

Kañch

INTERNATIONAL YEAR OF
GLASS
2022

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Quarterly Journal of The **All India Glass Manufacturers' Federation**
Bi-lingual

Special Feature

- Glass News
- Rising Glass Industry Star Recognised
- Jewel in the Crown
- Glass for Diamond Processing: A tale of two Outstanding Materials
- Beauty in a Bottle
- Architectural Glass Testing in India & Architectural Glass Research and Testing (AGRT) facility at CSIR-CGCRI, Kolkata
- What will it take to Decarbonise the Glass Container Industry?
- Benefits of Structured Project Management

Upcoming Events

- Virtual Events (Sept 10, 2021)
 - Executive Committee and Annual General Meetings
 - 1st Photography Contest (Awards ceremony)
 - 4th AIGMF Glass Awards
- Glasspex and Glasspro India at Mumbai (March 3-5, 2022)
- 14th International Conference of the AIGMF at Mumbai (March 3, 2022)



The All India Glass Manufacturers' Federation
presents



1st PHOTOGRAPHY CONTEST

Theme: **GLASS IN OUR LIVES** / Age Group: **7-24 YEARS**

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Last Date of Submission: 31st July 2021
(International entries are welcome)

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Best entries will be published in:
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and at: www.aigmf.com

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TERMS & CONDITIONS:

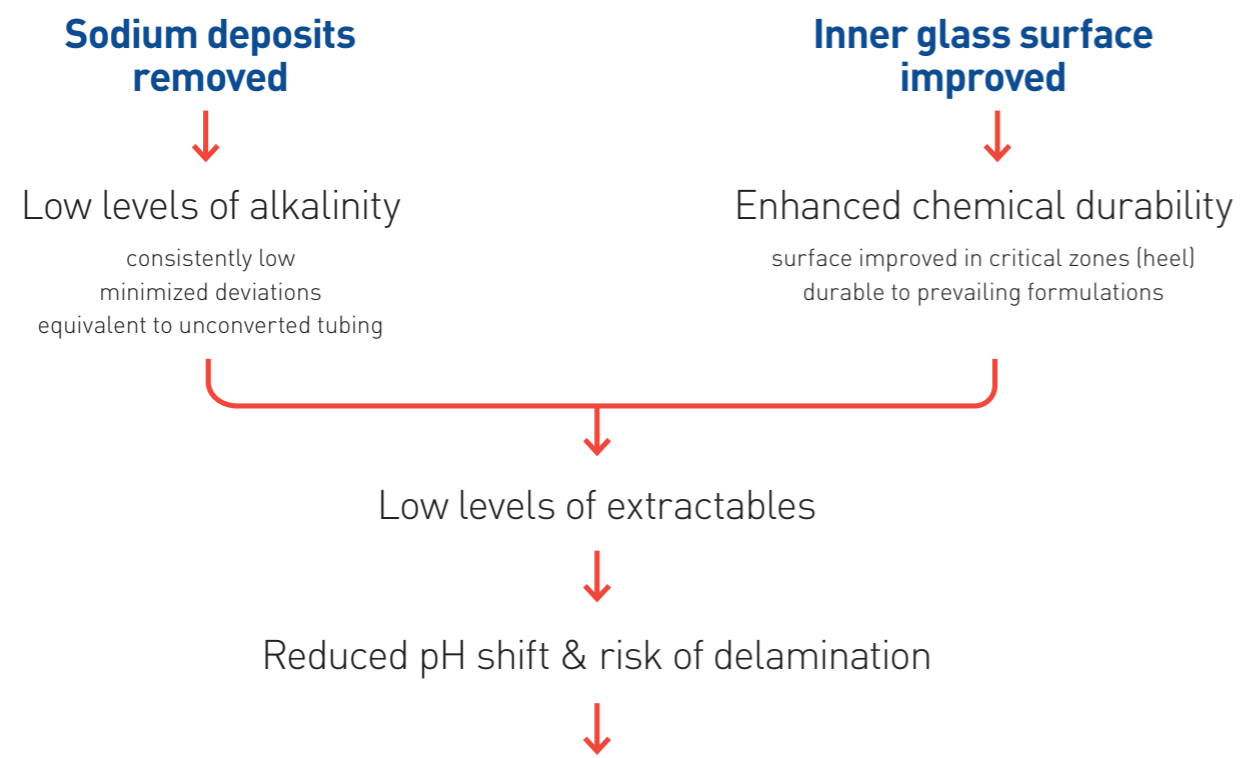
1. The entrant should be aged between 7-24 years
2. Only one entry per applicant in high resolution needs to be submitted with self-declaration about the ownership of the photograph
3. All entries need to be mailed at info@aigmf.com with any Photo ID issued by Govt. (as Address and Date of Birth proof) or Passport or School/College ID, alongside email ID and contact number
4. AIGMF has the rights to use the submitted entry for its social media channels, events, newsletters, publications i.e., Kañch and Glass Worldwide, reports, etc.
5. Any false information provided within the context of the contest by an entrant, concerning identity, address, telephone number, email address, ownership of photograph or non-compliance with these rules, will result in the immediate elimination of the entrant from this contest
6. The last date to submit the entries is 31st July 2021 (Date is subject to change)
7. There is no entry fee for this contest



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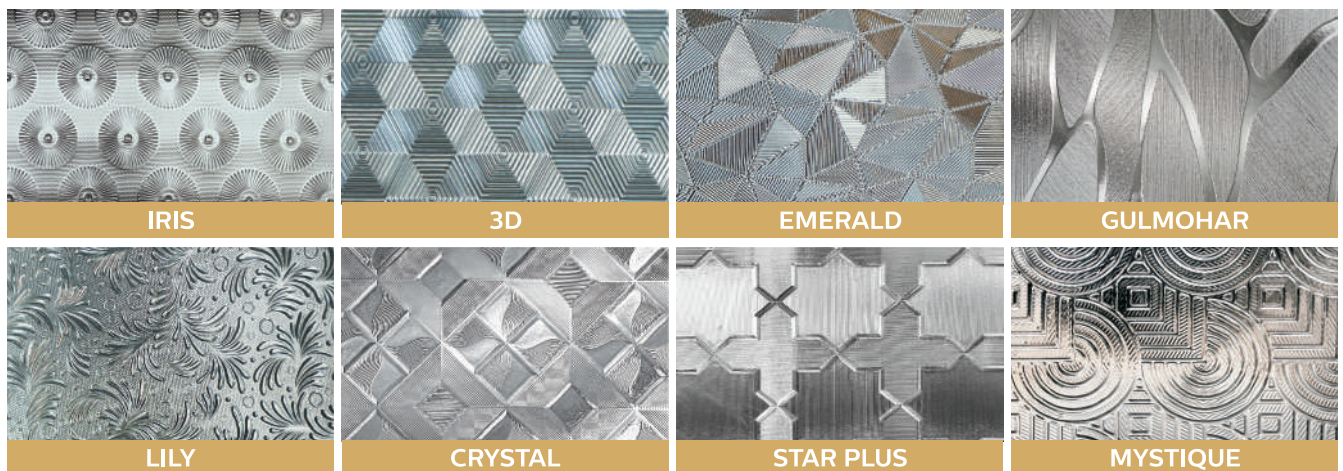
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Kañch

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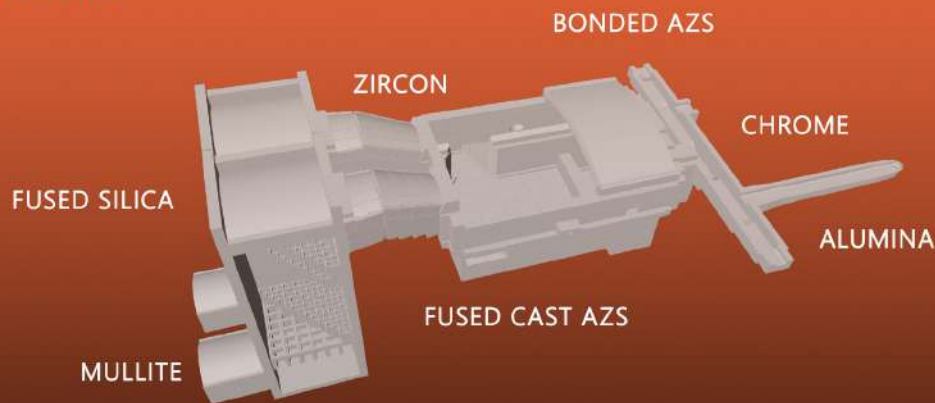
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From President's Desk

I would sincerely like to thank the Ministry of Home Affairs (MHA) and Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry who exempted the Ampoules and Vials segment from limitations on using liquid oxygen as India reeled under the deadly second wave of COVID-19 in the month of April. This certainly helped Glass Industry to continue seamless manufacturing of Vials meant for Covid-19 and other lifesaving drugs.



We are also thankful to the Ministry of Road, Transport and Highways (MoRTH) who provided relief after vide Gazette Notification GSR 435(E) dated 18th June 2021 covering motor vehicles of category N2 or N3 engaged to carry indivisible loads. This will help Flat/Sheet Glass segment to carry the material up to the height of 4.75 meters enabling Glass Industry to continue supplying unhinderedly for the Construction and Infrastructure industry and thereby supplementing Smart/Solar Cities vision of the Govt.

In May 2021, the General Assembly of the UNITED NATIONS approved the Year 2022 as International Year of Glass (IYOG22). Many Glass related activities are planned worldwide; as a kickstart to these events and a partner organisation in INDIA, AIGMF announced its 1st Photography Contest for the age group between 7-24 years on the theme: GLASS IN OUR LIVES. Entries are invited online at info@aimf.com by July 31, with results to be announced on the International Youth Day on August 12, 2021. International entries are welcome.

In the virtual Executive Committee meeting held on June 25, AIGMF announced accepting of applications for the 4th C K Somany Award for Innovation & Technology and Balkrishna Gupta Award for Exports. The Awards will be given on Sept 10th at the virtual AGM of the AIGMF.

New AIGMF Members; Schott Kaisha Pvt. Ltd. (*manufacturers of Tubular glass Vials, Ampoules, Prefillable Syringes & Cartridges*), Kapoor Glass India Pvt. Ltd. (*manufacturers of Ampoules, Vials, Cartridges & Laboratory Glass - Test Tubes*), Glassco Laboratory Equipments Pvt. Ltd. (*manufacturers of Laboratory Glassware, Vials, Tubes and Disposable Glassware*) and Monotech Systems Ltd. (*manufacturers of Pixeljet Roll to Roll Digital UV Printers for decorative glass door wrapping, Pixeljet Flatbed Digital UV Printers for direct printing on Flat Glass*) were formally welcomed at the Executive Committee Meeting.

Also, in recognition of decades of cooperation, Glass Worldwide was enrolled as an Honorary Member of the AIGMF. Glass Worldwide therefore becomes the first overseas company to become an Honorary AIGMF Member in addition to the existing other Honorary Members in India, namely CGCRI, CDGI and BHU.

The next virtual meeting would be held on Sept 10. All Members are requested to participate ■

(Bharat Somany)

President AIGMF

and Vice - President, HNG & Inds. Ltd.

July - September 2021 - Issue

will carry detailed coverage of the 1st Photography Contest on 'Glass in our Lives', 4th AIGMF Awards, Executive Committee & Annual General Meetings, Technical Articles, Glass News, other supported Events and more.

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GLASS

News



UNITED NATIONS APPROVES 2022 AS THE INTERNATIONAL YEAR OF GLASS

The International Commission on Glass (ICG), the Community of Glass Associations (CGA) and ICOM-Glass are promoting 2022 as a United Nations International Year of Glass to underline its scientific, economic and cultural roles and celebrate several anniversaries. Glass supports many vital technologies, facilitates sustainability and a green world and enriches our lives, yet often goes unnoticed.

The UN application was made with the support of ICG (International Commission on Glass, CGA (the Community of Glass Associations) and ICOM (International Committee for Museums and Collections of Glass). ICG President Prof. Alicia Duran acted as the prime driving force. The Spanish Ambassador at the UN provided important assistance. A total of 1580 endorsement letters from 80 different countries were received and the number of endorsement letters grew to 1600 up to the meeting date with more and more people joining to support. The IYOG2022 resolution was co-sponsored by 19 countries at the UN, creating a record for UN Year application.

The formal resolution was agreed at the United Nations General Assembly on May 18, 2021.

For planning the activities and to promote Glass, a Steering Committee under the banner of the International



1st IYOG2022 International Steering Committee Meeting underway

Commission on Glass comprises of Glass Associations worldwide, Glass Technologists, Academicians as well as prominent glass magazines. The 1st IYOG2022 International Council's virtual meeting was held on June 16 which was attended by around 40 Members. The meeting focussed on planning the Glass related activities worldwide.

As a kickstart to these events and a partner organisation in India, AIMGF announced 1st Photography Contest for the age group between 7-24 years on the theme: GLASS IN OUR LIVES. Details of the contest are available at www.aimf.com

Entries are invited online at info@aimf.com by July 31, with results to be announced on the International Youth Day on August 12, 2021.

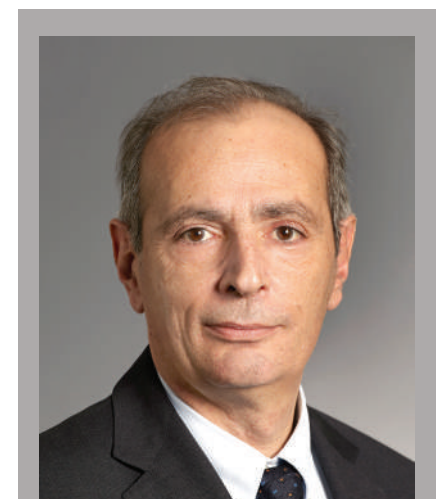
From India, Members for the Steering Committee comprises of Mr. Sitendu Mandal, Chief Scientist CSIR-CGCRI, Head Specialty Glass Division; Dr. Atiar Rahman Molla,

Pr. Scientist, Specialty Glass Division, CSIR-CGCRI. and Mr. Vinit Kapur, Secretary AIMGF.

The documents, brochure and video of IYOG2022 could be found at the official website: www.iyog2022.org

NEW LEADERSHIP TEAM ELECTED AT FEVE

FEVE – the European Container Glass Federation has elected its executive team for the 2021-23 term of office at its Annual General Assembly held on June 18.



Mr. Vitaliano Torno, O-I Glass President Business Operations & O-I Europe – one of Europe’s leading glass packaging manufacturers for the food and beverage sector - has been elected President of the EU container glass federation.

Commenting on his appointment, Mr. Torno said: *“I look forward to working closely with FEVE members, staff, and the national associations to further strengthen our Circular Economy industry’s business model which is already a leading example”*.

He added: *“We have the privilege to work with a material that has unique inherent sustainability benefits: it is endlessly recyclable and ensures quality and safety no matter how many times it is recycled. Glass is virtually inert and preserves the taste of the foods and beverages it protects. It adds prestige and the premium look and feel that supports our customers in nurturing their brands. And we are working towards glass as a climate neutral and fully circular packaging.”*

Mr. Torno succeeds Mr. Michel Giannuzzi, CEO of Verallia, who led the association for the previous two years. *“Michel Giannuzzi led the federation not only through this pandemic crisis but also set us on course to tackle some of our biggest challenges”*, commented Mr. Torno.

