materials or parts of the basic structure of the building. The materials obtained are separated and reclaimed at great expense. But there are also risks to the purity of materials lingering at the recycling centre itself. There are clear guidelines for both commercial operators and end users on where to dump which material but at times the old ceramic hob still ends up in the construction glass container or the window complete with frame and profiles is dumped in the wrong bin because it just happens to be closer to the van. The results are contaminated materials and even after reprocessing, the quality may not be sufficient to meet the very high demands of the flat glass industry. The background to this: even tiny contaminations in the glass batch can seriously disrupt production because the systems react sensitively to smallest material fluctuations; meaning they need to be recalibrated, potentially leading to lengthy and expensive production downtimes. Even if the cullet quality is found to be good after inspection at the recycling centre, there is often a perceived "residual risk" for recyclers who prefer (on account of the lower entrepreneurial risks) to sell this cullet to container glass or insulation material manufacturers who have lower purity requirements and also require it as an important recyclate.

For recycling it would therefore be important to sort/separate the materials more carefully and to take them to recycling centres. Solutions should be found to protect

the material pools better from contamination. To this end, there must be more general awareness raised for the value of materials, which become valuable resources and thereby save natural resources – maybe a long-term communication task for all associations involved in construction. The situation could also be improved if interfaces between the glass industry and system providers were created with initiatives like Rewindo (recycling plastics from old windows) and A/U/F (aluminium recycling) in order to secure the highest quality of insulating glass possible from these already well-functioning systems.

What already works well for recyclers is the cooperation with glass processing companies. The cullet produced by sizing in insulating glass production, for example, is separately pooled by recyclers and returned to float glass manufacturers for closing the loop in the glass batch. However, this is not always easy at present, as float glass manufacturers are competing for cullet and rising costs for tolls and transportation to the melting unit sites are causing cullet prices to rise on a market already impacted by high energy prices.



Glass sheet, sections and spacers with sealants.

Photo: Martin Teich / Michael Elstner

Major float glass manufacturers are already seeking alternative ways to increase their recycling ratios and are trying to already identify demolition, dismantling or refurbishment projects in the tendering phase to then arrange individual collection and reclamation with recycling companies. But this does not eliminate the general problem of volumes.

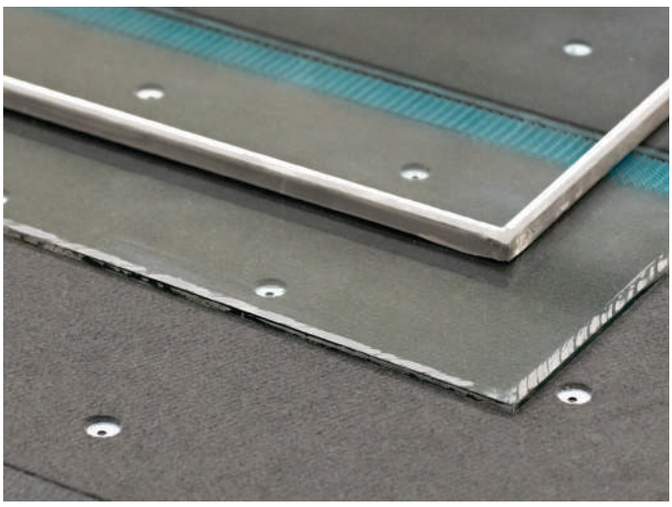
QUANTITIES ISSUE: ARCHITECTURAL GLASS IS LONG-LASTING

Manual separation of an insulating glass unit.

