Vol. 10 | No. 4 | January - March 2023

Kañch

Celebrating 80 Years of AIGMF
1944 2023
The All India Glass Manufacturers' Federation

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

Bi-lingual

Special Feature

Upcoming Events

AIGMF since 1944

The All India Glass Manufacturers' Federation
invites Project work

on

Green Energy via Solar Glass

विषय: सोलर ग्लास से हरित ऊर्जा

Project can be supplemented by a Model / Essay / Poem / Drawing / Photography

Send Entries at info@aigmf.com
Last Date of Submission: 25th July 2023
(International entries are welcome)

GRAND PRIZE:
Stand a chance to win ₹25,000
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Salient Features of Glass:
- Transparent
- Sustainable
- Fully Inert
- 100% Recyclable
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- Enables Communication
- Eco-Friendly

Age Group: 7-24 Years

Top 100 entries get a specially designed 80 Years AIGMF Glass Mementoes

1st Prize ₹25,000
2nd Prize ₹15,000
3rd Prize ₹10,000

Winners will be announced on:
INTERNATIONAL YOUTH DAY
12th August 2023

Best entries will be published in:
Glass News, Kañch
and at: www.aigmf.com

SUPPORTED BY:
ICG International Commission on Glass
glass WORLDWIDE
CSIR-Central Glass & Ceramic Research Institute

TERMS & CONDITIONS:
1. The entrant should be aged between 7-24 years
2. Only one project per applicant, either neatly hand-written or computer typed or animated work needs to be submitted with self-declaration about the ownership of the project
3. **All entries need to be mailed at info@aigmf.com with any Photo ID issued by the Govt. *(as Address and Date of Birth proof)* or Passport or School/College ID, along with 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. Kanch, Glass News 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 write-up 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 25th July 2023 *(Date is subject to change)***
7. **There is no entry fee for this contest**

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Tubular Glass Range

Material: Type I Borosilicate Glass
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Syringes and Cartridges in Clear Glass
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Crimp Neck Press Fit, Blowback
Ampoules: OPC, Break / Score Ring, Form:
B, C, D Printed / Non printed, treated / non treated

Syringes & Cartridges Range

Material: Type 1 Glass
Syringes and Cartridges in Clear Glass
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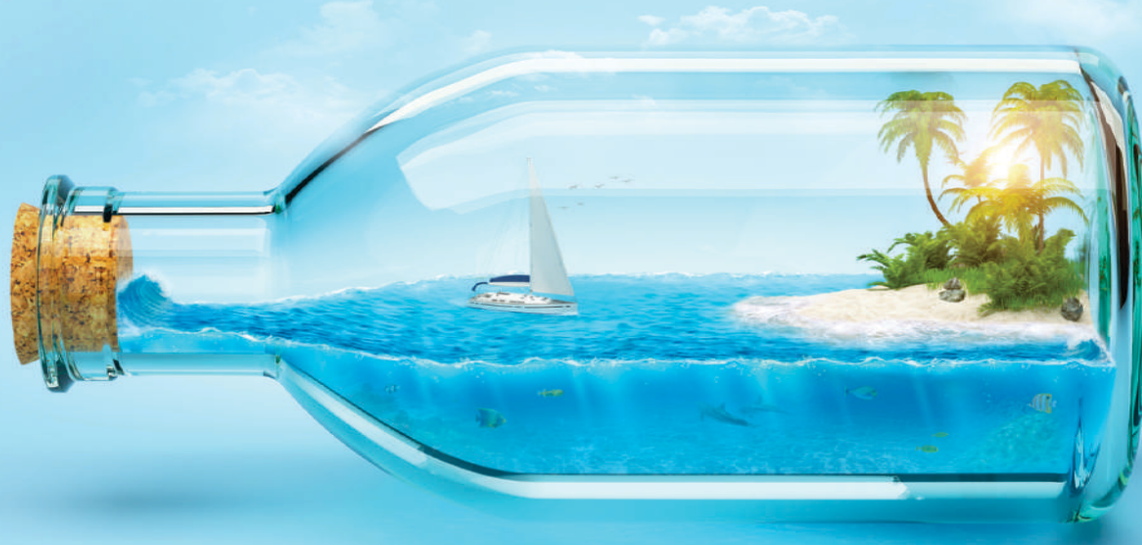