The FEVE members also elected Mr. Martin Petersson, CEO Ardagh Glass Packaging - Europe, as Vice-President. Mr. Petersson commented: *“This is an exciting time for the glass industry as we undertake one of the most important transitions to secure our future: the path to decarbonising glass packaging. I am looking forward to supporting Vitaliano and the sector over the next two years in the drive to address climate change and the sustainability agenda.”*

GOLD PLUS GLASS INDUSTRY PLANS CAPACITY EXPANSION OF 700,000 METRIC TONNES

Gold Plus Glass Industry Limited, India’s second largest float glass manufacturer and a dominant player in the architectural glass segment have firmed up its plans to undertake a large float glass capacity expansion. The company has confirmed plan to put two float glass lines and one solar glass line with combined installed capacity of approx. 700,000 metric tonnes annually.

Gold Plus is the only Indian owned float glass manufacturer and presently has two float lines in Roorkee, Uttarakhand with installed capacity of approx. 460,000 metric tonnes annually. Its facility at Roorkee is spread across 100 acres and produces almost entire bouquet of float glass (clear, tinted, solar control reflective, frosted glass, mirror, etc.).

The Company also has a processing unit to cater to high value glasses such as toughened, laminated, insulating, ceramic printed, acoustic, bulletproof, and automotive. The company competes with MNCs like Saint Gobain, Asahi, Sisecam and Gujarat Guardian.

The total project outlay is said to be in tune of INR 2,200 - 2,300 crores, and the company is already in discussion with Government authorities for land allotment and capital/revenue subsidies. The company is likely to finalize the state and the land parcel soon, moreover company is targeting revenue of over INR 3,000 crores with this capacity expansion.

Mr. Jimmy Tyagi, Whole time Director said, *“The management of the company takes pride in being the only Indian owned/ controlled float glass*

manufacturer and has laid out a clear plan to further entrench its position in the industry. The company has been eyeing capacity expansion for last couple of years and have finally decided to move forward, considering the overall positive business environment and government policies supporting the domestic glass industry.” He also indicated that the company plans to list its shares on stock exchange in the future.

The expansion is expected to be funded through a mix of internal accruals, equity raise and debt. The company is already backed by Premji Invest, which invested INR 400 crores in 2018.

The company is also setting up a solar glass manufacturing line as part of its planned expansion. Solar glass is used in photovoltaic (PV) panels used to generate electricity. Currently, only 30% of solar glass requirement is produced in India, and with an expansive solar energy target laid out by the Government, this move by Gold Plus should be welcomed by PV panel manufacturers which are also in the process of expanding their own capacities. Solar energy is on Government’s top agenda and recently the cabinet approved production linked incentives for PV panel manufacturing to promote domestic manufacturing of panels. Currently, Borosil Renewables Ltd. is the only solar glass manufacturer in the country.

Glass is one of the most versatile man-made materials and carries widespread application. The float glass consumption in India has been grown rapidly over the years driven by growth and expanded use in architectural, industrial and automotive sectors. India’s per capita

glass consumption is only about 2.7 kg as compared to an average of 20-25 kg in other developing economies clearly indicating a tremendous potential for growth.

Based on industry estimates, domestic manufacturers are only able to meet approx. 70% of float glass demand and the balance is met through imports. Recently, as part of the Government's efforts to curb cheap imports and promote domestic manufacturing, quality certification (under Quality Control Order or QCO) has been mandated for imported glass and Anti-Dumping Duty has been levied. This, along with rebound in commercial activity in the country has given a much-needed impetus to players like Gold Plus to go for the capacity expansion.

INDIA'S LARGEST VIAL MAKER EXPECTS SALES TO TRIPLE ON COVID-19 VACCINE RAMP UP

Indian drug vial maker Schott Kaisha is expecting annual vial sales for COVID-19 shots to more than triple as vaccine production, including by one of its top customers Serum Institute, increases in response to a monster second wave of infections.

"An Indo-German joint venture between specialty glass makers Schott AG and Kaisha, the company expects to sell 380 million vials for COVID-19 vaccines in 2021-22, up from 113 million a year earlier. The demand from our major customers has gone up two-fold, and is indicated to go up three-fold in the near future," said Mr. Rishad Dadachanji.

Serum Institute of India, which makes AstraZeneca's COVID-19 shot, is planning to produce 100 million doses a month from July, up from 70 million earlier. A single vial can typically store several vaccine doses.

A major vaccine hub, India has been running short of COVID-19 shots for its own people just when the pandemic has killed over 4,00,000 people.

Schott Kaisha is also in talks with Indian manufacturers of Russia's Sputnik V vaccine to supply millions of vials, but is yet to receive bulk orders, Mr. Dadachanji said. "We have received enquiries. The quantities are still in discussion."

The company, which is India's largest maker of tubular borosilicate glass vials used to store drugs and vaccines

by volume, is supplying vials for 14 COVID-19 vaccine candidates either in development or full production.

It plans to increase its annual production capacity for the vials to 1.7 billion by year-end from 1.2 billion last year. The company by its own estimate has a 60-65% market share.

BOROSIL TAKES RESPONSIBILITY FOR EDUCATION OF CHILDREN OF DECEASED EMPLOYEES

Borosil Group which is known for Consumer Products, Laboratory glassware and Pharmaceutical packaging (under Borosil Ltd.), and Solar glass (under Borosil Renewables Ltd.) has announced that in the event of an employee's unfortunate demise due to COVID-19, his or her family will continue to receive salary for the next two years.

Family members will also be eligible to receive other additional benefits the employee is entitled to. More importantly children's education till graduation will completely be covered by the firm.

The firm, which has lost 4 of their employees due to this pandemic, says it will do everything to keep employees and their families future safe and secure during these times.

Mr. Shreevar Kheruka, Managing Director, Borosil said *"In such unprecedented situation, we have to come together and help each other. I am deeply saddened by the demise of 4 of our employees due to this dreadful Pandemic. We, as an organisation will give the entire salary of 2 years to the family of the deceased. Also, we take full responsibility of the education of their children till their graduation. This trying situation will bring us together*



and I hope we will collectively emerge into a better tomorrow”.

Borosil and Borosil Renewables are also conducting medical counselling sessions with senior doctors, aiding employees to get help in medication and hospitalisation if required.

ACCURAMECH'S INITIATIVE ON WORLD ENVIRONMENT DAY

On 5th June, better known as the World Environment Day, an AIGMF Member company- Accuramech Industrial Engineering Pvt Ltd., arranged a COVID vaccination drive. The campaign was extended to the family members, sub-suppliers of Accuramech, and the surrounding industrial community.

The drive was in collaboration with Sanjeevan Hospital, Pune. They came to Accuramech premises to vaccinate 200 people on that day. Plants and seedlings were handed to everyone who were vaccinated.



GHCL OFFERING SPECIAL ASSISTANCE TO EMPLOYEES AFFECTED BY COVID-19

As India fights off its second pandemic wave, an AIGMF Member company- GHCL Limited has been providing support to employees and their families.

The industrial conglomerate, which includes a sizable home textiles

manufacturing operation, is ensuring vaccination of all eligible employees, their families and business partners. It has also invested in supporting employees, customers, vendors and communities during the Pandemic through enhancing safety measures, providing healthcare assistance as well as food, financial and livelihood support.

As part of that, the families of the deceased employees will continue to receive financial assistance equivalent to the last drawn salary of the employee for a period of two years from the date of death.

“The COVID-19 pandemic has brought emotional and financial challenges for all sections of society. As a company, we want to assist the families of our employees to pick up the threads and face the future in spite of the irreparable loss suffered by them,” GHCL said in a statement. *“We understand that no amount of help can compensate the loss of a precious loved one, but through this policy we would like to offer our*

support because we value and care for our employees, who are the pillars of GHCL.”

In addition to home textiles, GCHL manufactures edible salt and industrial grade salt under its consumer products division and produces soda ash for the detergents, **Glass** and ceramics sectors under its chemical division. It employs more than 4,000 people.

RETIREMENT OF DIRK PÖRTNER, MANAGING DIRECTOR OF HEYE INTERNATIONAL



As a progressive company, Heye International is always looking ahead and not backwards. However, special events give us an opportunity to look back on mutual successes with joy, pride and gratitude. The retirement of Heye International's Managing Director, Mr. Dirk Pörtner, on May 31, 2021 was such a special event. After more than 40 years in the glass industry and 13 years of management activity at Heye International, one era has come to an end and new era has begun.

The long-standing Managing Director was given a small, but well-deserved retirement event due to the Covid-19 Pandemic. Mr. Henrik Bonn , COO Ardagh Glass Europe, stated *“I would like to thank Dirk Pörtner for his outstanding work and success, not only at Heye International, but also in the Ardagh Group. In particular, his knowledge and experience in the glass industry and his charismatic personality will be remembered by employees, colleagues and customers. He made a significant contribution to the positive development and growth of Heye International. All in the Ardagh Glass family wish him all the best in this new phase of his life, and that he continues*

to enjoy good health and activities according to his desire. I am sure that our paths will cross in the future and I look forward to it.”

“I look back with great gratitude and a certain pride on what we, as the Heye team, have created in recent years,” said Mr. Pörtner. “Together we faced many challenges and celebrated many successes. I am proud of all that we accomplished together, and I am especially proud of all of my colleagues at Heye International.”

Mr. Achim Prange (CTO) and Mr. Jens Langer (CCO) will take over the tasks of Mr. Pörtner in addition to their previous fields of activity. Mr. Langer has been with the company for six years and is now responsible for sales, product management, marketing, service, IT, human resources and finance. Mr. Prange has been working in various management positions at Heye for over 20 years and will be responsible for the areas of development, production, logistics, purchasing, quality, application engineering and project management in the future.

“The continuation of the good relationships with our customers and suppliers remain the primary focus of our business. Heye International will continue to play an important role in the development of new technologies for the glass container industry and in the expansion of the global range of our services,” said Mr. Prange and Mr. Langer.

SOLAR GLASS MAKER BOROSIL RENEWABLES BAGS NATIONAL AWARD

The Government of India has recognized the manufacturer for the development and commercialization of 2 mm thick fully-tempered solar glass, Selene anti-glare solar glass, and Shakti solar glass in matt-matt finish.

Borosil Renewables Limited has bagged an award from the Indian



Government for the successful development and commercialization of indigenous solar glass technologies.

The award was conferred by the Department of Science and Technology’s Technology Development Board.

Borosil Renewables Limited has developed a state-of-the-art manufacturing technology to produce a variety of solar glasses including the 2 mm thick fully-tempered solar glass (which is being used in high-powered glass-glass bifacial modules), Selene anti-glare solar glass for solar installations near airports, Shakti solar glass in the matt-matt finish and world’s 1st Antimony-free solar glass.

The company has a manufacturing facility in Bharuch of Gujarat and supplies its 2.0 mm and 2.5 mm fully tempered solar glass to the European markets.

With rising sales, the company is expanding its capacity from 450 tons



per day to 1000 tons per day by adding a third solar glass line of 550 tons per day along with processing facilities. The expansion is expected to cost about INR 600 crores.

GLASS WORLDWIDE MADE HONORARY MEMBER OF AIGMF

In recognition of decades of cooperation, Glass Worldwide was enrolled as an Honorary Member of The All India Glass Manufacturers’ Federation (AIGMF) at the virtual Executive Committee meeting held on June 25.

Glass Worldwide therefore becomes the first overseas company to become an Honorary AIGMF Member in addition to the existing other Honorary Members in India, namely CGCRI, CDGI and BHU.

Glass Worldwide already acts as preferred international journal of the AIGMF in association with Kanch and the two organisations will intensify cooperation in media and event management.

Mr. Bharat Somany, President AIGMF commented: “Glass Worldwide are our partners in progress and we consider them very much a part of us. It is always an absolute pleasure to work with them and find ways forward for the industry together”.

“Glass Worldwide is honoured to officially join the AIGMF and cement our longstanding cooperation for mutual benefit. We look forward to continuing the excellent partnership and assisting the Indian sub-continent with the best possible forum for the exchange of information, as well as keeping our global readership abreast of the latest developments from the Indian market” added Mr. Dave Fordham, Glass Worldwide Publisher.

The AIGMF website also hosts a library of over 60 articles originally published in Glass Worldwide that focus on the Indian sector: <https://aigmf.com/glass-worldwide.php>

WELCOMING PAWAN SHUKLA AT AIGMF SECRETARIAT

Mr. Pawan Kumar Shukla (right), Managing Director, Schott Glass India Pvt. Ltd., was welcomed by Secretary Vinit Kapur on his maiden visit to the AIGMF Secretariat in New Delhi on July 2. Mr. Shukla was in Delhi for discussions with Govt., and stakeholders on Schott's action plan to tackle the present Pandemic situation as well as their expansion plans for tubular vials not just for India but also for the International markets.

Discussions with AIGMF were held on the activities that may be possible for Schott to lend support in CSR and other events related to

the International Year of Glass to be celebrated in 2022.

Secretary AIGMF appreciated the role of Schott and other vial manufacturers for their relentless efforts of providing vials for Covid-19 and other life saving drugs.

TURKEY'S ŞİŞECAM TO INVEST \$310M IN GLASS FACTORY IN HUNGARY

In a bid to further boost its global expansion targets, Turkish glass manufacturer Şişecam is establishing a glass packaging factory in Hungary with an investment of 255 million euros (\$310 million).

The facility with two furnaces will have an annual net production capacity of 330,000 tons, according to a statement sent to Turkey's Public Disclosure Platform (KAP).

The first furnace will start operating in 2023, and the facility will reach full capacity by 2025.

Chairperson Dr. Ahmet Kirman said, “Europe offers great opportunities for rapid development of the glass manufacturing industry and their company.”

“The investment will meet the increasing glass packaging demand in Hungary and (other countries) in Europe,” he said.

He added that Şişecam has 10 production facilities in four countries, with an annual production capacity of 2.6 million tons.

Hungarian Minister of Foreign Affairs and Foreign Trade Peter Szijjarto and Turkish Ambassador to Budapest Ahmet Akif Oktay attended a ceremony held for

the opening of the Şişecam factory at Budapest, Hungary on June 7, 2021.

Dr. Kirman said Şişecam continued its investments despite the coronavirus pandemic, and the company's flat glass production capacity in Turkey surpassed 2 million tons.

“We plan to boost flat glass production capacity in Turkey by 25% to over 2.5 million tons by the end of 2024,” he added.

Founded in 1935, Şişecam operates in the areas of flat glass, glassware, glass packaging and chemicals, with nearly 22,000 employees in 43 plants across 14 countries. It sells its products in over 150 countries.



SUPERMARKETS BRINGING BACK GLASS MILK BOTTLES

Morrisons is trialling the return of glass bottles, which cost 90p and hold one pint of milk in seven UK stores. Supermarket shoppers can once again pick up glass bottles as part of plans to reduce CO₂ emissions.

Morrisons is the first grocer to make the change, with customers able to bring back the empty bottles on their next visit. The supermarket then collects and sanitises the containers so they can be reused — and says they can last for ten years.



Reactions from shoppers have been mixed on social media - with some praising the move, and others annoyed about the price.

One said: "Got to say, Morrisons just keeps getting better. First paper bags for veg, now glass bottles for milk, and today they were playing Blue Monday by New Order in store. Putting the others to shame."

Another tweeted: "Morrisons in the UK are bringing back glass milk bottles to reduce plastic waste. Great idea."

Morrisons says it has committed to a 50% reduction across its own-brand primary plastic packaging by 2025. Reusing glass milk bottles is an easy leap for many people to make because they remember that this was how milk used to arrive on the doorstep.

A PANORAMIC VIEW OF THE WESTERN GHATS

Now passengers of Mumbai-Pune Deccan Express can enjoy unhindered views of river, valley, and waterfalls.