Photo: Martin Teich / Michael Elstner

Increasing the percentage of cullet quickly and significantly proves difficult due to the far too low overall quantities of glass from end-of-life buildings and components because float glass is an extraordinarily slow-moving commodity. Buildings dating back to the 1970s, 80s and 90s will only end up at recycling centres in the coming years. The buildings of relevance currently are older buildings with a significantly lower percentage of glass in the building skin than is customary today. It will take time before we see more glass for recycling being reclaimed from triple insulating glass or large-format facades – high-quality insulating glass is long-lasting and survives several decades without losing functionality. This is also backed up by the numbers: according to the latest figures published by "Bundesverband Flachglas e.V." (German Flat Glass Association), some 521,000 tons of cullet are available annually in Germany.[2] Of this, 350,000 tons come from old buildings while the remaining 171,000 tons with markedly higher purity are sent by glass processing companies to

[2]For these and more figures see "Recycling of Flat Glass in Construction – Analysis of As-is Situation and Derivation of Recommendations for Action" ift Rosenheim 11/2019 and the climate and sustainability working party "Klima und Nachhaltigkeit", Federal Flat Glass Association, 1 March 2022



With its IG2Pieces, HEGLA offers a system solution that can separate glass cleanly and without damage from an IGU.

Photo: HEGLA GmbH & Co. KG

recycling firms. On the other hand, every year 1.67 million tons of new float glass are placed on the market for use in building applications. Due to the circumstances outlined above, only 101,000 tons (19%) flow back into float tanks in a closed loop from recyclers. The largest share, some 235,000 tons (45%), leaves the closed-loop systems to end up in container glass while a further 165,000 tons (32%) are channelled into producing insulation materials and other mineral construction materials. Adding all this up you realise that 20,000 tons (4%) of cullet still end up in landfill at the end of the day if they cannot be used for another purpose.

Even if solutions are found to salvage the cullet existing in old buildings to the ideal quality level: over a third of the total volume of glass put on the market every year will – for the time being – not be recoverable from buildings because the proportion of glass in their facades is too low – it is not expected for large formats and triple-insulating units to be returned any time soon. By adding cullet from their own manufacturing sites, float glass producers could realise a recycling ratio of 40 to 50 mathematically speaking – provided the cullet was not required in other industries, too. A higher figure will only become achievable once the first triple glazing units, larger window-pane formats and glass facades, which appeared around the turn of the millennium, are received by recycling centres.

Manufacturers' own networks and systems would also be worth considering to secure end-of-life insulating glass and cullet. This is a view also shared by Mr. Tim Janßen, Executive Managing Director and co-founder of the non-profit "Cradle to Cradle" NGO: *"Manufacturers should, in their own interest, work towards orienting not only their product but also their business model towards a cradle-to-cradle approach and design them for circularity. This may mean offering glass as a service for a building for a specific period of use, and after the end of this period, getting the product and the raw materials contained in it back rather than selling their property rights."* Modular facades and glass or windows for buildings could in future be rented. Like this, "Glass as a Service" could make for a planned, energetic updating of buildings at regular intervals thereby ensuring a more constant return of insulating glass for re-use, re-manufacturing and recycling – albeit still at very long-term intervals.

Mr. Tim Janßen is Executive Managing Director and co-founder of the non-profit Cradle to Cradle NGO.

Photo: Cradle to Cradle NGO

RE-USE, RE-MANUFACTURING AND RECYCLING

"End-of-life" insulating glass, i.e. insulating glass from old buildings, can be given a "second life" in a variety of ways. The term "re-use" refers to the reutilisation of insulating glass as a component in another location if it still has the necessary mechanical strength and the required Ug value. Failing this, the insulating glass can be "re-manufactured" either by upgrading it (e.g. refilling with argon) or by separating it into individual components, reconditioning it and processing it into a "new" insulating glass with dismantled and recoated individual panes. Should the test show that this is not possible either, for instance because glass and layer corrosion, relevant scratches, defects and edge damage are detected, the glass is returned to the material cycle as cullet. The German Glass Construction Association (Fachverband Konstruktiver Glasbau e.V.) is currently working on this issue in its "Sustainability Working Group", primarily to create technical and ideally standardised factual data. At present, there are no basic principles that can serve as guidelines or orientation for planners and contractors to qualify glass from existing buildings for new applications. Tests are also underway to determine whether the applicable

Once the pane has been detached from the IGU laminate, the IGU can either be created again with the existing panes or used for further orders.

Photo: HEGLA GmbH & Co. KG

technical regulations can be used or whether a tiered system of quality requirements needs to be defined. The working group's interim report 9/2023 provides a detailed overview of the research concept and the current status; in future, it is intended for this to lead to a set of guidelines entitled "R-Glass Recommendations for Action" ("Handlungsempfehlungen R-Glas").