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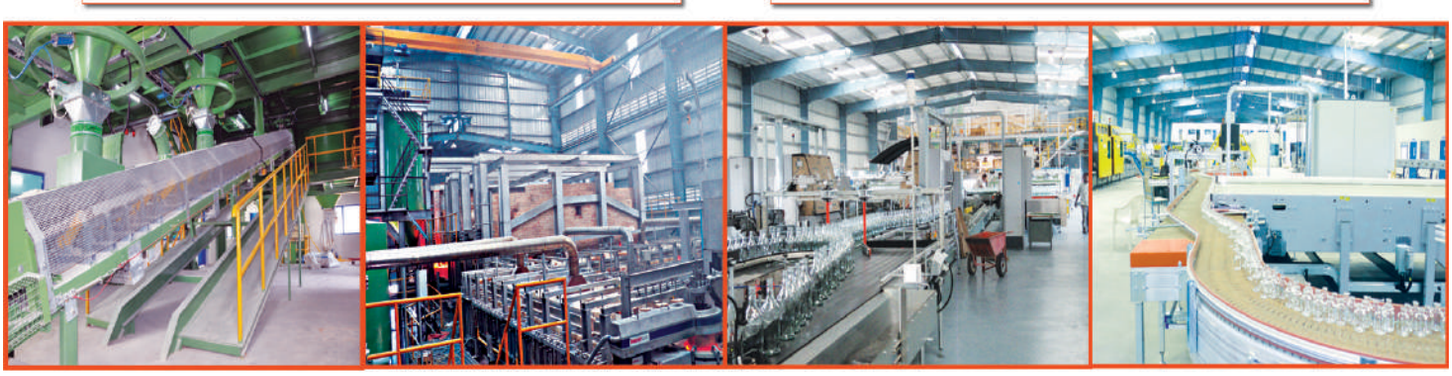

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Kañch

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

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From President's Desk

The first quarter Executive Committee meeting of The All India Glass Manufacturers' Federation (AIGMF) started with 80 years celebrations, which was hosted by M/s Nirmal Glasstech Industries Pvt. Ltd., at Kundan Van, Jaipur, Rajasthan.

Former Presidents and Office Bearers unveiled the 80 Years AIGMF Mementoes. I would sincerely like to thank Mr. Ajit Jhunjhunwala of LaOpala RG Ltd., for sponsoring and arranging the elegant Mementos specially designed for AIGMF.

A special thanksgiving ceremony was organised, where Former Presidents of the AIGMF were felicitated by presenting the traditional shawls over the photo shoot-outs. And Motto was set to reach 100-years' celebration in the flying colors.

Parallel to the Executive Committee meeting, a special session on Investment opportunities in the state of Rajasthan was organized wherein Mr. Kulveer Singh, Additional General Manager, Rajasthan State Industrial Development & Investment Corporation Limited (RIICO) gave a presentation on the lucrative opportunities that could be made available in various RIICO Industrial hubs for the glass manufacturers.

Another special session was kept on the Innovative Glass Melting Technologies – A patchwork of progress wherein Mr. Aston Fuller, General Manager and Mr. MasimbaToperesu, R&D Projects of Glass Futures Ltd., United Kingdom gave a presentation by covering the following main topics: Progress across the global glass industry for decarbonization; The selection of technologies for different regions; Discussions about how to drive global collaborations and an update on the Glass Futures facility and what access Indian innovators can expect.