On June 26, in a first, Indian Railways

restored the services of Mumbai-Pune Deccan Express with a Vistadome coach.

According to Railway Minister Piyush Goyal, on the Mumbai-Pune rail route during the monsoon season, besides the world-class facilities provided inside the train, passengers are fascinated by the natural beauty of the roads as the transparent roof and large windows of the Vistadome coach allow

them to enjoy nature to the fullest.

Wide window panes & glass rooftops of the first ever Vistadome Coach in Pune-Mumbai Deccan Express provide passengers with a unhindered, unique and unforgettable travel experience.

The Vistadome coach has big glass windows. Glass roof provides an unhindered view of the sky.

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



सेंट गोबेन राजस्थान में बढ़ाएगा निवेश

राजस्थान निवेश के लिए सर्वाधिक अनुकूल राज्य के रूप में उभर रहा है। सरकार के नीतिगत फैसलों के साथ-साथ कानून-व्यवस्था की बेहतर स्थिति, अच्छी सड़कें, ऊर्जा में आत्मनिर्भरता, पर्याप्त मात्रा में कच्चे माल की उपलब्धता, सुदृढ़ आधारभूत ढांचे के कारण दुनिया की नामी कंपनियां राजस्थान में निवेश के लिए रूचि दिखा रही हैं।

मई में मुख्यमंत्री अशोक गहलोत से हुई वीडियो कॉन्फ्रेंस के माध्यम से विश्व की प्रमुख ग्लास निर्माता कंपनी सेंट गोबेन के प्रदेश में निवेश के विस्तार के संबंध में बैठक हुई। मुख्यमंत्री ने कहा कि सेंट गोबेन जैसी प्रतिष्ठित कंपनी द्वारा राजस्थान में भिवाड़ी स्थित प्लांट में अभी तक करीब 1200 करोड़ रूपए के सफल निवेश के बाद

निवेश में विस्तार का प्रस्ताव देना यह सिद्ध करता है कि राजस्थान के प्रति अंतर्राष्ट्रीय कंपनियों में भरोसा कायम हुआ है। उन्होंने कहा कि उद्योगों के लिए एमएसएमई एक्ट, रिफ्स-2019, नई उद्योग नीति, वन स्टॉप शॉप सिस्टम जैसे नीतिगत फैसले लिए गए हैं।

मुख्यमंत्री ने निवेश में विस्तार के सेंट गोबेन के निर्णय का स्वागत करते हुए उन्हें विश्वास दिलाया है कि राज्य सरकार की ओर से उन्हें पूरा सहयोग मिलेगा।

उद्योग मंत्री श्री परसादी लाल मीणा ने कहा कि राज्य सरकार ने प्रदेश में औद्योगिक इकाइयों की स्थापना को सुगम बनाने के लिए नियमों एवं प्रक्रियाओं का सरलीकरण किया है। बड़े उद्योगों की स्थापना के प्रस्तावों को

तुरंत मंजूरी देने के लिए बोर्ड ऑफ इन्वेस्टमेंट का गठन किया गया है। बोर्ड की पहली ही बैठक में 78 हजार करोड़ रूपए के निवेश प्रस्तावों को मंजूरी दी गई है।

उद्योग राज्यमंत्री श्री अर्जुन बामनिया ने कहा कि राज्य में सेरेमिक उद्योगों की स्थापना के लिए प्रचुर मात्रा में खनिज संसाधन उपलब्ध हैं। इसका लाभ सेंट गोबेन को मिलेगा।

मुख्य सचिव श्री निरंजन आर्य ने कहा कि कोरोना के इस समय में सेंट गोबेन सहित प्रदेश के अन्य उद्योगों से कॉर्पोरेट सामाजिक उत्तरदायित्व के रूप में राज्य सरकार को अच्छा सहयोग मिल रहा है।

रीको के अध्यक्ष श्री कुलदीप रांका ने कहा कि सेंट गोबेन ग्लास निर्माण के क्षेत्र में विश्व की

प्रमुख कंपनी है। एक दशक के समय में ही निवेश के विस्तार के लिए इतनी बड़ी कंपनी का आगे आना प्रदेश के लिए सुखद है।

सेंट गोबेन इंडिया के सीईओ श्री बी संधानम ने कहा कि राजस्थान में बीते करीब 11 वर्षों का उनका अनुभव शानदार रहा है। इसी का परिणाम है कि कंपनी ने इतने कम समय में ही भिवाड़ी को करीब 1100 करोड़ रूपए के निवेश विस्तार के लिए चुना है। उन्होंने बताया कि श्री गहलोत ने

अपने पिछले कार्यकाल के समय वर्ष 2010 में भिवाड़ी प्लांट का शिलान्यास किया था। राज्य में इन्वेस्टर फ्रेंडली माहौल का ही नतीजा है कि विश्व स्तरीय कॉन्क्लेव में भिवाड़ी प्लांट को हमारा औद्योगिक समूह सफल मॉडल के रूप में प्रदर्शित करता है। इससे अंतर्राष्ट्रीय उद्यमियों के बीच राजस्थान के लिए सकारात्मक संदेश जाता है। उन्होंने मुख्यमंत्री श्री अशोक गहलोत के नेतृत्व में राजस्थान में कोविड-19 के सफल प्रबंधन

की खुलकर तारीफ की।

रीको के एमडी एवं उद्योग सचिव श्री आशुतोष एटी पेडनेकर ने बताया कि सेंट गोबेन का भिवाड़ी प्लांट कंपनी का विश्व स्तरीय प्लांट है। इस अवसर पर प्रमुख शासन सचिव, वित्त, श्री अखिल अरोरा, आयुक्त उद्योग एवं निवेश संवर्धन ब्यूरो श्रीमती अर्चना सिंह, सेंट गोबेन के ग्लास बिजनेस के एमडी श्री ए. आर. उन्नीकृष्णन सहित अन्य वरिष्ठ अधिकारी उपस्थित थे।

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सूर्या रोशनी पहुंचे कोविड प्रभारी मंत्री, ऑक्सीजन के लिए दंडवत प्रणाम कर जताया आभार

ग्वालियर के अस्पतालों में अचानक आई ऑक्सीजन की किल्लत के बाद ऑक्सीजन की आपूर्ति के लिए कोविड प्रभारी प्रद्युमन सिंह तोमर और कलेक्टर कौशलेन्द्र विक्रम सिंह ने दिन रात एक कर दिया। लेकिन सभी अस्पतालों की ऑक्सीजन सप्लाई सामान्य नहीं हो पाई। इसी बीच मालनपुर स्थित सूर्या रोशनी लिमिटेड से प्रशासन ने बात की और भरोसा दिलाया कि वो अपने प्लांट से ऑक्सीजन सप्लाई उपलब्ध कराएगा। कोविड प्रभारी मंत्री प्रद्युमन सिंह तोमर सूर्या रोशनी पहुंचे और व्यवस्थाएं देखकर फैक्ट्री अफसरों को दंडवत प्रणाम किया।

ग्वालियर में ऑक्सीजन की कमी के हालात को नियंत्रित करने के लिए जिला प्रशासन के साथ साथ कोविड प्रभारी मंत्री प्रद्युमन सिंह तोमर भी जुटे हैं। कोविड प्रभारी एवं ऊर्जा मंत्री प्रद्युमन सिंह तोमर- ग्वालियर, चम्बल, अंचल के कोविड मरीजों के लिए ऑक्सीजन जुटाने हेतु मालनपुर स्थित सूर्या रोशनी लिमिटेड पहुंचकर ऑक्सीजन की व्यवस्थाओं को देखा।

कोविड प्रभारी मंत्री प्रद्युमन सिंह तोमर ने सूर्या रोशनी लिमिटेड में स्थित ऑक्सीजन रीफिलिंग प्लांट के अधिकारियों के साथ चर्चा की।

अधिकारियों द्वारा बताया गया कि सूर्या रोशनी ऑक्सीजन प्लांट में 24 घण्टे में लगभग 250 ऑक्सीजन सिलेण्डर रीफिल होंगे जिससे ग्वालियर, मुरैना, भिण्ड, श्योरपुर जिले में कोरोना मरीजों को प्राणवायु मिल सकेगी। कोविड प्रभारी मंत्री प्रद्युमन सिंह तोमर ने अपील की है कि संकट के दौर में मैं सभी संचालकों से अनुरोध करता हूँ कि अगर उनकी फैक्ट्री में ऑक्सीजन प्लांट है तो वह आगे आएँ और प्रशासन की मदद कर मरीजों के लिए ऑक्सीजन उपलब्ध कर मरीजों की जान बचाने के पुनीत कार्य में सहयोगी बनें।

ऑक्सीजन की किल्लत को देख उद्यमियों ने बांटे ऑक्सीजन कंसंट्रेटर

कोरोना काल में उद्योगपति लगातार आगे बढ़कर आये। मई के माह में फिरोजाबाद उद्यमियों ने मेडिकल कॉलेज पहुंच मरीजों के लिए ऑक्सीजन कंसंट्रेटर का वितरण किया। उनके इस कार्य की हर कोई सराहना करते नजर आया।

जिलाधिकारी चंद्रविजय सिंह के प्रयासों एवं नगर विधायक मनीष असीजा द्वारा उद्योगपतियों एवं समाजसेवियों ने कोरोना काल के दौरान ऑक्सीजन की कमी से निजात दिलाने तथा हर जरूरत की जगह पर ऑक्सीजन की उपलब्धता बनाए रखने के उद्देश्य से स्वशासी राजकीय चिकित्सालय

के आइसोलेशन वार्ड के प्रांगण में प्रमुख उद्योगपति एवं निर्यातक मुकेश बंसल टोनी ने 15 ऑक्सीजन कंसंट्रेटर सामाजिक उत्तरदायित्व के तहत जिला चिकित्सालय को प्रदान किए। नगर विधायक मनीष असीजा ने कहा कि कोरोना संकट के दौरान शहर के समाजसेवी एवं उद्योगपतियों का भी सहयोग मिल रहा है। इसके लिए जिला प्रशासन, मेडिकल कॉलेज आपस में समन्वय बनाकर बेहतर कार्य कर रहे हैं। जिलाधिकारी ने कहा कि जनपद में शहर के उद्योगपतियों का सहयोग पूर्व में भी मिलता रहा है। इनके द्वारा प्रदान किए गए

ऑक्सीजन कंसंट्रेटर बहु उपयोगी है। इनके द्वारा पांच लीटर प्रति मिनट की क्षमता से ऑक्सीजन का उत्पादन किया जाएगा। जिसे आपातकाल के दौरान मरीजों की ऑक्सीजन लेवल कम होने पर उन्हें तत्काल राहत प्रदान की जा सकेगी।

इस दौरान उद्योगपति राजेंद्र गुप्ता, गगन सचदेवा, विनीत जैन, सलभ बंसल, सरवर हुसैन, पुष्पेंद्र गोयल के अलावा प्राचार्य मेडिकल कॉलेज डा. संगीता अनेजा, आइसोलेशन वार्ड प्रभारी डॉ. आलोक सहित आदि मौजूद रहे।

4th AIGMF Glass Awards

Supported by:



In recognition of the tremendous contribution to Indian Glass Industry, The All India Glass Manufacturers' Federation (AIGMF) announces C K Somany Award for Innovation & Technology and Balkrishna Gupta Award for Exports.

C K Somany Award for Innovation and Technology will be given to an individual who has made significant contributions to the glass industry in the field or fields of manufacturing, product development, environmental factors, business performance/growth, research and development and/or science/technology.

Balkrishna Gupta Award for Exports will be given to an individual/firm by considering following factors: who have contributed towards identification or growth of new potential markets/volume of exports/reaching no. of countries or any other area showcasing valuable contribution in Glass Exports.

Winners

Year	CK Somany Award for Innovation and Technology	Balkrishna Gupta Award for Exports
2020	Dr. Mukul Chandra Paul, CSIR-CGCRI	M/s La Opala RG Ltd.
2019	Mr. B L Kheruka, Gujarat Borosil Ltd. (Now, Borosil Ltd.)	M/s Firozabad Glass Shell Industries
2018	Mr. S K Jhunjhunwala, La Opala RG Ltd.	M/s Piramal Glass Pvt. Ltd. (Now, PGP Glass Pvt. Ltd.)

Referral applications can also be submitted by Regional Associations: U.P. Glass Manufacturers' Syndicate (UPGMS)- Firozabad; South India Glass Manufacturers' Association (SIGMA)- Hyderabad; Western India Glass Manufacturers' Association (WIGMA)-Mumbai; Northern India Glass Manufacturers' Association (NIGMA)- Bahadurgarh, Haryana and Eastern India Glass Manufacturers' Association (EIGMA)- Kolkata, who may give recommendation for giving an award to a likely individual.

AIGMF may consult Banaras Hindu University (BHU-Ceramic Glass Division), CGCRI (Central Glass and Ceramic Research Institute), CCPS (Confederation of Construction Products and Services) and FOSG (Federation of Safety Glass), for identifying suitable candidates for the award.

4th Awards in these categories would be given during the Annual General Meeting on Sept 10, 2021.

The jury for the awards comprise of:

- Dr. K. Annapurna, Senior Principal Scientist, Glass Division, CSIR-Central Glass & Ceramic Research Institute (CSIR-CGCRI)
- Mr. Dave Fordham, Publisher, Glass Worldwide, London (UK)
- Mr. Sanjay Somany, Former President AIGMF and CMD HNG Industries Ltd.
- Mr. P K Kheruka, Former President AIGMF and Chairman Borosil Ltd.
- Mr. Vinit Kapur, Secretary AIGMF

Applications are invited at info@aimf.com from within India from all those connected with the glass industry who may submit a brief write-up/CV in support of their candidature latest by August 15, 2021 ■

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Erin Miller, Batch and Furnace Manager (left) with Lara Edison, Batch and Furnace Supervisor.

Rising glass industry star recognised

Winner of the 'Rising Star' award at the British Glass 2020 Glass Focus Awards, Erin Miller joined Encirc straight from university and is now Vidrala's Batch and Furnace Manager at the groups' Elton, Derrylin and Italian plants. She spoke exclusively to *Glass Worldwide* (preferred international journal of the AIGMF) about her experience of the glass industry and why she is keen to recruit others into the sector.

"Following university, I never expected to find myself in a role within the glass industry" confides Erin Miller. "After graduation, I was extremely interested in sustainability and so applied for the Cheshire Energy Hub (CEH) graduate scheme (a multi-engineering, science partnership between organisations in the region including Encirc, Urenco and Scottish Power Energy Networks). Encirc decided to hire me for their graduate scheme based on my education and experience."

As a Graduate Engineer for Encirc, Erin spent her first few months "familiarising myself with glass" before being allocated to work on a project researching biofuel in partnership with Glass Futures, the not-for profit company focused on creating a long-term future for the glass industry.

Glass Futures

"Once on the biofuels project at Encirc, I attended meetings with Glass Futures to better understand the organisation's ambitions for the industry" explains Ms Miller. "I, along with others from


the business, represented Encirc at these meetings and established a close working relationship with the Glass Futures team. As part of the CEH graduate scheme, in March 2020, I was preparing to leave Encirc for a year to complete six month placements in other industries. However, due to the Covid-19 crisis, these placements were postponed. As

a result, both Encirc and Glass Futures thought that it would be a great opportunity for my development to second me to Glass Futures so that I could act as the liaison between both companies."