AUTOMATED SEPARATION OF "END-OF-LIFE" INSULATING GLASS UNITS

The re-use and re-manufacturing of insulating glass is already happening in initial projects (of course with approval in individual cases ("Zustimmung im Einzelfall" – ZiE) and project-related construction authorisation ("vorhabenbezogene Bauartgenehmigung" – vBG) and is an important approach that conserves resources, reduces the CO_2 footprint of buildings and saves a little on new glass production. Until now, in addition to complex German building legislation, the main technical problem was that it was not easy to cleanly separate insulating glass units built to last. In any case, this process has so far been a manual one. This is where machinery manufacturers like HEGLA are now coming up with promising and more economical solutions: With "IG2Pieces system technology", the company has now developed a solution that can separate glass from insulating glass units cleanly and without damage from the spacer, and where the sealing compound is also said to be removed almost residue-free and fully automatically. The machine also measures the dimensions and insulating glass structure automatically. Once the individual panes have been separated from the laminate, they can be "re-manufactured" or recycled in the float glass manufacturer's "closed loop" without compromising the quality of the raw materials. Re-manufacturing is particularly economical for large, high-quality units that are still in use and reduces CO_2 emissions, especially if the units contain complex structures, TSG and laminated sheet glass or high-quality coated glass sheets that are not lost in this way. Separating high-quality glass plates for reuse is now becoming increasingly attractive commercially, thanks to the automated process, especially as the price of CO_2 rises. Planned "urban mining" is the key to climate neutrality, as only around half of the total CO_2 emissions from new buildings are generated during operation. The other half, the "grey energy", is generated by the production and transport of building materials, as well as the "end-of-life" – it is these CO_2 emissions that could most effectively be reduced through more re-use, re-manufacturing and recycling. More standardisation of building components could perhaps contribute to this most effectively – a topic that has been under discussion for a long time. With more standardisation in suitable building categories, serial production by manufacturers and processors would be simplified, the take-back systems for re-use, re-manufacturing and recycling would be easier to organise and manufacturer solutions for separating insulating glass would be immediately cost-effective.

The "Circular Economy" is one of the hot topics at this year's glasstec, the leading international trade fair for the glass industry, and one that will also be discussed at the trade fair's Architecture Forum in October 2024. It will be interesting to see what impetus the trade fair will provide for the future of closed-loop recycling ■

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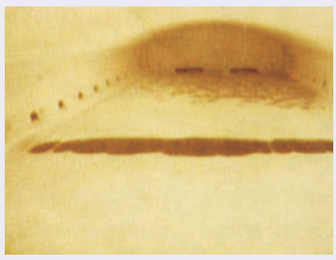


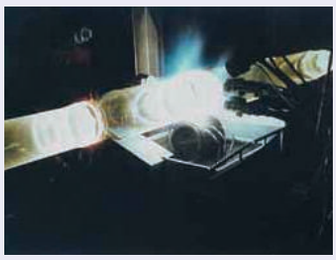




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SmartLine 2 is the latest generation of Heye's starwheel inspection machine series. Developed and manufactured at Heye International's dedicated Cold End Centre in Nienburg, Germany, SmartLine 2 glass container inspection equipment can be configured in several different ways, with up to six inspection stations available. The Nienburg facility employs a team of experts and features a modern production layout. Importantly, the Centre is close to several German glass plants to undertake essential testing work and collaboration.

CAMERA CHECK INSPECTION BY RANGER 2

Equipped with the best in market camera based check inspection system Ranger 2, customers all over the world have confirmed the SmartLine 2 robustness and reliability.

Proved in multiple cases, Heye's Ranger 2 detect a wide range of checks in the finish, shoulder and bottom area.