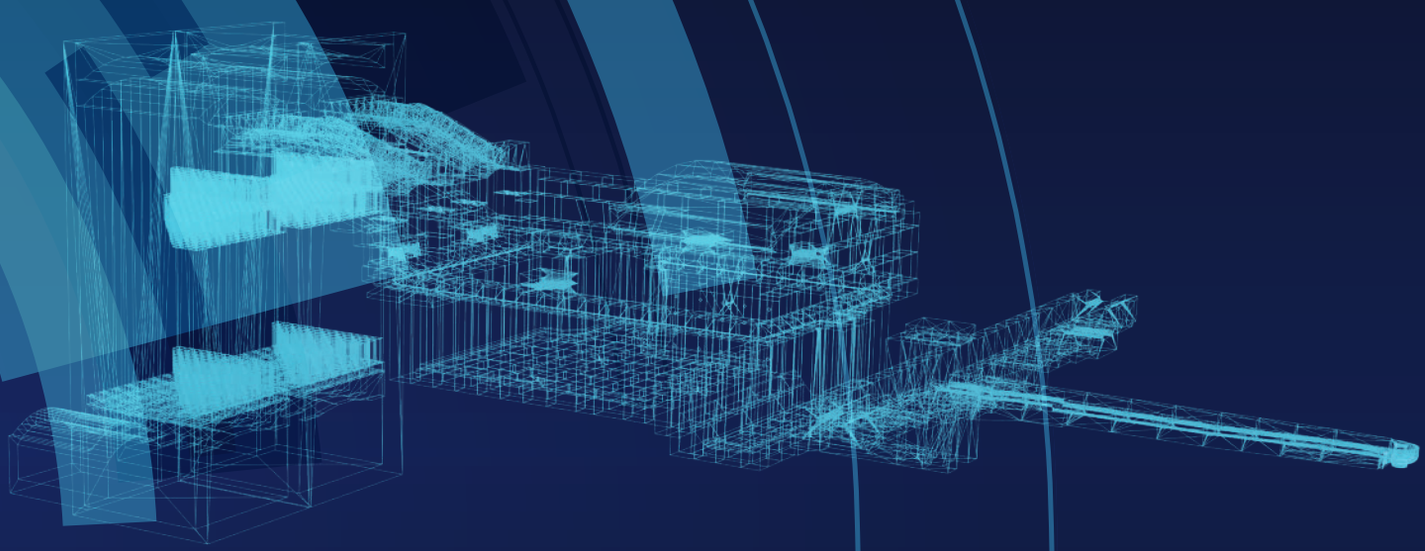
I would also like to thankfully acknowledge the support of M/s Nirmal Glasstech Industries Pvt. Ltd., Jaipur for organizing a power packed event for the benefit of Glass Manufacturers. The event saw participation of approx. 80 stakeholders comprising Glass manufacturers, Machinery suppliers, consultants and research organizations thereby benefitting the glass industry to debate on programs aimed for the betterment of environment and health issues.

The event concluded with a Gala Dinner and a cultural show, which saw hundreds participate from Rajasthan and pan-India to celebrate 80 years of the AIGMF as well as the 25th birthday of Mr. Aditya Mundra, Executive Director, Nirmal Glasstech Industries Pvt. Ltd. On March 26, the guests were taken for a sightseeing and visit to Amer fort. As a token of appreciation, a glass memento gift set was given to all participants to mark the special milestone of the AIGMF.

The next Executive Committee meeting will be held at DoubleTree by Hilton on June 17 at Ahmedabad and will be hosted by M/s Gopal Glass Works Ltd. The event at Ahmedabad will celebrate the World Environment Day where discussions will focus on Solar Glass, Cullet- Glass Recycling and Air Quality in Glass Manufacturing. I invite all Members to be a part of some interesting discussions ■