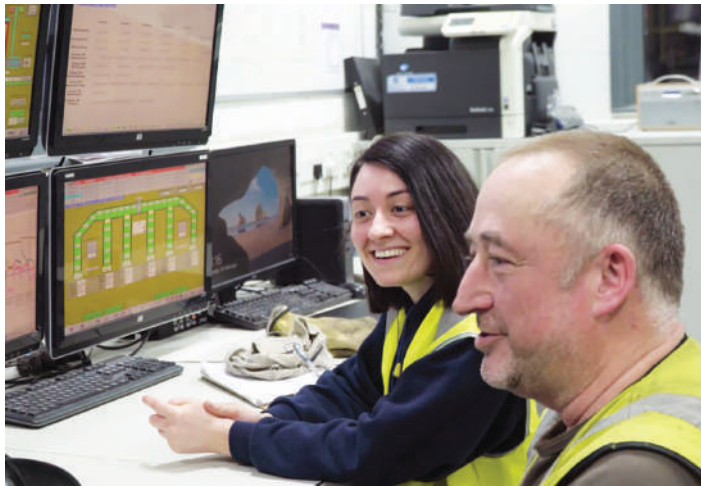
During her time at Glass Futures, Erin Miller was actively involved in the Industrial Fuel Switching project – a study into hydrogen research projects across the UK. Her contributions included gathering data on biofuels to inform Encirc's experimental programmes, producing a scoping document for an engineering study into how to convert a glass plant



Encirc has invested significantly into its state-of-the-art plant in Elton.

Originally published in Glass Worldwide, preferred international journal of 

glass
WORLDWIDE



Erin Miller is Batch and Furnace Manager at Vidrala's UK and Italian sites.

from natural gas to hydrogen fuel and leading an exercise to produce a specification for a multi-fuel pot furnace capable of melting up to 100kg of glass.

Conscious of the glass sector's need to decarbonise following the Government's 2050 emissions targets, Erin Miller believes Glass Futures' Industrial Fuel Switching workstreams "will be a key contributor to the longevity of the glass business sector and the industry as a whole." Achieving this goal "is something that I am passionate about" she declares.

Over the eight months that Erin Miller worked for Glass Futures, the team grew from five to 12 people, while navigating Covid-19 restrictions. "It feels like I have witnessed the growth of the company" she reflects. "It's fantastic that Glass Futures has shown resilience and teamwork despite the fact that some team

members have never met."

Working across the fields of academia and industry with Encirc's partners and contractors exposed Ms Miller to the multi-faceted nature of the glass industry, as well as boosting her communication and networking skills. "I'd say the biggest highlight from my time at Glass Futures was having the opportunity to work with a variety of different people" she says. "Taking their words of wisdom on board will allow me to make more informed career decisions at Encirc."

A rewarding career

A mentor of sorts emerged for Erin Miller in the form of Richard Hulme, Senior Glass Technologist at Guardian Glass and on long-term secondment at Glass Futures working as a Technical Director. "His passion for the industry is motivating and somewhat contagious" Ms Miller remarks. "He

has taught me to think pragmatically in my approach to glass and to challenge the status quo. While working with Richard, he has encouraged me to not coast through a career but to really care about what I do and that if I can help others in the process, then even better."

As Encirc's Batch and Furnace Manager at Elton, Erin is responsible for managing the site's two furnaces (the largest of their kind for the glass container industry) and managing the control of raw materials that enter the furnace, with the help of an assistant manager and the rest of the batch and furnace team. According to the company, she has already made a significant impact and contributed towards pioneering projects and initiatives.

In 2019, Encirc hosted the Society of Glass Technology Melting Technical Committee. Co-hosting a tour of its facilities, Erin Miller discussed future aspirations of the company, including Industry 4.0 and encouraging young people to join the glass industry through the CEH graduate scheme and Encirc's IGNITE apprenticeship scheme.

"At Encirc, we are always investing in the most cutting edge and innovative technology to make our products" she notes. "The relationships we have with our suppliers are key to continuous improvement and unlocking the potential of Industry 4.0."

Women in manufacturing

In a traditionally male-dominated manufacturing environment, Erin Miller sees Encirc's 'Women in Manufacturing' campaign as "an extremely positive initiative" to attract females into the sector. She is a role model and advocate for the movement, not only for existing colleagues but for women and young people entering the glass industry.

"As well as empowering and encouraging women to work in a male-dominated environment, I feel it has been highly educational for all within the workforce" she clarifies. "It's clear to see from discussions with other women across the business that the manufacturing world is not visible enough in secondary schools, especially to young girls. By creating this initiative, I feel as though the company has helped raise awareness of the issue. 'Women in industry' is a hot topic and through recognising this, Encirc has created a support system for more females in the manufacturing environment."

As part of her involvement in the 'Women in Manufacturing' campaign, Ms Miller filmed an informative video interview, which aims to inform and promote equality and diversity within the manufacturing industry and raise the profile of women engineers and consequently work towards eliminating current perceptions of the manufacturing industry.

Rising Star recipient

Last year, Erin Miller received the Rising Star accolade at Glass Focus Awards 2020, organised by British Glass. Open to any individual under the age of 30 engaged in a formal apprenticeship or graduate/training programme within the glass industry, the award honours young talent in the industry. New for 2020, the Rising Star category was sponsored by the Worshipful Company of Glass Sellers of London

"I felt extremely overwhelmed to receive the Rising Star award this year as I felt as though all of the nominees (James Miller, Allied Glass; Liam Appleyard, Allied Glass; Rob Windley, Allied Glass; Mathew Coffey, Electric Glass Fibre) were equally as deserving" she says. "It was incredible to have my efforts recognised by people outside of Encirc and Glass Futures and experts in the field.

"Having worked with Richard Katz (immediate Past



Celebrating the lighting of the world's largest glass container furnace in Elton.



Erin Miller enjoyed a placement at Glass Futures, the proposed global centre of glass excellence in R&D, training and innovation.

Master of the livery and CEO of Glass Futures) I was aware of the Worshipful Company of Glass Sellers of London and through discussions have been made aware of their activities” she continues. “Since winning my award, I have been invited to attend a Court and Livery Dinner (when safe to do so), with the Worshipful Company of Glass Sellers of London and I look

forward to hearing more about the livery company.”

Of the awards organisers, British Glass – the representative body for the UK industry - Erin Miller believes the trade association is “extremely relevant, as the industry continues on the path to improving standards. They encourage research, which can also challenge the status quo within the industry.”

Always learning

“The most rewarding aspect of my role so far has been how much knowledge I have developed in such a short space of time” Ms Miller reflects. “In the glass world, every day is different, with new challenges arising that require creative solutions. So, for me, the problem solving tasks are the most rewarding. The greatest challenge is that you never know what you are going to walk into from one day to the next. My understanding is whether you have been in the industry for 10 years or a year, you are constantly presented with new challenges, some of which you have never faced before.

“The most common phrase I have heard since working in the industry is ‘every day in glass is a learning day’ and I have definitely experienced this first-hand” she continues. “No two days are the same and although you may feel like you have experience, something always comes along to surprise you when you least expect it.”

And the people are just as important as the product. “The thing I like most about working within the glass industry is that you find that the majority of people who work in the sector have been there for quite some time and have a wealth of experience and knowledge they are eager to share.

“I would recommend the glass industry to others” Erin Miller states unequivocally. She offers a thoughtful insider’s take on the sector: “I think it is an area in manufacturing in which the process and products can be easily overlooked and taken for granted. It’s interesting when you take a step back and see just how much glass is all around us.” ●



Glass Focus’ Rising Star award is sponsored by the Worshipful Company of Glass Sellers of London and 2020 winner Erin Miller will be a guest at a future Court and Livery Dinner.



Erin Miller believes Encirc’s ‘Women in Manufacturing’ campaign is an extremely positive initiative.

Further information:

Encirc, Elton, Cheshire, UK
web: www.encirc360.com

British Glass, Sheffield, UK
web: www.britglass.org.uk

Glass Futures, Sheffield, UK
web: www.glass-futures.org

The Worshipful Company of Glass Sellers of London, London, UK
web: www.glass-sellers.co.uk

The Backbone for Glass Manufacturers

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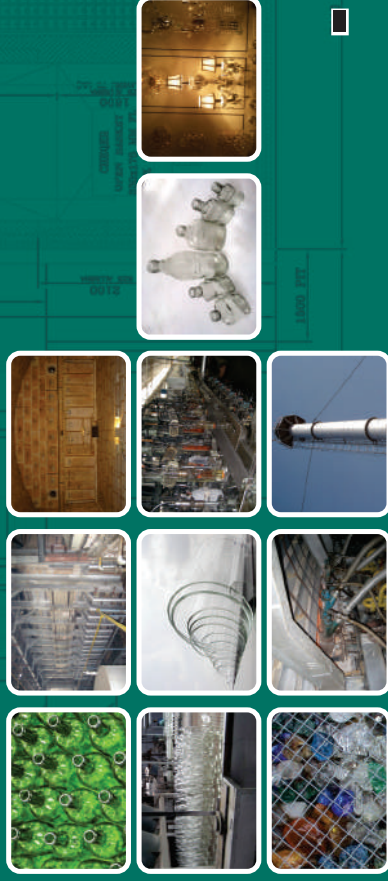
- Selection of site
- Plant layout
- Furnace design, selection of refractory & steel structure
- Furnace building, commissioning & maintenance
- Selection & commissioning of combustion system, instrumentation & allied equipment
- Selection of raw material
- Designing of fully automatic batch house and cullet handling system.
- Selection, installation and commissioning of production machinery and annealing lehrs
- Installation and commissioning of quality control equipment and packing machinery

■ Furnace design, building, maintenance, modification and modernization

■ Conversion of combustion system

■ Furnace audits for reducing fuel consumption and predicting furnace life

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In 2018, Saint-Gobain renovated its €85 million float line at the Dąbrowa Górnicza plant in Poland.

Jewel in the crown

The Saint-Gobain Group is a global leader on habitat and construction markets, offering solutions to save energy and protect the environment. In an exclusive interview with *Glass Worldwide* (preferred international journal of AIGMF), Jérôme Lionet, General Manager Glass Industry at Saint-Gobain Flat Glass and Vice Chairman of Glass for Europe discusses his passion for technical innovation and explains how new European legislation is creating further opportunities for the company to excel.



Jérôme Lionet is General Manager Glass Industry at Saint-Gobain Flat Glass and Vice Chairman of Glass for Europe.

Saint-Gobain traces its glass industry roots back to the 17th Century and the reign of French monarch Louis XIV, whose 'Royal Factory' of mirror glass took its name from the small village in the north eastern part of the kingdom where it was situated: Saint-Gobain. Headquartered today in Paris, the Saint-Gobain Group has an empire of its own, extending to 70 countries and over 170,000 employees who design, manufacture and distribute materials and solutions for buildings, transportation, infrastructure and industrial applications.

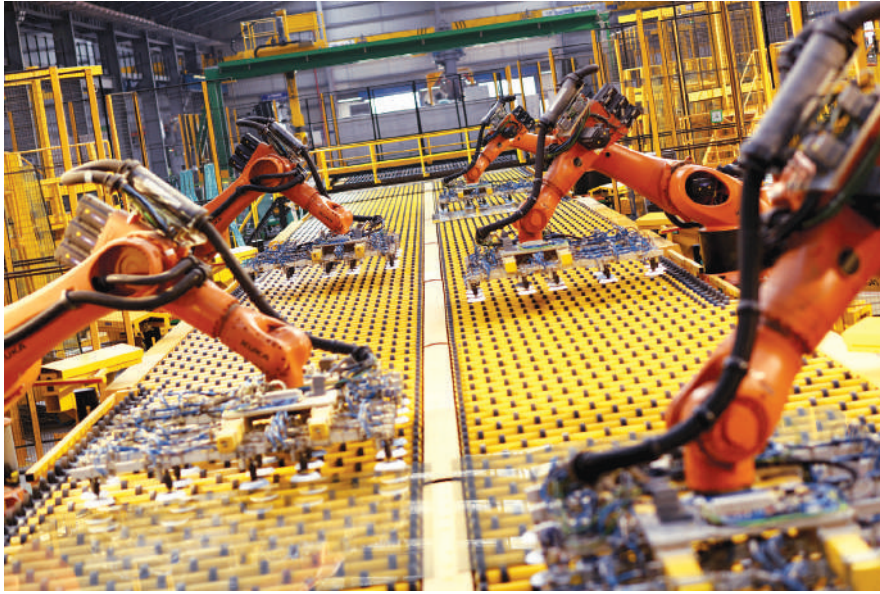
Jérôme Lionet joined Saint-Gobain's Abrasives business in 2001 and worked in different positions in strategy, marketing and general management for more than 10 years. He moved to the group's glass business at the end of 2011 and until 2015 was the General Manager for South Eastern Europe, a region covered by a float plant in Romania. Jérôme is now General Manager of Glass Industry and Industrial Director of primary and transformed products at Saint-Gobain Flat Glass.

"I am an engineer" says Mr Lionet, who graduated in France and holds master degrees in industrial engineering and fluid mechanics. "My engineering background and

specialist engineering degree is extremely useful to be able to understand what is happening in the plants where the processes involve both sophisticated scientific and technical aspects.

"Since 2015, I have held a position with 'two hats' as both the General Manager of flat glass operations in Europe, whether it be float, coated, laminated etc – the upstream part of the activity; plus I am also the Industrial Director for the glass business worldwide" he explains.

In Europe, Jérôme Lionet supervises 13 float plants: Saniche, Chantereine, Salaise sur Sanne (Eurofloat) in France; four in Germany: Torgau, Porz, Stolberg and Herzogenrath; at Eggborough in the UK; Dąbrowa in Poland; Calarasi in Romania; Pisa in Italy; Arbos in Spain;



The 'World Glass Complex' in India houses three float lines and two state-of-the-art magnetron coater lines.

and Ain el Sokna in Egypt.

Saint-Gobain Flat Glass also has nine coaters, a number of lamination lines, mirror lines and cutting lines for architectural and automotive glass.

"Our market position is number one in Europe and number two in the world and we have been growing our position over the years" says Mr Lionet. "We also have a very strong position with our colleagues in automotive glass" he adds (one out of two European cars is equipped with automotive glazing from Saint-Gobain Sekurit).

Going global

"I always wished to join an international industrial company like Saint-Gobain" Mr Lionet confides. "I oversee the plants outside Europe from an industrial policy point of view, such as all the global functions surrounding engineering and technical direction." His responsibilities also include being in charge of strategic projects – for example building a new float, cold repairing a float or investing in a new coater. "I oversee the global teams that are managing those projects and global standards" he says.

Discussing the challenge of managing plants in a multi-national, multi-cultural organisation, Mr Lionet explains how "the exposure to such diversity of people, experiences, culture and backgrounds requires an awareness; it is a challenge and I have learned over the years that we should never take for granted the cultural differences." There is 'constant discovery' but 'being exposed to such

a level of diversity is a very positive thing' he believes. "I am exposed to diversity not only in terms of culture but also businesses throughout the whole international Saint-Gobain group" he continues. "Capturing and transferring the best (knowhow) throughout our operations is a big part of my activity and that of central management. To recognise that a plant is making progress thanks to a local initiative in terms of a process or organisation, for example and being able to transfer that to other plants."

Besides infrastructure that is common to all plants, such as industrial IT, Saint-Gobain is developing best practices and standards "that we try to apply everywhere in terms of process control and knowledge" says Jérôme Lionet. "We exchange the knowhow and expertise across all our plants worldwide."