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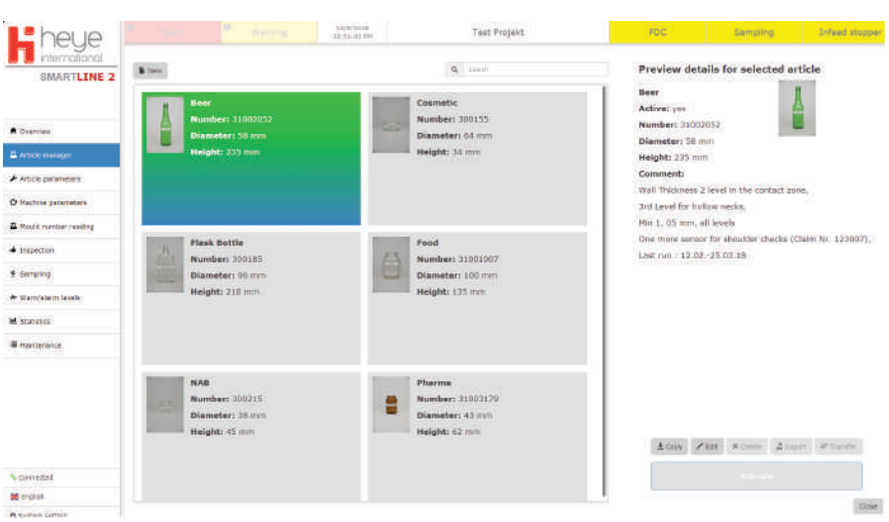
HOW RANGER 2 WORKS:

Every container produced must be considered as a unique object with an individual shape and reflections resulting from this and every concept of a crack test must consider this. Therefore, the Ranger 2 uses the concept of "**Intelligent Cloud Masking**", which makes any kind of "teaching" superfluous after a job change.

Assuming that each container is unique, the Ranger 2 inspects each container for itself and sets one mask for each single container. Therefore, each container is its own reference and has no negative influence on the following ones. So the zones are subject inspection of high dynamics and can immediately adapt to changes that occur during production.

NON ROUND – OUR CORE COMPETENCE

Container shapes, which differ from



the standard *round* container, are one of the most common tasks in the glass container inspection industry. Heye masters this "non-rounds" with excellence.

The range of inspectable container sizes and shapes is top of the class, inspection is possible with almost all imaginable shapes, no matter if they are angular, oval or round.

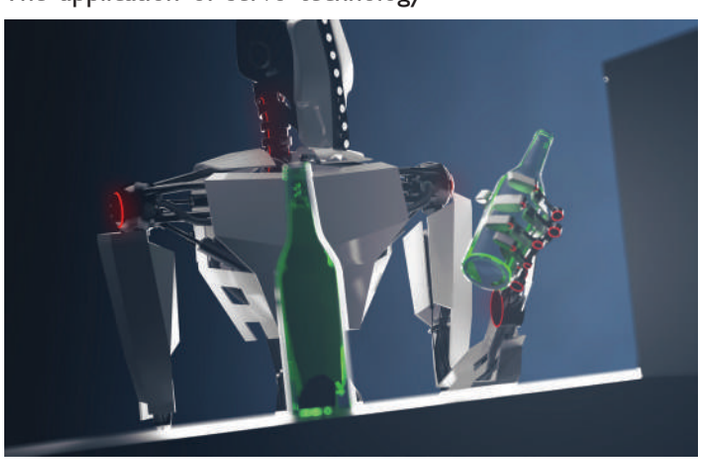
With this huge range of container sizes and forms, the SmartLine 2 offers a high degree of flexibility and is therefore as suitable for customers with a wide range of different products and many job changes as it is for the high-speed production of long runs.

IMPROVED JOB CHANGE TIMES

The application of servo technology results in a high degree of flexibility. Fast and easy changes to an item's indexing positions and optimal use of the servo torque for up to four rotation stations are possible. Optimised motion sequences allow faster reactions to changing process parameters. The equipment's innovative design and its large and easy-to-open hood provide more working space between the inspection stations. Job changes become much easier.

The maximum article height accommodated is up to 400mm, with angular, oval and round containers processed. Thanks to the servo-driven starwheel, indexing positions from six to 48 are possible.