Sanjay Agarwal
President AIGMF and
Director, Kwality Glass Works, Firozabad

WE SHAPE
A CARBON-NEUTRAL
GLASS INDUSTRY FOR A BRIGHTER FUTURE



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GLASS News

SCHOTT LAUNCHES PRODUCTION OF AMBER PHARMA GLASS IN INDIA TO MEET INCREASING DEMAND

To meet the increasing demand in Asia, SCHOTT invested 75 million euros (approx. INR 660 crores) over the last three years to expand its pharma glass production in India. The Gujarat-based facility is the company's manufacturing hub for borosilicate glass tubing, a high-quality material that is converted to pharmaceutical containers, such as vials, ampoules, or syringes, to store life-saving drugs. This expansion contributes to the Indian government's vision of further strengthening India as a global pharmaceutical hub, while also supporting Germany's commitment to increasingly invest in India – as recently agreed upon by Chancellor Mr. Olaf Scholz and Indian Prime Minister Mr. Narendra Modi. At the official opening event, local government officials, business unit executives, and pharma industry representatives celebrated the start of a new production of FIOLAX® amber pharmaceutical glass tubing. With this move, manufacturers of drug containment solutions in the region can now receive SCHOTT's complete portfolio of pharmaceutical glass tubing produced in India. Amber glass is used to store light-sensitive medications such as antibiotics or chemotherapeutic agents. The local production will also improve availability, planning reliability, and cost efficiency for pharmaceutical converters.

"As part of our strategy to manufacture close to our customers, we are enabling their growth plans by ensuring a sufficient regional supply of high-quality pharmaceutical glass tubing," says Dr. Patrick Markschläger, Executive Vice President of SCHOTT's Business Unit Tubing.

Since breaking ground for construction of the expansion in 2021, the company has achieved its first milestone: "We have been a reliable partner for the healthcare industry in India for decades and are pleased to expand our local footprint even further. We would like to thank the local authorities and our partners for making this project a success", explains Mr. Pawan Shukla, Managing Director, SCHOTT Glass India.

As a global leader in pharmaceutical glass manufacturing, SCHOTT offers a wide range of products and services to help store injectable medications safely. The company's FIOLAX® borosilicate glass portfolio has been the gold standard for pharmaceutical packaging for more than a century. *"We combined Indian and European state-of-the-art technologies with local skills to manufacture premium quality borosilicate glass tubing. This unique mix allows us to offer specifications that meet the high standards of the international pharma industry",* states Mr. Shukla.

SCHOTT's facility in Jambusar uses automation, big data, and smart manufacturing technologies such as perfeXion® to detect even the tiniest deviations in the glass tubing, enhancing quality above the industry standard.

SAD DEMISE OF R K SOMANY, CMD AGI GREENPAC LTD.

CMD AGI Greenpac Ltd., Dr. R K Somany passed away on January 20 at the age of 85.

Dr. Somany was keeping unwell for the last few days.

A prayer meeting was kept on Jan 23 at Chinmaya Mission at New Delhi in remembrance of the departed soul.

PROF. A S RAO APPOINTED AS MEMBER EDITORIAL BOARD OF KANCH

Prof. A S Rao *(extreme left)*

In the Executive Committee meeting held on March 25 at Jaipur, Prof. A S Rao, Head, Department of Applied Physics, Delhi Technological University was appointed as the Member Editorial Board of KANCH.

At the 6th Research Excellence Awards function held at the Delhi Technological University (DTU) on 16 April 2023, Prof. Rao was conferred with the Cumulative Citation Award in the Gold category; Early Research Impact and Influence Award; and 13 papers under the commendable research award category co-authored by his research students at the DTU.

NIRMAL GLASSTECH INDUSTRIES AT MIR STEKLA

An AIGMF Member and a leading glass machinery supplier M/s Nirmal Glasstech Industries participated at the 24th International Exhibition MIR STEKLA 2023 from Feb 28 till March 3 at EXPOCENTRE Fairgrounds, Moscow, RUSSIA.

P K KHERUKA WINS E&Y INDIAN ENTREPRENEUR OF THE YEAR 2022 AWARD IN MANUFACTURING

Mr. Pradeep Kheruka, Chairman Borosil Ltd., was named E&Y Indian entrepreneur of the year 2022 award in the Manufacturing category.