The value of knowhow

While technical business, machinery and automation are very important at Saint-Gobain Flat Glass, the quality of the workforce is fundamental, Mr Lionet stresses. "It's a business that is based on knowhow" he states. "Even if we standardise best practices, the knowhow of our team is extremely important. Over the years, we have been investing in specific glass training knowledge for our teams, not only at management level but to all operators throughout the world being trained on glass practices every month on a permanent basis. The higher you go in hierarchy, we also have technical training programmes on a global level for float line managers and plant directors that are deeper in terms of science and technology.

"In addition to using the science and techniques gained from our R&D knowledge, we feed our training structures and programmes with daily operational experience because the different events you can be confronted with on a furnace are almost unlimited."

Automation is an aspect of technology towards which Saint-Gobain prides itself on having a "very proactive" approach. As part of an Industry 4.0 strategy to develop the skills of its teams, in 2019 the group started to roll out a global programme for its Data Analytics Academy. "The objective is to have (personnel from) all levels from the plants (operators, shift managers, engineers etc) getting

more knowledgeable with the latest analytical tools and methods that have been developed" Mr Lionet explains. "Data in the process industry has always been extremely important; every day we have millions of data coming from the process but in the past, we were often limited in our analytical capabilities. New computing technology is addressing being able to better analyse the data and it's really important that we are now making those tools accessible to many levels in our plants, empowering our operators. We can now respond more quickly in terms of process evaluation and the increased flexibility allows us then to adapt quicker to market demands" he maintains.

Investing in production plants

In a spate of recent investments, in 2018, Saint-Gobain renovated with €85 million a float line at its Dąbrowa Górnicza plant in Poland to increase production of glass for the construction and automotive industries. "In 2019 and 2020, we also invested in a new coater" Mr Lionet added. "In Poland the market is growing extremely actively, in terms of volume and quality of products so more value-added glass is needed and we invested to respond to the market needs."

In 2019, Saint-Gobain opened a third float glass line and a second magnetron coater line at its factory near Chennai, making it the largest float glass plant in India.

The same year the French glassmaking giant made a significant outlay for a jumbo coater in Morelos, Mexico to manufacture large panels of layered glass with 6x thermal insulation capacity for automotive and building applications. A new flat glass plant is being built in Mexico to meet growing domestic demand and supply Central America, the Caribbean and North America. "We have strong growth in the automotive sector in Mexico and the USA and we need more capacity to serve the market" says Jérôme Lionet. "It is a massive investment and the plant should go live in the course of summer 2021.

"We have also recently been investing significantly in Europe in two big lamination lines, one in Germany and one in France" he adds. "To summarise our investment strategy, we will keep investing to add value to our products in Europe, making them increasingly sophisticated, with better performance. Outside Europe, the investment is more focused

on increasing capacity. We have future plans in place but will review accordingly due to uncertain market conditions because of the Covid-19 pandemic."

Contending with Covid

"Before the pandemic, we started 2020 with overcapacity because of a new float plant in Poland" Mr Lionet explains. "The spring 2020 lockdown led to a temporary stop of our activity in countries like Spain, France Italy and the UK but we never stopped in other countries such as Germany and Poland. Firstly, we had to make sure there were measures in place to protect our people with the best sanitary standards and procedures. In May, building activities restarted quickly and on the architectural glass side and today, all our float activities in the world are working at full speed.

"In automotive, the restart was a little slower and it took until September/October 2020 to be back at full speed" he says. But now the company is back "at full saturation" across of its lines, he reports. "We see even tension on the market and there are no regions where demand is not at the top end. We are enjoying this period while it lasts!"

Approaching carbon neutrality

As a major player in the glass industry, the issue of going carbon-neutral has major consequences for both Saint-Gobain and the industry as a whole, something that Jérôme Lionet views as



Saint-Gobain inaugurated its float glass production plant in Aniche-Emerchicourt in the north of France in May 2017.

both a challenge and an opportunity.

"Usually, carbon neutrality is thought about in terms of cost and change of technology but it is a big opportunity as glass is actually part of the solution. Nearly 40% of worldwide CO₂ comes from buildings, whether it be the construction, usage or demolition. In Europe, 50% of that comes from construction and 50% from usage (heating and air cooling); from the 50% caused by heating and air cooling, glass is a big part of the solution.

"In terms of the heating of the building and traditional thermal insulation, the performance of the glass can be a big part in almost completely insulating a house and also very importantly (especially in a lockdown!), it keeps the light going inside" he continues. "Thanks to extremely high value-added glass, we are able to have a good energy balance, as well as adding a very high level of light entering the building. It's a long historical path of development to have extremely

efficient glass in terms of energy balance and daylight transmission. Coated glass and electrochromic glass (such as produced by the Saint-Gobain company SageGlass in the USA) have big roles to play as part of the solution."

In terms of CO₂ produced by manufacturing, glass has another advantage because it can be recycled without limit Mr Lionet notes. "For that, we are investing heavily in terms of capital expenditure and R&D to develop our usage of cullet; this is not a completely new initiative but if you compare flat glass to container glass recycling, container glass started 30 years ago but due to quality constraints, flat glass only started much more recently. We have made great progress and on average, 30% of our glass is now made from recycled cullet. In addition to cullet from the value chain (processors and window makers), we are also now starting to recycle from construction and for this, we want to increase our level of cullet content, which helps to reduce the CO₂ emitted during the fabrication of the glass.

"Each time we have a new furnace or a rebuild, we improve the energy efficiency of the furnace and we invest into energy recovery" Mr Lionet maintains. Saint-Gobain is taking steps to increase the longevity of furnaces by working with refractory suppliers to improve thermal/lifetime efficiency. The company has numerous general development agreements with suppliers where we try to innovate with, for example, equipment that is new for the industry or a customisation of equipment from other industries into



The Dabrowa facility in Poland is one of 13 float plants Jérôme Lionet supervises in Europe.

the glass industry. We are developing such external partnerships to speed up innovation in general” he states.

“We are also investing in R&D for the long term. A key question is whether we will be able to use higher levels of green electricity in the glass manufacturing process or whether we move from natural gas to hydrogen. And it is too early to know...” he muses.

Saint-Gobain as a group has committed to carbon neutrality by 2050 and in November 2020, the group issued an additional target to reduce its carbon footprint by 30% by 2030, validated by the Science-Based Targets. Embedded in the company’s environmental strategy, this roadmap outlines Saint-Gobain’s new commitments to reduce not only direct and indirect carbon dioxide emissions but also emissions along the value chain. To meet these targets, the group has dedicated a capital expenditure and R&D budget of around €100 million per year until 2030.

Riding the renovation wave

The European Union’s Renovation Wave initiative to meet carbon neutrality targets and relaunch the construction sector by increasing the rate and quality of renovation of existing buildings has created “a real opportunity for glass and Saint-Gobain” Jérôme Lionet believes. Increased demand for the standard of glazing that EU buildings must have to become carbon-neutral by 2050 and the need to ‘repair and prepare for the next generation’ was highlighted by the European Commission amid proposals



The ‘World Glass Complex’ at Sriperumbudur, near Chennai in India is spread over a campus of 177 acres.

for a recovery package and a revised EU budget to address the immediate economic and social damage brought by the coronavirus pandemic. “We are part of the solution for the renovation wave” says Mr Lionet: “All the recovery packages are green and insist on building renovation.”

As Vice Chairman of Glass for Europe, the trade association for Europe’s flat glass sector, Jérôme Lionet participates actively because “a lot of regulations are coming from the EU in terms of renovation waves and green financing that is really important to our business. Glass for Europe is representing the interests of the flat glass industry and also advocating the benefits in general of the flat glass industry” he adds.

Extending the reach of R&D

“Being part of a large group means we can keep our research and development investment almost constant and this is part of Saint-Gobain’s strategy” Mr Lionet notes. Reflecting on recent flat glass product innovations of which he is particularly proud – and permitted to discuss in this publication! – he cites ECLAZ, the company’s enhanced insulating glass, designed for residential and tertiary markets

in cold and temperate climates to deliver the thermal insulation benefits of triple glazing with the daylight gain of double glazing. The technology is “unique in the flat glass industry, involving really deep science and R&D to understand the behaviour of coatings” says Mr Lionet. “We are very proud to have developed this new technology, which is bringing better energy balance for the windows with maximum daylight inside the building.”

Another innovation that he finds “particularly pleasing” is an 18m pane of glass that Saint-Gobain started to produce a few years ago. “It might not be that difficult from a technical point of view” he concedes “but it’s impressive when you see examples of installations that are as high as a standard building in Paris. The glass is always a signature of an architect’s building in terms of aesthetics and shape and it can be emotional to see our glass in such applications.

“Because the glass process is so complex and touches on so many themes in terms of science, physics, chemistry etc, it’s always a pleasure that we are developing new approaches, systems and practices and to see the speed they are adopted throughout the organisation” Jérôme Lionet explains. I find it fascinating when we make something possible that was impossible before. With glass, you have the opportunity to discover new things every day.” ●



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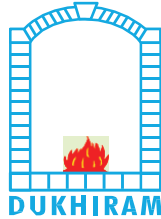
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Glass for Diamond Processing: A tale of two Outstanding Materials



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chalcogenide glasses for diamond processing and thermal imaging applications and utilization of wastes for synthesis of glasses and or glass-ceramics. He has published more than 50 papers in international journals of repute, 6 granted patents in India, Germany, EU, Indonesia, Turkey and China, (Malaysia-Pending), contributed for 2 book chapters. He is representing India as a member of the technical committee (TC-23) on Education in the International Commission on Glass (ICG) and a council member of the ICG for the UN's International Year of Glass 2022. He is reachable at atiar@cgcri.res.in

Abstract

This article aims to give a brief introduction on diamond, its important properties and processing techniques starting from a rough diamond, primarily for the readers from the non-diamond professionals. A sincere effort has been made to describe how chalcogenide glasses can play an important role for diamond processing, especially at the rough diamond inspection stage to help the diamond professionals for making a perfect process planning to realize an augmented profitability. Chalcogenide glass being a non-oxide and non-conventional glass, a brief overview on this glass, its important properties and specialized fabrication technique has been presented. Finally, diamond processing technique using chalcogenide glass and its advantages has been elucidated.

INTRODUCTION

Do you know that 92% of the world's diamonds are cut in Surat, India and earn India about 10 billion US\$ in annual exports?!

Diamond is the hardest known natural material on the earth and the costliest gemstone. Raw diamonds are highly stressed in the presence of impurities and crystal imperfections. Its attributes pose diamond manufacturers with a great challenge since, its mechanical properties make it difficult to cut and polish. Any loss during processing will affect seriously the profitability².

To the common person, a rough, raw diamond piece appears very much like a dull piece of glass. Only when polished and faceted, does it ascend to its full glory, displaying the sparkling brightness and splash of colours for which it is famous. About half of its weight is lost when transforming a rough stone into a gem set in an item of jewellery³ (Figure 1). Being the costliest gemstone, it is a huge loss for diamond processors. Extreme precautions are employed and the process is undertaken by professionals with expert knowledge,

equipment and tools for the job since every single decision will impact on profitability⁴. Before the cutting and polishing process begins, a thorough examination of the rough diamond is conducted. In this article it will be covered how glass can play an important role for inspection of rough diamond pieces, in order to minimize losses during processing to yield maximum profit to the diamond processing industries. We can distinguish four different phases in diamond processing: drawing/ marking, cleaving/sawing, bruising

and polishing. Before we go deeper in to the diamond processing, let us understand about this material and why it is the costliest gemstone in the universe and how glass can play a very vital role in diamond processing.

SOME IMPORTANT FACTS ABOUT DIAMOND

How diamond is formed

Diamonds are extremely rare, with concentrations of at most parts per billion in source rock. It is often said that a diamond is a chunk of coal that did well under extreme pressure. In fact, coal has rarely played any role in the formation of diamonds. The most diamonds that have been dated are much older than earth's first land plants, the source material of coal. Geologists believe that most of the diamonds are formed in the earth's mantle and are transported to the earth's surface by deep-source volcanic eruptions. The diamonds are formed from pure carbon in the mantle under extreme heat and pressure. One of the most fascinating aspects of a diamond is the amount of time it takes to form, the entire process takes between 1 billion and 3.3 billion years. Most were formed at depths between 150 and 250 kilometers in the Earth's mantle, these

regions have high enough pressure ~ 4.5 GPa and temperature ~ 950 °C to allow diamonds to form and they are not convecting, so diamonds can be stored for billions of years until a kimberlite eruption samples them. Smithsonian researchers also found large number of tiny diamonds when they were cutting a sample from the Allen Hills meteorite. These diamonds in meteorites are thought to have formed in space through high-speed collisions similar to how diamonds form on earth at a meteorite impact sites. Synthetic diamonds can be grown from high-purity carbon under high pressures and temperatures or from hydrocarbon gas by chemical vapor deposition (CVD) technique. However, this article deals with only naturally occurring diamonds.

Important properties of diamonds

Diamonds possess many outstanding physical characteristics and they are most suitable for many versatile applications, besides its universal appeal as a gemstone in jewellery. It has the highest hardness, least compressibility and highest thermal conductivity of any natural material. It has low adhesion and friction, and its coefficient of thermal expansion is extremely low. Its optical transparency extends from the far infrared to

the deep ultraviolet, making it the most suitable candidate material for thermal imaging applications. It also has high electrical resistance. It is chemically inert, not reacting with most corrosive substances, and has excellent biological compatibility⁵. All these superior properties of diamond are attributed to its unique crystal structure. Diamond is a solid form of the element carbon with its atoms arranged in diamond cubic crystal structure. In diamond bonds are sp³ orbital hybrids and the atoms form tetrahedra with four nearest neighbors, which are rigid and strong. Of all known substances, diamond has the greatest number of atoms per unit volume that possibly makes it both the hardest and the least compressible⁶.

The high hardness of diamond contributes to its suitability as a gemstone. It can be scratched by other diamonds only; it maintains its polish extremely well. Diamonds are naturally hydrophobic, which means the diamonds' surface cannot be wet by water. Most importantly at room temperature, diamonds do not react with any chemical reagents including strong acids and bases making them everlasting. The high dispersion of white light into spectral colors and its high brilliance induced by higher refractive index are the primary gemological characteristics of gem diamonds.

DIAMOND PROCESSING

What is the 4 c's of diamonds?

A diamond's quality is determined by the 4C's:

- Cut: Quality of the angles, proportions, facets, and finishing details
- Color: How colorless the diamond is
- Clarity: How clean the diamond is of inclusions and blemishes
- Carat: The weight of the diamond



It is said that to process a rough diamond to set in a jewellery it loses half of its weight and makes a trip around the world

Fig. 1: How a rough diamond looks like and what we see in a jewellery set

These four qualities of a diamond are the key components that impact its beauty and cost. The 4C's interact with each other within the diamond. They dictate how the diamond appears and how high quality it is. The prices of diamonds do not rise linearly with their quality and size. Instead, prices have an exponential relationship with the carat sizes. A large, flawless diamond is known as a paragon and the diamond processors devote their maximum time in the preliminary analysis of the rough stone for a perfect planning to extract flawless diamond pieces of maximum carat size out of a rough diamond. It needs to address a large number of issues, bears much responsibility, and therefore can last years in case of unique diamonds. The following issues are considered:

The hardness of diamond and its ability to cleave strongly depend on the crystal orientation.

- Most diamonds contain visible non-diamond inclusions and crystal flaws. The cutter has to decide which flaws are to be removed by the cutting and which could be kept.
- The diamond can be split by a single, well calculated blow of a hammer to a pointed tool, which is quick, but risky. Alternatively, it can be cut with a diamond saw, which is a more reliable but a tedious procedure.