STATE-OF-THE-ART USER INTERFACE



The sophisticated design of the graphical user interface of SmartLine 2 has been conceptualised due to an easy and fast handling in the plant for a perfect operation. Orientation for the development approached comes from our customers. The two-click-management, whereby the vast majority of functions can be accessed via a single submenu, is only one of many advantages next to smart configuration and a great overview over all statistics an operator needs for easy-to-use handling.

POSITIVE FEEDBACK

Feedback generated from Heye International customers has confirmed the SmartLine equipment's robustness and reliability. The German engineered design and drive system in particular are highlighted for their robust design, while the control system is praised for its reliable operation.

ABOUT HEYE INTERNATIONAL:

Based at Obernkirchen, GERMANY, Heye International GmbH is one of the international glass container industry's foremost suppliers of production technology, high performance equipment and production knowhow. Its mechanical engineering has set industry standards for more than six decades. Extensive industry expertise, combined with the positive attitude and enthusiasm of Heye International employees is mirrored by the company motto 'We are Glass People'. Its three sub-brands HiPERFORM, HiSHIELD and HiTRUST form the Heye Smart Plant portfolio, addressing the glass industry's hot end, cold end and service requirements respectively ■

Further information:
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Obernkirchen, GERMANY
TEL: +49 5724 26-0
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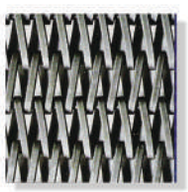

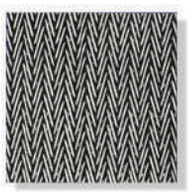

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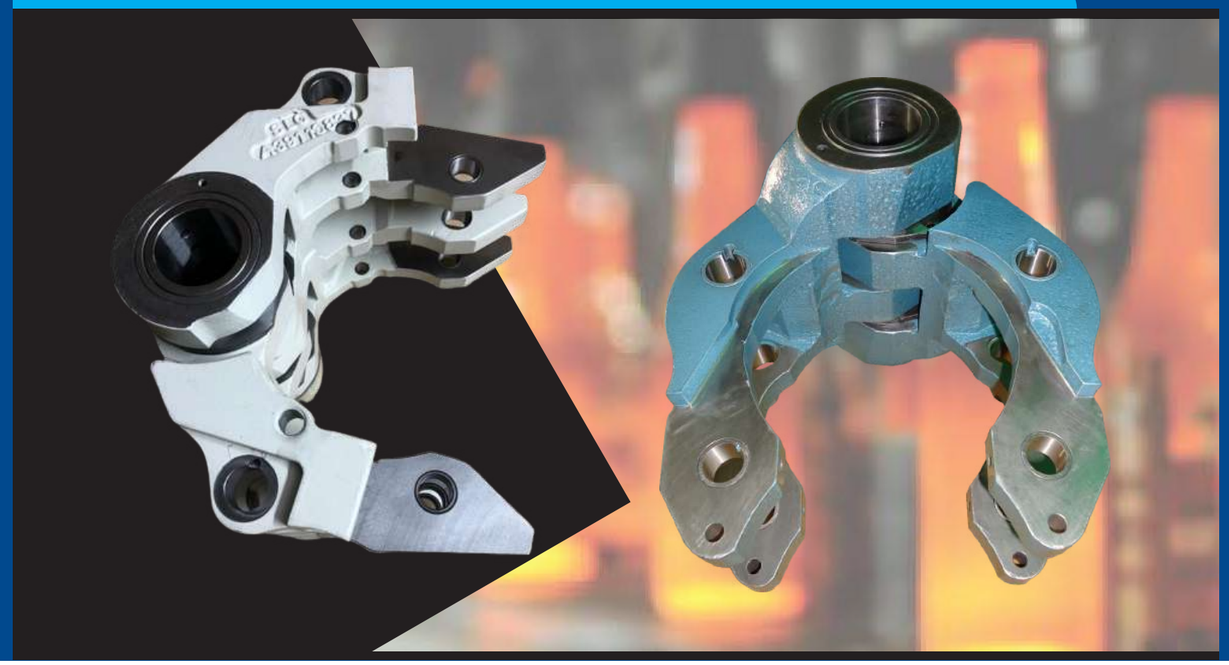

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