A seven-member jury led by former ICICI Bank Chairman Mr. KV Kamath selected the winners, while Hon. Union Minister Mr. Hardeep Singh Puri was the chief guest at the awards ceremony.

ŞIŞECAM RECEIVES 'BEST ORGANIZATION IN TRAINING AND DEVELOPMENT' AWARD

Şişecam, a global player in the glass and chemicals industries with 24,000 employees in 14 countries spanning four continents received the 'Best Organization in Training and Development' award at the BEST Awards. Organized by the Association for Talent Development (ATD), a globally renowned authority in its field, the BEST Awards recognized the activities of Şişecam Academy, where Şişecam conducts employee training and development activities.

To date, Şişecam Academy has delivered a total of 2,750,000 hours of training to over 52,000 persons. The Academy operates with the vision of being the leading development center that trains value-adding employees. The Association for Talent Development recognizes Şişecam Academy as one of the largest corporate academies in the world today.

Established in 2016 to contribute to Sisecam's corporate goals, improve human resources competencies and foster employee engagement, Şişecam Academy carries out development activities that continuously support its employees and stakeholders in its ecosystem.

Mr. P K Kheruka recieving award from Hon. Union Minister Mr. Hardeep Singh Puri

Şişecam employees can pursue their career development in line with their career goals by attending specialized schools for different functions. Şişecam Academy's strategies, practices, and standards are expanded in Şişecam's operating countries. As a result, employees from different territories meet in the same training environment and benefit from each other's knowledge and experience. At Şişecam Academy, development opportunities are not limited to employees. Development programs are offered to all stakeholders with training content that will improve the entire Şişecam ecosystem. The

Academy offers Şişecam employees in-class and e-learning programs under the hybrid learning model. Şişecam Academy also provides the opportunity for employees to benefit from the world's leading learning resource providers on the Unlimited Learning Platform.

Since 2003, the BEST Awards have recognized exceptional organizations that create added value by aligning their training and development efforts with their strategies in the best way and supporting their employees with pioneering development opportunities.

R SUBRAMANIAN FELLOWSHIP IN SCIENTIFIC RESEARCH ON GLASS AND GLAZING

The First Annual Awards of R Subramanian Fellowship Program was held on 31st March 2023 at the School of Planning and Architecture in New Delhi.

Mr. Omprakash and Ms. Tripti Singh Rajput, PhD students under the guidance of Prof. Albert Thomas from IIT Bombay won the First "R Subramanian Fellowship" Award. The Fellowship Award was given by Dr. Ajay Mathur, Director General, International Solar Alliance in the presence of Mr. Gopal Ganatra, Chairman Glazing Society of India; Mr. Sanjay Seth, Senior Director, The Energy Resources Institute (TERI); Mr. Gohul Deepak, Executive Director, Glazing Society of India; Mr. Lalit Yadav, Member GSI and Members from Industry and Academia. The topic which won the Fellowship Award was *"Development of SIMecc-Opt framework for optimizing glazing parameters enhancing residential building thermal comfort and energy performance at minimum life cycle cost"*.

The R Subramanian Fellowship Award consists of a Fellowship grant of Rs. 1.5 lakh, complete support and guidance from the Glass and Glazing Industry and huge credibility and recognition on successful completion of the project.

In his Chief Guest Address, Dr. Ajay Mathur said that the Research Fellowship Program is a milestone in the Glass and Glazing Industry and insisted that more such research initiatives are required for the glass building sector in addressing the challenges and scaling up to next level of excellence.

Mr. Sanjay Seth made a special address in the event and said that the dream of Mr. R Subramanian in building research programs at the institute level had become a reality and it would create a great momentum in the glass research in India.

Mr. Gopal Ganatra, Chairman, Glazing Society of India, made the Welcome address and said that the glass sector has seen tremendous growth over the past few years and is now one of the leading industries in the country and this program was started at the right time to boost research at the institute level and thereby would support the glass and glazing industry in a major scale.