After initial cutting, the diamond is shaped by means of numerous stages of polishing. Polishing removes material by gradual erosion and is extremely time-consuming. The associated steps are technically proven and can be performed with perfection by the technicians. The colours in the diamond evolve due to inclusion of other elements in the diamond crystal structure, although

colourless diamonds are the costliest one. The perfect planning may hugely influence on the clarity and carat size of a diamond resulting in augmented profits.

HOW GLASS CAN PLAY AN IMPORTANT ROLE FOR MAKING A PERFECT PLAN FOR DIAMOND PROCESSING?

Diamonds are unstable against high temperature above 400 °C under atmospheric pressure⁷. The temperature of diamond ignition in pure oxygen is 690° C to 840° C. It is transparent from the far infrared to the deep ultraviolet region, i.e. it is transparent in visible spectrum as well and it has the highest refractive index of 2.417 at 589.29 nm wavelength.

The rough diamond inspections as well as planning for processing play a vital role for optimizing profitability. Historically the following methods are evolved for inspection of a rough diamond⁸⁻⁹.

1. Without polished windows, without constructing a 3D model, without immersion:

A diamond cutter looks through a magnifying glass at the diamond, trying to see and understand the inclusions and their many reflections. He identifies and locates the inclusions, weighs the stone, determines its shape, crystal structure, color and purity. Such a method is typically used during purchase of rough diamonds.

2. With polishing windows, without constructing a 3D model, without immersion:

The expert first observes the stone, and then opens (polishes) a number (typically two), "windows" on opposite sides of the stone, such that he can look through one of these windows to

see it, perceive inclusion against a background formed by the other window.

3. With polishing windows, with a 3D model of the diamond, without immersion:

Typically, a number of windows are first polished for observing the inclusions. In the case of flat and solid facets of the rough stone, these facets can act as such useful windows. In a typical case, the windows must allow inclusions to be observed from at least two points of view. The stone is then glued to a holder, mounted in a scanner, and a 3D model of the diamond is constructed.

4. Without windows, with or without a 3D model of the diamond, using a liquid in which the diamond is immersed:

In this technique a diamond is glued to the holder and immersed in an immersion liquid with the same refractive index as a diamond. Consequently, the diamond disappears into the liquid but the inclusions remain visible. The brick in the immersion fluid is rotated and 2D images are taken from multiple different viewing directions to determine a full 3D model of the inclusion or inclusions¹⁰. As an immersion fluid molten Se is used.

5. Without windows, with or without a 3D model of the diamond, using a solid medium in which the diamond is embedded:

This can be considered as a latest technology employed so far for inspection of a rough diamond due to its several advantages like¹¹:

- There are no size limitations, as any size of diamond can be inspected

- The diamond need not be laser marked like older techniques. This gives one the freedom of re-trading if necessary
- Diamond's interior can be viewed with naked eyes or under loupe or microscope, making one feel more comfortable
- A rough estimation can be made, without even use of any machine or scanner
- Visibility of inclusions under normal lighting without any external aid that helps inspectors to check quality of a plot with highest accuracy
- An inclusion even in a highest clarity diamond (VVS1 grade) is easily visible
- It is a completely safe material at room temperature and can be handled by plotters without any health hazard
- Very cost-effective solution to chart inclusions in a rough diamond
- The immersion glass material can be reused

It is understood that if a rough diamond piece can be embedded within a transparent glass of matching refractive index with diamond, the whole interiors of the diamond become visible, even with a naked eye. It can now enable one to inspect the glass with absolute accuracy and to make a perfect planning to achieve maximum yields. Additionally, one can assess the stress distribution within a rough piece embedded in a glass using a polarimeter and can take measures to prevent unintentional breaking of a precious diamond by adopting stress removal measures. Now the glass has to have the following important properties to meet the above purpose:

6. It should have low melting temperature and enough fluidity below 300°C in order to embed the diamond.
7. The glass has to be highly transparent in visible spectrum.
8. The refractive index of glass needs to be matched with diamond i.e. 2.417 at 589.29 nm wavelength.

Now, no oxide glasses are known to have such a unique combination of optical and thermal properties (melting temperature <300°C). Only some novel chalcogenide glasses may exhibit such unique combination of properties and can impact diamond processing industries for an augmented profitability.

WHAT IS CHALCOGENIDE GLASS?

Chalcogenide glasses (ChGs) are non-oxide vitreous materials based on any of the chalcogen elements out of sulphur, selenium or tellurium from Group VIA of the periodic table or together with other network formers from Group VA (such as Sulphur, Sb) and Group IVA (such as Ge). These glasses do not contain any oxygen. Such glasses are covalently bonded,

unlike oxide glasses. These glasses are famous for their unique properties and functionalities including large transmission window extended to far infrared (FIR) through visible, high refractive index, and most importantly low melting temperature. However, as it is a non-oxide glass, special synthesis technique is required to avoid oxygen contamination. In brief, glass composition is weighed and mixed in an atmosphere-controlled glove box filled with inert gases e.g., N₂ or Ar. The glass batch is transferred to a silica ampule, which is further vacuum sealed to eliminate presence of any oxygen. The sealed ampule containing glass batch is then loaded within a rocking furnace that rocks continuously for about 12 hours for homogeneous mixing of the glass at the melting temperature. Once the melting is completed the ampule containing glass is quenched in air or water depending on the compositional requirement. The synthesis technique (schematic) of chalcogenide glass has been shown in Figure 2. The annealing of glass is carried out in an atmosphere-controlled oven, prior to collecting the glass by breaking the ampules. It is understood that specialized techniques/machineries



Fig. 2: A typical chalcogenide glass melting facility at CSIR-CGCRI, Kolkata

are employed for synthesis of non-oxide chalcogenide glasses. Due to furnace rocking mechanism and high vacuum ampule sealing arrangements, a limitation exists for production of chalcogenide glass in a large size and quantity. As such raw materials cost for such glasses are very high and due to this specialized technique of synthesis; chalcogenide glasses are relatively much costlier than conventional oxide glasses.

SOME IMPORTANT PROPERTIES OF CHALCOGENIDE GLASS

The elements forming chalcogenide glasses are generally covalently bonded due to the small difference in electronegativity between cations and anions. As a result, the strength of the bonding is lower than in oxide materials, making glass formation feasible over a large variety of compositions. The addition of Se increases the polarizability, because Se is larger than S, with weaker bonds that are more polarizable. Similarly, chalcogenide glasses containing Te are more polarizable than selenium and sulphur. Since, refractive index is directly related with the polarizability, higher refractive index is observed in case of presence of Te than Selenium and sulphur in a glass.

As mentioned previously, chalcogenide glasses present a wide transparency window in the infrared region. At the shorter wavelengths, the optical transmission window of a glass is limited by its band-gap, while at longer wavelengths it is limited by multi-phonon absorption. Therefore, the band gap shifts from visible with sulfur-based glasses to near infrared for selenium and tellurium-based glasses. Chalcogenide glasses present a transmission extending far in the infrared region, up to $11\ \mu\text{m}$ for sulfide glasses, $16\ \mu\text{m}$ for selenide glasses,

and more than $20\ \mu\text{m}$ for tellurium glasses, while the transmission of silica and fluoride glasses is limited to about $4\ \mu\text{m}$ and $7\ \mu\text{m}$ respectively. Hence, both the transmission window and refractive index of a chalcogenide glass can be tailored by selecting the composition of the glass.

Due to their high transparency in the infrared region, their ability to be shaped by molding and their lower cost as compared to other materials transmitting in the second and third atmospheric windows such as single crystalline germanium, chalcogenide glasses are used for a wide range of applications in the infrared optics. These applications comprise night vision, non-linear optics, chemical and biological sensing or optical fibers. Furthermore, variations in the glass stoichiometry can be easily carried out to adjust specific parameters such as the refractive indices.

The main strategy for synthesizing chalcogenide glasses is based on the creation of a covalent polymeric framework involving elements having similar electro-negativity. This means that the central elements such as S, Se or Te have to be combined with close neighbour atoms in the periodic table such as As, Sb, Ge, Ga, or I. Presence

of As, Sb, Ge or I in the glass modifies its structure, thereby influencing glass property substantially¹². Hence, by suitably selecting the glass compositions, its transparency, melting temperature and refractive index can be tailored to suit for diamond processing applications. Flaschen et al. was the first to give a general description of the properties of a series of low-melting glasses in the system arsenic-sulfur modified by bromine, iodine, and thallium¹³. The ternary iodine glasses possess remarkably low melting temperatures and are the first example of inorganic glasses having high fluidities at below 100°C . Compounds of this type were also reported by Goryunova and Kolomiets¹⁴. The As-S-I chalcogenide glass was also reported way back in 1963 by Lin and Ho¹⁵ who demonstrated that As-S-I glasses exhibit excellent resistance to moisture and to acids, including HF. Such properties of chalcogenide glasses were also reported by the different groups¹⁶. Kurushkin and his group reported use of chalcogenide glass of the $\text{As}_2\text{S}_3\text{-I-Br}$ system having refractive index (2.41) similar to natural diamonds as an ideal immersion medium for processing of diamonds¹⁷.

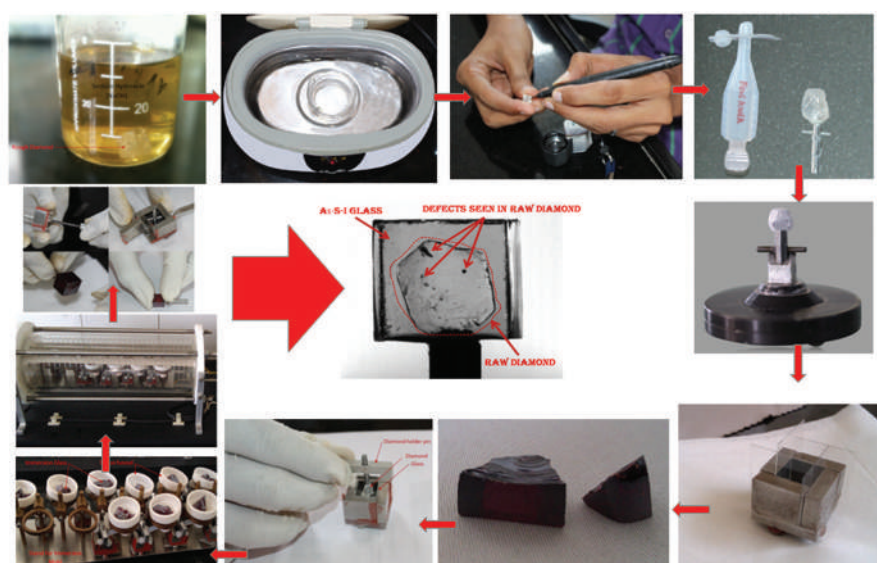


Fig. 3: Process flow chart for embedding rough diamonds in glass

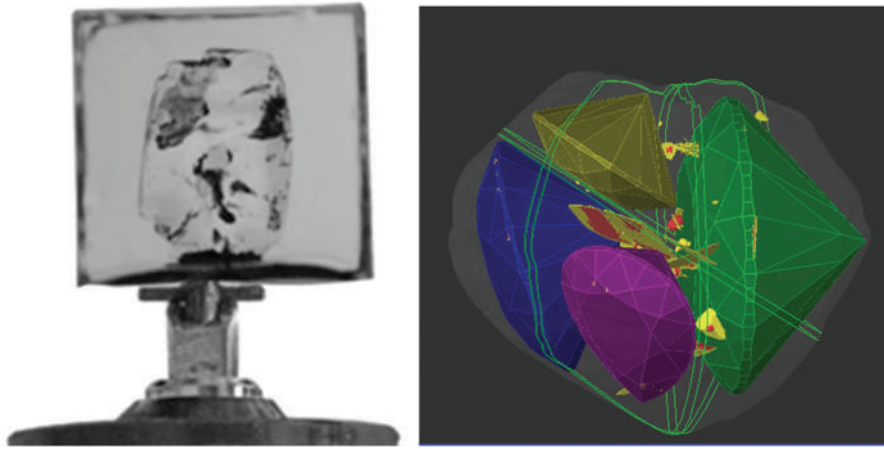


Fig. 4: A rough diamond is embedded in a chalcogenide glass making the internal defects visible, that helps in plotting¹¹ using software

CSIR-CGCRI researchers reported usage of As-S-I based low melting chalcogenide glasses for diamond processing in great details¹⁸. Waste's recycling of chalcogenide glass of the As-S-I system make the process even more economically viable¹⁹.

HOW DIAMONDS CAN BE PROCESSED USING SUCH CHALCOGENIDE GLASSES?

DIAMOND ENCAPSULATION:

An atmosphere-controlled furnace containing two chambers of differential pressure can be used for encapsulation of a rough diamond in a glass medium. One chamber containing the low melting chalcogenide glass in Teflon made crucible and the other chamber contains the raw diamond suitably hanged in a mica mold. The diamond encapsulation process has been shown in Figure 3. The crucible and the molds are connected by a pipe. Within the chamber, a differential pressure is maintained by using argon gas where crucible chamber is in higher pressure than the mold. Once the chamber containing the glass is heated up to say 200°C, the glass becomes fluid and due to differential pressure, the glass flows to the mold chamber and gradually covers the entire raw diamond piece. The furnace is then

cooled to room temperature by natural cooling for taking out the glass encapsulated diamond (GED). There are other innovative methods available for diamond encapsulation in glass. The GED is shown in Figure 4 where defects within the diamond are clearly visible in naked eye. The GED is then placed under an optical microscope to see through the raw diamond to find defects, and suitable processing strategies are adopted with the help of softwares specially developed for this purpose to get maximum defect free diamond from the raw one.

CONCLUDING REMARKS:

Diamond processing using novel chalcogenide glasses is a unique approach towards establishing a cost-effective, user friendly potential technology. CSIR-Central Glass and Ceramic Research Institute, Kolkata has set up a state-of-the-art chalcogenide glass synthesis facility and formulated novel chalcogenide glasses for processing of rough diamonds and to observe stresses within it. The technology is proven and ready for commercialization.

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Beauty in a bottle

Leading international glassmaker for the beauty industry, Verescence deploys expertise gained from over a century of experience at three sites in the Bresle Valley of northern France, as well as in Spain and the USA. General Manager of Verescence France, H el ene Marchand exclusively discussed the company's evolution and its plans for the future in *Glass Worldwide* (preferred international journal of AIGMF).



As General Manager of Verescence France, H el ene Marchand is responsible for the brand's three factories: Mers-les-Bains for glass and Verescence Orne and Verescence Somme for decoration.

Highly regarded in the field of glass containers for the luxury perfumery and cosmetics industry, Verescence develops bespoke bottles for customers, as well as offering a wide range of stock bottles for customisation.

Founded in 1896, the Mers-les-Bains glass factory in France's Bresle Valley operates 24/7, 365 days a year and has a production capacity of 200 million bottles per year – comprising almost half of the total capacity of the Verescence Group. French operations represent 60% of overall activity within the group, with a €180 million turnover (Spanish operations account for 25%



Verescence Orne.

and North American operations 15%).

As General Manager of Verescence France, H el ene Marchand is responsible for the brand's three factories: Mers-les-Bains for glass and Verescence Orne and Verescence Somme for decoration.

International appeal

"Our customers are the biggest beauty groups leading the international market, such as Est ee Lauder, LVMH, L'Or el, Shiseido, Revlon,

MAST, PUIG, Herm es, Chanel, Interparfums and Clarins" Ms Marchand reveals. Verescence's offering includes Xtra Flint glass (valued by perfumers for its brightness and transparency), high quality PCR (post-consumer recycled) glass and coloured glass including Mineral Glass and Red Glass, which are exclusive to the company.