Mr. G N Gohul Deepak, briefed the audience about the R Subramanian Research Program and its system and process in selecting the winners. Mr. Lalit Yadav made the vote of thanks. The Event was attended by 150+ participants from Industry, Academia and Government bodies.

About R Subramanian Fellowship Program: *The program was launched in the memory of Late Mr. R Subramanian, the Founder Chairman of Glazing Society of India. With a view to encourage research in the field of glass and glazing in India, the Fellowship program objective was to encourage and build research on glass and glazing in India. The research fellowship will focus on the quality, performance, innovations, applications, and functional aspects of building materials like glass, profiles, frames, façade & fenestration, sealants, films etc. The RS Fellowship Award will provide monetary & technical support, credibility and recognition for the selected awardees. Research will be conducted by students under the guidance of Professors of the respective Institution and Industry.*

The process and the guidelines for the RS Fellowship Awards was set by the "RS Fellowship Awards Advisory and Technical Committee (RS FAATC)". The first set of awards was announced in September 2022 for Premium Institutions with Post Graduate Students and PhD Scholars in the areas of Architecture, Engineering and Technical Studies in India. And 10 research abstracts were received from Students from various premium institutions (including IITs, NITs, CEPT and CSIR-CGCRI) across the country. The Eligible Students made presentation to the Eminent Jury Team of RS Fellowship Awards and the Jury selected the Final Award Winners. The JURY team members were from Government bodies, Industry and Academia.

PRAGATI GLASS AND INDUSTRIES PVT LTD EXPANDS ITS PRODUCTION CAPACITY

Besides manufacturing packaging accessories, the company manufactures a Million glass containers a day for Cosmetic & Perfumery, Food Processing, Pharma and others.

President Mr. H R Bhandari announced an addition of another Million glass containers from April 2023 as the new furnace has become operative with five production lines.

This will cater to the growing demand for packaging in Domestic as well as International markets.

CONTAINER GLASS INDUSTRY WELCOMES GREEN CLAIMS PROPOSAL

The European Container Glass manufacturing industry supports the intention of the European Commission's Green Claims proposal to ensure that consumers and businesses have access to reliable, comparable, and verifiable information to make sustainable decisions and avoid the proliferation of misleading green claims.

European Commission proposes a legal framework to enable companies substantiate their green claims based on reliable assessment. The methods used for calculating sustainable impacts though still have large gaps and it is welcome that the proposal takes an open approach to prescribing methods that can be used to ensure credibility, reliability, transparency, robustness, and clarity of the claims being made.

Even the EU Product Environmental Footprint (PEF) methodology (2), based on Life-Cycle-Assessment (LCA), has large gaps, which need to be addressed to improve its robustness and reliability. In particular, some environmental impacts of products – such as the circularity of packaging, its infinite recyclability, the avoidance of food waste, littering, biodiversity, toxicity, etc. – are not yet or sufficiently taken into account.

Until now, sustainable packaging assessments have focused mainly on environmental impacts such as CO_2 emissions, but human health effects must not be understated, and should be equally measured.

Sustainability assessments are complicated, and this proposal goes a long way to help consumers know more about what they are buying based on verified claims.

SURYA ROSHNI LTD LIGHTING PLANT FELICITATED BY BUREAU OF INDIAN STANDARDS (BIS)

An AIGMF Member, Surya Roshni Ltd., Lighting Plant, Malanpur Factory has been felicitated at the BIS organised program of Management Systems Licensees on 17th March for consistent compliance to the Management Systems as per ISO STANDARDS.

SCHOTT ENTERS PPA WITH CLEANMAX FOR WIND SOLAR HYBRID PROJECT

The international technology group SCHOTT has entered into an agreement with CleanMax Enviro Energy Solutions, Asia's leading C&I renewable energy company for purchasing green energy from a 5.5 MW renewable energy (Wind – Solar hybrid) project in Babra, Gujarat.