Verescence developed SCULPT'in glass, a patented technology for creating individual shapes inside a bottle with a standard neck opening, for example the Arizona fragrance by Proenza Schouler, which features an asymmetric distribution of glass to hold the perfume at an angle inside the bottle. Guerlain's Abeille Royale Cream employs Verescence's technique for creating very thin glass walls – ensuring a lightweight product for ultimate portability, while the Terre d'Herm es perfume features a luxurious heavyweight design with a thick glass base. The company also makes fragrance miniatures.

"Some of the key global leaders in the beauty market are located in France and we are very proud to contribute to their international success" says Ms Marchand. "Proximity during the development phase is a key factor of success given the high complexity of the new launches on the luxury beauty market" she notes.

Verescence's French knowhow is then deployed (if required) in Spain and the USA. "Internally, being part of a group creates synergies by sharing best practices, benchmarking between departments and efficiency [using] the same 'One Verescence' language and [employing] the same standards on certain key processes" Ms Marchand explains. "At the same time, the specific nature of our group



The glassmaker's customers are the biggest beauty groups leading the international market.

Originally published in Glass Worldwide, preferred international journal of



is to give a dose of autonomy to each site, in order to encourage local initiatives and agility.”

Dedicated to decoration

In 1968, Verescence acquired its first decoration site: Verescence Orne, in Ecouché, France, followed by an Abbeville factory for Verescence Somme in 1989.

“Since 1968, we have gradually integrated more techniques and developed innovative decoration technologies” says Ms Marchand. “More than 90% of our finishing operations are now done in-house (in 2020). By having these techniques internally, we can optimise our customer service and maintain better control of quality and costs. In addition, we are able to innovate more in decoration, for example COLOR’in and METAL’in (an interior colour or metallic coating compatible with the bottle’s contents).”

In France, Verescence is responsible for over 300 million decoration passes per year. “Today, nearly half of the added value of Verescence comes from decoration and this trend is growing” H el ene Marchand explains.

“In recent years, Verescence has made significant investments to gain flexibility and increase production capacities” she reports. These include an acid etching machine, gluing machines, hot stamping lines, latest generation silk screening machines, the latest equipment for lacquering lines (to reduce lacquer consumption by nearly 30%) and 3D printing for decoration tools.

The company is keen to explore progressive digital decoration technology to complement its screen



Verescence has massively renewed its furnaces in recent years, with significant reduction of CO₂ emissions and energy consumption (-15%).

printing techniques. “We are closely monitoring innovative digital printing techniques that could match the aesthetic requirements of luxury brands, while bringing value to the end consumer” Ms Marchand notes. “In 2019, we manufactured the limited edition of Bulgari perfume Rose Goldea with inkjet technology with one of our Bresle Valley partners. This is still a niche market today.”

Future investment

“We [will] focus our next investments on strategic modernisation projects such as automation and robotisation (new control machines, robots to improve working conditions and efficiency), digitisation (new generation of manufacturing execution systems) and investments to meet our CSR (corporate social responsibility) commitments (energy consumption in

particular)” H el ene Marchand continues.

Following a €30 million renovation programme at Mers-Les-Bains, which included the reconstruction of its largest glass melting furnace, Verescence’s 2022 ‘Forming the Future’ project aims to make the group “the global reference in the sustainable beauty industry”. According to Ms Marchand, the strategic plan will be supported by an outlay of €122 million to improve industrial performance, with investment in automation and digitisation, acceleration of innovation and CSR objectives.

Valuable personnel

Verescence employs a workforce of 1400 people in France; 800 in Mers-les-Bains, 250 at Verescence Orne and 350 at Verescence Somme. In addition, the company works with many local suppliers. “Our suppliers are genuine partners and we work with them towards innovation momentum” Ms Marchand explains. “More than 96% of our purchases are made locally. This proximity to our suppliers guarantees rapid speed to market and superior service.”

The company’s performance is made possible by “the commitment of our people” H el ene Marchand underlines. “Our priorities are: Health and safety – a move towards



The Covid-19 pandemic has significantly impacted the beauty market but demand for prestige skincare products has been more resilient than demand for fragrance and makeup products.



Verescence’s offering includes Xtra Flint glass (valued by perfumers for its brightness and transparency), high quality PCR (post-consumer recycled) glass and coloured glass including Mineral Glass and Red Glass, which are exclusive to the company.



Verescence employs a workforce of 1400 people in France; 800 in Mers-les-Bains, 250 at Verescence Orne and 350 at Verescence Somme.

zero accidents and improvement of working conditions by limiting the repetitive movements; using the Verescence Academy to strengthen skills in new equipment technologies and in continuous improvement; use of new tools to improve the effectiveness of our training courses on glass and decoration (e-learning programmes with videos etc); strengthening our organisations with new talents to accelerate our strategic projects (CSR, automation); and diversity – increasing the intelligence of our organisations through the recruitment of female employees for the fields of production, engineering and management and strengthen international mobility between our sites.”

Sustainability strategy

Sustainability is a driving force in the beauty market, Ms Marchand contends. “When it comes to packaging for beauty, glass is rated number one for customer experience (‘glass signifies luxury’); for health (glass is a non-controversial material) and for sustainability (glass is infinitely recyclable).”

Verescence championed water-

based lacquers “10 years ago” H  l  ne Marchand recollects, “we encouraged our clients to remove solvent-based solutions. We also encourage them to use more sustainable decorations, for example by replacing precious metal with hot stamping, enamels with organic inks.”

Glass production is an energy-intensive activity, Ms Marchand acknowledges. “In our industry, the environmental impact depends primarily on the energy consumption of furnaces. Verescence has massively renewed its furnaces in recent years, with significant reduction of CO₂ emissions and energy consumption (-15%). However, we want to go further and prepare for the future, which is why, together with European glass partners, we are actively contributing to the financing and development of a more efficient pilot furnace by 2023 (FEVE’s ‘Furnace of the Future’ initiative).”

Such projects are essential in the face of the urgency of climate change, asserts Ms Marchand. “It is our common duty to respond to climate challenges and move together towards climate-neutral glass packaging.”

Showing its support for similar



The Mers-les-Bains production site.

initiatives, Verescence committed to set a science-based greenhouse gas emissions reduction target by joining the Science Based Targets initiative (SBTi). “Our membership in the SBTi allows us to structure a long-term approach to reducing our emissions and energy consumption, making the work of our technical experts even more meaningful in the years ahead” says H  l  ne Marchand. “Our objective is to reduce our greenhouse gas emissions by 40% by 2030 and we are currently considering many projects to achieve this goal.”

Verescence has also partnered with Engie, Fives and Saverglass in the French ‘VERCANE: fusion de VERre CARboNEutre’ (carbon neutral glass melting) consortium, which Ms Marchand describes as “an ambitious R&D programme to support the industrial glass sector in its efforts to decarbonise glass production.”

Recycling

The glass packaging recycling rate in France is 85% and the ‘Verre 100% Solutions’ Commitment Charter in France sets a goal of 100% recycled glass by 2030, ie zero non-recovered waste.

“However studies show that glass beauty packaging is behind beverages and food and some consumers still do not know how to sort their glass containers” Ms Marchand cautions. “Our customers are currently working hard to inform and educate the end consumer to do the right thing, in order to make the recycling of glass products possible, even in beauty.”

To support this endeavour, the company classifies the impact that decorations have on the recyclability of glass and “makes it a point of honour to ban the development of a decoration technique that could make the recyclability of glass more difficult” states H  l  ne Marchand.

A pioneer in PCR glass for luxury fragrances and cosmetics glass packaging, in 2021 Verescence plans to dedicate its largest furnace in Mers-les-Bains to the production of Verre Infini 20 (containing 20% PCR) additionally to the existing Verre Infini 40 (containing 40% PCR). Verre Infini 20 will be deployed in Spain and the USA by the end of 2021. At Verescence Orne and Verescence Somme, there are initiatives for reducing lacquer sludge.

Globally, Verescence recycled an impressive 82% of its waste in 2019 and aims to raise this figure to 97% by 2022.

Environmental rating

In 2018, Verescence became the first glassmaker to win the EcoVadis Gold Medal for all its sites and in 2020, the company was awarded Platinum for all its plants. Verescence scored a 79/100, ranking among the top 1% of the most committed and most advanced companies in CSR.

“We believe that CSR is key for our company project, for our employees, for our customers and for end consumers” says Ms Marchand. “This is key to be able to get a measure of all the work done in this direction and to absolutely avoid greenwashing. EcoVadis is a very good referential, understandable and used also by our clients with more than 60,000 companies assessed worldwide, all sectors combined.

“Verescence has also been scored ‘B’ by CDP for both Water Security and Climate Change 2020 disclosure, recognising our commitment to transparency and our work towards a climate and water secure future” she adds. At Mers-les-Bains, 97% of the factory’s water is currently collected and treated through a rainwater storage system and plans are afoot to convert it into a completely ‘dry’ plant.

Coping with the coronavirus

Responsible for an estimated 30% decrease in the beauty market, with little prospect of a full recovery before 2023, the coronavirus crisis is “a highly problematic situation for an industry with a high proportion of fixed costs like the glass industry” Ms Marchand suggests. “The pandemic has significantly impacted the beauty market but demand for prestige skincare products has been more resilient than demand for fragrance and makeup products” she observes.

Regardless, “our top priority has and will always be the health and safety of our employees” she maintains.

During the first wave of the crisis in March and April 2020, Verescence’s position was to maintain the activity of its three plants. “We adapted the capacity our facilities to minimise the impact on our operations, while maintaining activity to support customers still in operation, for whom it was necessary to guarantee continuity of service, to work on their new launches and to secure their strategic lines” H el ene Marchand explains. “By maintaining the activity of our three plants, we have been able to give business to our suppliers, while helping the healthcare personnel of our communities (mask donations, supply of bottles and packaging of hydroalcoholic gel, loan of vehicles etc)” she adds.

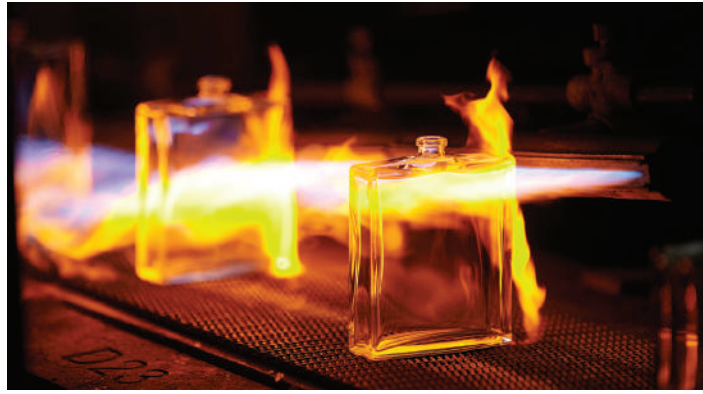
Overall, the crisis has shown the importance of a strong local footprint, while maintaining co-operation across the group’s territories.

Accelerated action

It has also been an expeditor of change, Ms Marchand believes, citing a transformation of the beauty market: “Accelerated growth in sales of skin care products, increased weight of Asia in the consumption of beauty products, decrease of travel retail sales (15% of the market) and rising demand for glass (‘glassification’) for beauty packaging, whether for aesthetic, health or environmental reasons.”

In addition digital transformation has seen an acceleration of Verescence’s industry 4.0 projects (big data, connected glasses, information systems and new control technologies) and the company has turned to new working and communication methods; implementation of digital tools to enable employees to carry out teleworking activities or to exchange information without travelling internally or with clients.

Amid growing consumer concerns about the environment, Verescence has fast-tracked projects to reduce the



Verescence has fast-tracked projects to reduce the environmental impact of its businesses and decarbonisation of the glass packaging industry.

environmental impact of its businesses and decarbonisation of the glass packaging industry. “The pandemic has accelerated challenges for the glass packaging industry related to CSR” Ms Marchand maintains. “Today more than ever, we need to be able to present the advantages of glass versus plastic, respond to the desire of consumers to ‘de-plasticise’ their beauty packaging and defend our local ecosystem.”

In September 2020, Agn es Pannier-Runacher, the French Minister for Industry visited the Mers-Les-Bains factory as part of the ‘France Relance’ (France Relaunch) economic, social and ecological recovery plan for the next 10 years. “Verescence will benefit from the support of the French government to pursue industrial investments related to energy efficiency and industry 4.0 in the context of the Covid-19 crisis” says H el ene Marchand. “We were also very proud to let (Ms Pannier-Runacher) discover our unique knowhow and to share with her our strategy for the coming years.”

Facing up to the future

“We are determined to stay on course of our Verescence 2022 project, despite a very strong storm (Covid-19) and at the same time, we want to accelerate some key topics; structural impact of the crisis on the demand, industry 4.0 and CSR – a very big challenge” acknowledges Ms Marchand.

“We know that the recovery of the beauty market may take time with ups and downs but we hope that this crisis will ultimately be beneficial for the market by strengthening our eco-system with stronger links with our suppliers and customers and accelerating key changes in the way we work and the tools we use. In the long-term, we aim to strengthen our company’s leadership but also to keep its pioneering spirit, which gives it agility, as well as the ability to anticipate and adapt to market changes. In addition, we want to be able to offer alternatives to plastic in all beauty categories and to be collectively, with all glassmakers, the best in class in terms of sustainability.

“One of the core values of our group is passion” H el ene Marchand concludes: “Passion for the beauty of the products we produce every day; passion for our material: infinitely recyclable and which can last for ever; passion for innovation, excellence and progress; and passion that unifies Verescence employees and will make it possible to go through this historic crisis and face new challenges.” ●

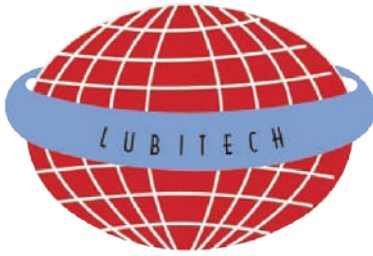
Verre Infini is a registered trademark of Verescence.



The Verescence Somme site.

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Architectural glass, a profound building material, has been in use for an exceptionally long time. Glass being a most versatile and fully recyclable material is considered as a green and sustainable material with high durability and long life.

In both residential and commercial buildings, the use of glass both as structural and non-structural members have increased drastically. Earlier glass usage in buildings was limited to only as window panes

either as transparent see-through plate or decorative coloured glass chips. With the notable progress in the glass science and processing technology, in the modern era most of the current commercial and residential buildings have Glass in complete envelopes, doors, wall to ceiling windows, skylights, staircase, balustrades, balcony etc. Innovative advancements in glass and glazing, such as switchable glasses provide privacy and transparency with just click of a button and many others

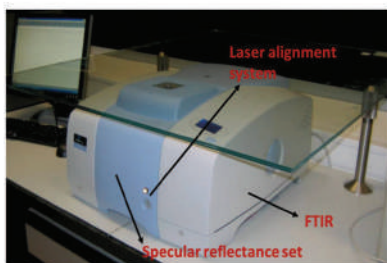
made glass as a smart construction material.

The various reasons why glass is being used extensively include Energy efficiency, thermal and acoustic comfort, structural integrity, safety, aesthetics etc. Using the right glass at the right place plays a major role in making glass a fully functional and as a performance material. With various options available in the market, choosing the right glass or glass combination for the desired performance is a significant step in designing a modern glass building. The parameters for different performance aspects are determined to evaluate the selection and use of the suitable glass for the building.