The green energy will be utilized to run SCHOTT's operations at its glass tubing factory in Jambusar, Bharuch, Gujarat. This agreement comes under the aegis of SCHOTT's commitment to becoming climate neutral across its production by 2030. To switch its electricity supply to 100% green energy, SCHOTT is also relying on power purchase agreements (PPAs). PPAs are contracts with operators of renewable energy plants, such as wind or solar farms.

CleanMax will set up and operate a hybrid power plant with a capacity of 3.6 MW Wind and 1.9 MW Solar and supply power to SCHOTT's glass facility in Jambusar, Gujarat (India). [CF1] The PPA is for a period of 20 years.

Mr. Kuldeep Jain, MD CleanMax, said, *"CleanMax strives to be the sustainability partner of choice for corporates and companies. This PPA with Schott Glass is another feather in our cap and we are proud to aid the sustainability efforts being undertaken at Schott Glass."*

Welcoming this move, Mr. Pawan Shukla, Managing Director SCHOTT Glass India, said, *"We are very proud to have signed this PPA with CleanMax as a part of our global commitment to become climate neutral. Apart from the fact that this will reduce our energy cost by a significant percentage, it is our valuable contribution to India's aim to reduce carbon emissions by 45% by the end of 2030".*

The 5.5 MW Wind – Solar hybrid project will lead to carbon abatement of approximately 16,000 tons CO_2 equivalent annually. This is equivalent to planting 420 trees or taking 2,750 cars off the roads. This project capacity is part of a larger wind solar hybrid farm being developed by CleanMax in

Hindustan National Glass and Industries Ltd., celebrated Safety Week from March 4-10, 2023 at their HNG Bahadurgarh Plant, Haryana. The Theme was 'Zero Harm'.

Babra, Gujarat. The overall capacity of the CleanMax wind solar hybrid farm will stand at 400 MW, leading to carbon abatement of more than 870,000 tons CO_2 equivalent annually.

In 2020, SCHOTT had announced its plan to become climate neutral across its production by 2030. The company wants to achieve its goal of climate neutrality through an action plan with four pillars. It is focusing on technology change in addition to switching to 100% green electricity. Another field of action is improving energy efficiency. The last step in the company's plan is compensating its remaining emissions. The company has launched important projects to develop more climate-friendly melting technologies.

Specialty glass production requires a lot of energy. To manufacture pharmaceutical glass tubing, or protective smartphone cover glass, SCHOTT requires temperatures of up to 1,700 °C to melt the raw materials for glass. Its melting furnaces have primarily relied on fossil fuel natural gas. They consume the largest share of energy at SCHOTT, and therefore cause most of its carbon emissions.

At the start of the Zero Carbon program, SCHOTT's global emissions were around one million tons of carbon dioxide equivalents (CO_2e). By 2022, the company has reduced its carbon emissions by more than 60%, despite an increase in energy consumption due to production facilities' high-capacity utilization and the construction of new ones.

AIGMF MEETING WITH RESEARCH STUDENTS FROM FREE UNIVERSITY, BRUSSELS

AIGMF Secretary met students of the Free University of Brussels, who were a part of the trade mission in India and were supported by the Belgian Embassy and Flanders Investment & Trade (FIT).

The trade mission was in India from 3-20 April 2023, during these three weeks Ms. Yanissa Lacaeyse (Masters in Communication Sciences at the Free University of Brussels) representing MU nv., conducted a market study and also explored cooperation opportunities with container glass companies.

MU nv is a Belgian company that specializes in gas burners for annealing ovens in container glass factories. The burners can be used in other brands lehrs, like the burners of Pennekamp, Antonini, Bowman, etc. The company also provides some spare parts used in annealing lehrs for containers in glass.

Another Masters student of Business and Technology, Ms. Hannelore Muyldermans at the Free University of Brussels) represented a software company Synerglass-soft. She also conducted a market study and explored cooperation opportunities with flat glass companies.

Synerglass-soft is a Belgium company that offers ERP software and add-on modules for the existing software to manage the activities of the flat glass processing companies.