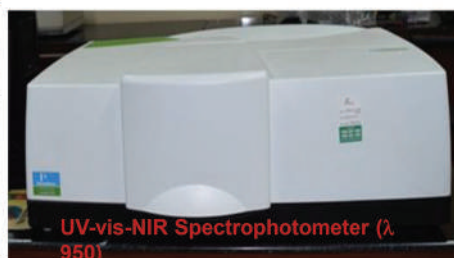
Quality and performance standards, regulatory compliance, research and testing are the four major pillars ensuring the right use of glass in buildings. With the launch of National Building Code (Ver. 2016) including a new section for Glass and Glazing, Energy Conservation Building Code (ECBC), Eco Niwas Samhita and the new 16 Indian Standards for Glass

Architectural Glass Research and Testing (AGRT) Facility

A joint initiative of CSIR-CGCRI and Glazing Society of India (GSI) for testing of energy and structural performance of architectural glass, glazing system



Energy performance testing of glazing system using FTIR spectrometer and UV-Vis-NIR spectrophotometer Make : Perkin Elmer



Energy Performance Testing:

- Solar Direct Transmittance
- Solar Direct Reflectance (External)
- Light Direct Reflectance (Internal)
- UV Transmittance
- Shading Co-efficient (SC)
- Emissivity & U Value
- Solar Factor (SHGC)
- Light Direct Reflectance (External)
- Light Direct Transmittance
- Solar Direct Reflectance (Internal)

and Glazing enables the users and the entire construction community to understand the quality and performance requirements of glass in buildings.

Currently, India has three world class research and testing facilities for Architectural Glass which includes AGRT facility at CSIR - CGCRI, SGRT Facility at IIT Madras and CARBSE at CEPT University in association with an exclusive technical organization for glass and glazing, Glazing Society of India. These four entities work on all the technical aspects, performance and safety testing requirements of glass and glazing in India.

Multiple research works have been undertaken and successfully completed in these bodies, which results in the creation of standards, determination of quality and performance requirements of glass and glazing suitable for the country. All these four entities work closely with Bureau of Indian Standards (BIS), Bureau of Energy Efficiency (BEE) and various other government organizations in the implementation of standards and the compliance

mechanism for the quality and performance of glass and glazing used in buildings.

The Architectural Glass Research & Testing (AGRT) facility was established in the year 2017 as a collaborative effort of Council of Scientific & Industrial Research (CSIR) -Central Glass & Ceramic Research Institute (CGCRI) and Glazing Society of India (GSI) for the research and testing of Architectural Glass and Glazing systems in India.

The AGRT facility is an integral part of the Specialty Glass Division of the CSIR-CGCRI serving the nation for all its performance, quality and safety requirements of glass and glazing used in buildings. AGRT facility is one of the recognized and approved centres by Bureau of Indian Standards for testing float glass (as per IS 14900: 2018) and safety glass (as per IS 2553: part 2) for ISI marking and certification.

AGRT facility carries out many research and testing activities related to Energy and Safety performance of glass, speciality glasses, coating durability analysis of glass and

many others. The AGRT facility works to maximize the economic, environmental, and social benefits in the areas of Glass and Glazing, for the people of India.

The AGRT facility has the advanced test capacities (Figs. 1 and 2) for the quality performance of float glass, safety performance of toughened and laminated glass, quality performance of Heat strengthened and Insulated glazing unit, thermo-physical and optical characterization of coated and clear glass, simulation tools for energy performance, quality and durability of coated glass, chemical composition analysis of glass and others.

Once a glazing is put in its place the cost of replacement is immense, hence choosing and checking the right glass at the design stage is important. As a consumer, to ensure the parameters mentioned by the Manufacturer or Processor are met, third party testing services are available to test all the kinds of parameters of architectural glass and glazing as per Indian and International standards in India. Quoting the words of John Heywood "make hay while the sun shines." test your glass and glazing at an early stage and choose the right glazing to build a safe and green glass building.

ACKNOWLEDGEMENTS:

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Architectural Glass Research and Testing (AGRT) Facility

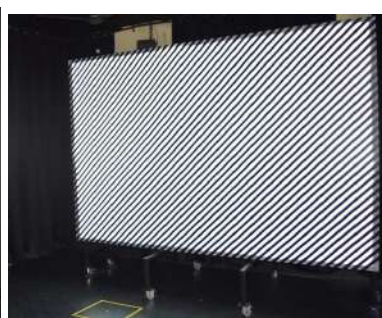
Float glass testing as per standard IS 14900: 2018



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DETERMINATION OF REAMS, STRINGS, LINES AND LINEAR FAULTS



DETERMINATION OF OPTICAL FAULTS
Zebra Board of 2500 mm x 2000 mm

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Determination of visual light transmittance
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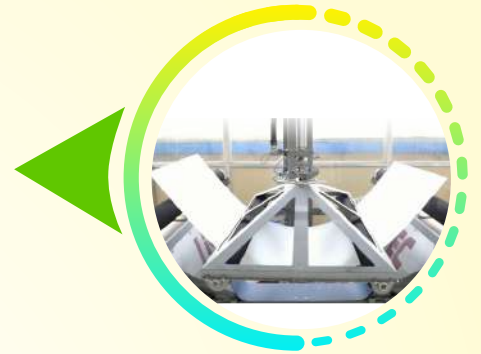
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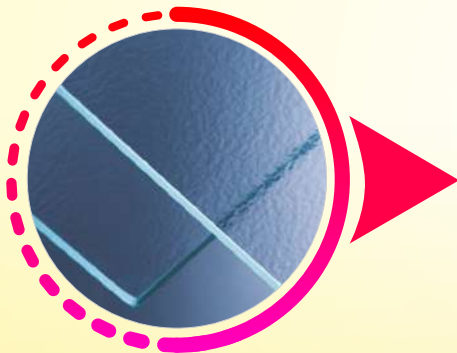
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What will it take to decarbonise the glass container industry?

By 2050, the glass container industry aims to achieve a major revolution, starting now, in the way it produces glass that is fit for a circular and climate-neutral economy. Public and private funding will be needed, as the following FEVE contribution explained in *Glass Worldwide* (preferred international journal of the AIGMF).



At present, for large scale furnaces, 80% of CO₂ emissions come from the combustion of natural gas used to melt glass

and 20% from melting virgin raw materials. Replacing these virgin raw materials with recycled glass is crucial to reducing CO₂ emissions but a more 'disruptive' route for decarbonising the production process is needed. The technologies and systems are not yet commercially available and public and private financial support will be instrumental in making breakthroughs, as well as the political will to enable this industrial revolution.

To support such a major transition to resource-efficient and low carbon production, a step change is needed at sector level to address the source of 80% of the CO₂ emissions. The use of renewable electricity in glass container production can, in theory, vastly reduce the CO₂ emissions from the combustion in the furnace but this technology is currently limited to small-scale furnaces for flint (clear) glass, with limited recycled glass content.

Innovative approach

The industry plans to challenge this and pioneer innovative electric melting on a commercial scale. Ardagh Group has volunteered to lead a coalition of 19 independent glass container producing companies that will fund, develop, build and operate a first of its kind (new technology), industrial scale, hybrid furnace for commercial production in Obernkirchen, Germany. The furnace will evaluate the required technical and market criteria for large-



scale electric glass packaging melting. The project is ground-breaking in terms of technology but also in terms of scope and collaboration within the glass container industry:

- It is sectoral: The European glass container sector has joined together to champion it. Supporting companies account for over 90% of EU glass container production, producing more than 80 billion containers annually.
- It is Europe-wide: The furnace will be built in Germany but the technical knowledge gained will benefit companies operating in 23 European countries to ensure quick and smooth scalability.

Strategic milestone

The joint 'Furnace for the Future' demonstration project represents a strategic milestone in securing not only the future of the European glass industry but also of the entire glass packaging value chain (food and drinks, pharma, perfumes, glass recyclers) that depend on it.

More than ever, the glass container industry is vital to the EU economy because it services the essential EU food, beverage and pharmaceutical sectors. Factories are currently working

around the clock to help meet the urgent demand for glass vials for coronavirus vaccines.

In addition to food, beverages and pharma, glass also serves high end alcohol, perfumery and cosmetics sectors in domestic markets and is an enabler for the export of these premium products across the world. Glass containers and items packed in glass drive more external EU export earnings (€250 billion) annually for Europe than plastics resins and pellets, organic chemicals or aircraft. More than 125,000 people work in the glass packaging value chain across Europe.


The container glass industry is potentially one of the few energy-intensive industries to have a clear pathway to decarbonisation through direct electrification but requires breakthrough technology such as the Furnace for the Future project.

This kind of project needs public funding to ensure scalability and the sharing of knowhow across the industry. The project is seeking funds from the EU's ETS Innovation Fund. FEVE commented: "We hope that public funds will go towards projects committed to enabling the transition to a resource-efficient and low carbon economy and that are unique in terms of scale, sectoral support and geographical breadth, as well as having the potential to revolutionise industrial manufacturing throughout Europe." ●

Further information:

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web: <https://feve.org/about-glass/furnace-of-the-future/>



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Benefits of Structured Project Management

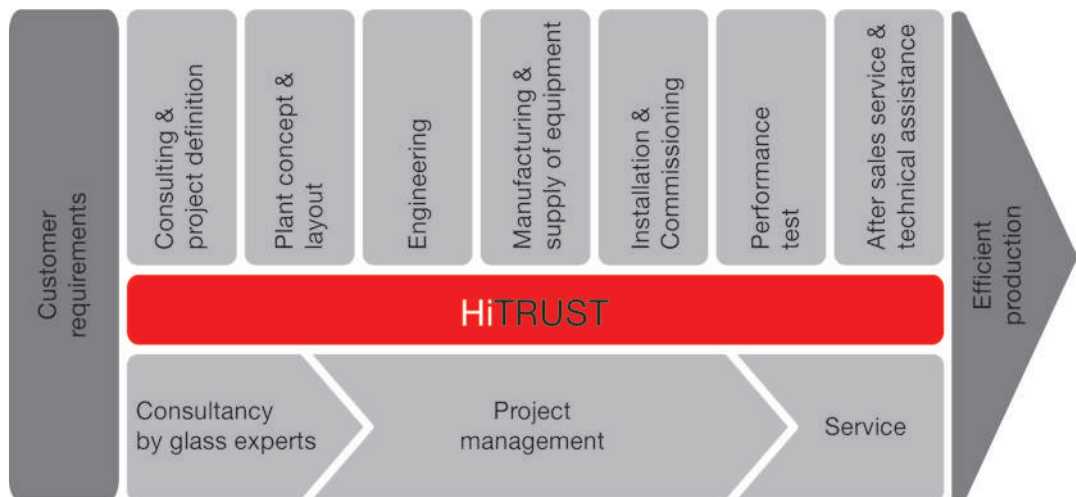
Keeping the overview is essential for every project. Many tasks are complex and need specialist knowledge and expertise. Sophisticated project management leads to specified and structured procedures during the entire project period, which finally helps to achieve the stipulated objectives in the shortest time. Heye International implemented a modern project management concept to fulfill customers requirements and bring the project to a success.



With a new investment, certain targets have to be kept. Finally it is all about budget, quality and time: The fixed budget may not be exceeded, the quality of products and practices must be satisfactory and the time schedule has to be kept. There is often an overwhelming amount of information when it comes to a new investment in a glass production facility. When Heye gets a machine order, the company handles all commercial and technical processes with a structured and permanently reviewed project management system, called “PM@Heye”. According to the project’s type and scope the basic structure can be adapted and customised. In the first phase Heye’s Sales Managers finally clarify all technical and commercial points with the customer before they hand over the project to

the project manager, who then is the permanently responsible contact person during the entire project (“one-face-to-the-customer”). The project management processes at Heye are well-organized and transparent to the customer. In each stage of the project, the customer is informed on the latest status, kept in the loop, with a comfortable “one-face-to-the-customer” approach.

With the invention of the SpeedLine IS-Machine, Heye’s flagship within the Hot End portfolio, tremendous improvements in project time-schedules have been generated based on standardised parts logistics, modular assembly and the integration of many sub-systems into the factory-assembled and factory-tested machine. This also allows the machine to be installed and put into operation in



Phase 1	OPENING
	<ul style="list-style-type: none"> • Final customer meeting <ul style="list-style-type: none"> - Commercial and technical clarification - Placement of purchase order / contract signing
Phase 2	PLANNING
	<ul style="list-style-type: none"> • Heye internal project handover from Sales to Project Management department • Customer kick-off: <ul style="list-style-type: none"> - Introduction of the Project Manager - Verification of the scope of supply - Project planning including milestones for delivery, start-up and training - Determination of start-up containers • Continuous customer communication
Phase 3	PRODUCTION
	<ul style="list-style-type: none"> • Production phase • Testing and verification of machinery and equipment • Preparing of readiness for shipment
Phase 4a	TRANSPORT
	<ul style="list-style-type: none"> • Transport and shipping process in accordance to agreed Incoterm
Phase 4b	INSTALLATION AND COMMISSIONING
	<ul style="list-style-type: none"> • Arrival of machinery and equipment at site • Installation • Training • Cold run and approval for first glass • Commissioning • Approval of readiness for packing bottles by customer • Acceptance
Phase 5	COMPLETION AND LESSONS LEARNED
	<ul style="list-style-type: none"> • Final project meeting of customer and Heye Project Management • Lessons learned • Special support until end of warranty period

the shortest time due to standardised processes, less interfaces and its modular and premounted design. Under best conditions, a skilled Heye installation team can move and install a SpeedLine IS-Machine within a period of 15-20 days from unloading from a truck until the start of the cold-run. Start-up and performance-run is an important part of the project and the experienced Heye service team is able to achieve full machine performance already two days after hot production starts. During all these

project stages, the project manager is the link between all acting groups and the customer.

The schedule above gives an overview of all typical project phases (here: Hot End project of an IS-Machine).

These single phases have proved a useful tool to structure and manage the complexity of many projects. By stipulating and maintaining these project goals and sub-goals in their single phases, the overall goal is usually better achieved and customers

are satisfied, as Mr. Ralph Versluis, Production Technology Manager at Ardagh Glass Europe, confirms: *“Since my cooperation with Heye I have been involved in many projects and I also met several project managers. The process PM@Heye is certainly a main driver for an effective flow through the different phases of a project and finally for a successful start of a machine. I am a strong believer that good processes drive good results. The main focus for the cooperation with Heye has always been on the process and the transparency. A mutual understanding of what the needs are and how those can best be translated into the project process is what has driven the good results over the latest projects.”*

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 five decades. Extensive industry expertise, combined with the positive attitude and enthusiasm of Heye International employees is mirrored by the company motto ‘We are Glass People’. Its three sub-brands HiPERFORM, HiSHIELD and HiTRUST form the Heye Smart Plant portfolio, addressing the glass industry’s hot end, cold end and service requirements respectively ■

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Mr. M.D. Farooq
(Founder)

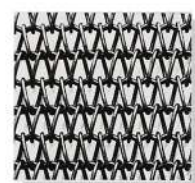
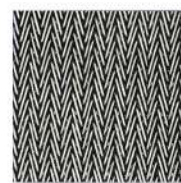
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Mr. M.D. Farooq, the founder of Umda Engineering, brings to the table more than 35 years of expertise in the manufacturing industry. Starting from humble beginnings, today more than 350 of Mr. Farooq's Lehr machines are successfully installed around the world.

Mr. Farooq is best recognised as one of the co-founders of TNF Engineering, a company known across the industry as not only the leading manufacturers of Metallic Wire Conveyor and Lehr belts but also of Glass Plant Equipment. This mantle of superior performance and expertise has now been passed on to Umda Engineering.

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