Both students were welcomed at the Secretariat on April 5, where Secretary Mr. Vinit Kapur gave an overview

about the Indian glass industry, also, helped them set up a few meetings in India with prospective partners. Both the students were presented a calendar glass bottle 2023 each as a goodwill gesture.

NIPRO PHARMAPACKAGING IS NOW GREAT PLACE TO WORK CERTIFIED!!

Nipro PharmaPackaging India is part of Nipro Corporation Japan. Nipro, a global healthcare company employs over 35k colleagues and has a culture of high performance, customer focus, and employee engagement. This has led Nipro PharmaPackaging India to being awarded with the certificate of the Great Place to Work – Oct' 22 – Oct' 23. In addition to the above achievement, Nipro PharmaPackaging India has now earned its recognition as being one of the top 50 "India's Best Workplaces in Manufacturing 2023". Nipro prioritizes customer satisfaction and encourages employees to go above and beyond for patients and their families. Nipro also focuses on employee engagement and continuous improvement to foster a sense of ownership and accountability among employees. Mr. Ashish Moghe, the Managing Director of Nipro in India, states, *"At Nipro, we believe that our employees are our greatest asset." Nipro's dedication to investing in its workforce is a key factor in its success. All colleagues unite in Nipro's pursuit for people everywhere to be able to lead a longer and better lives."*

"In 2022, Nipro PharmaPackaging India gathered further pace in the last year and crossed a few milestones. One such milestone was getting certified as a Great Place To Work! The Great Place to Work® Certification Program is the first step for an organization on its journey of building a High-Trust, High-Performance Culture™ and our organization has successfully accomplished this milestone.

To continue the same path of progress and development for us as individuals and as an organization we also enrolled ourselves for assessment for yet another prestigious certification, which is TOP 50 India's Best Workplaces in Manufacturing 2023. This year, 201 organizations in the Manufacturing sector undertook this assessment. All these organizations underwent a rigorous assessment.

The results are finally out, and it gives me immense amount of joy and pride to share that both plants of Nipro PharmaPackaging India (Meerut & Pune) HAVE WON THIS CERTIFICATION!!

I feel honoured to be a part of such a fantastic team. Looking forward to creating many more milestones"

Mr. Juned Akhtar, (General Manager- Human Resource, Nipro PharmaPackaging India Pvt. Ltd.) states *"We are thrilled to receive the recognition as "India's Best Workplaces in Manufacturing 2023". We are committed to fostering an environment of transparency, teamwork, and participation. Our organization promotes bonding among colleagues and encourages continuous improvement. Our team takes pride in working for a Great Place to Work certified company, and this recognition not only attracts top talent but also builds loyalty among our employees. The Trust Index study conducted by Great Place to Work provides valuable insights for us to improve as an organization. We strive to be an employer of choice and this recognition is a testament to our efforts.*

We believe that by focusing on our employee's growth and engagement, we create a positive and productive work environment, which leads to improved customer service and the overall success of our organization. It is our ambition to have colleagues thrive and achieve their full potential."

Welcomes its New Members

Company	Products / Services
V&K Recycling Co. 54 Rajdeep Park, Odhav Industrial Post National Highway, Ahmedabad Contact: Mr. Kartik Morar, Proprietor +91 98984 73557 & 98980 73557 kartik@vnkrecycling.com	V&K Recycling Co., has its core focus on providing comprehensive hi-tech engineering solutions and **turn-key projects for processing different types of glass cullet into Furnace-Ready qualitative raw** material at lowest possible operating cost. V&K Recycling Co., currently serves India and Middle East's glass processors in Flat, Container and Fiberglass sectors. V&K Recycling Co., helps the glass industry streamline their cullet sourcing, sorted and unsorted from their local and global business connections. V&K Recycling Co., provides similar services to organise qualitative and quantitative processing of diverse range of materials like Waste Papers, Plastics, MSW, E-Wastes and minerals like Quartz, Feldspar, Limestone, Manganese, Coal etc. V&K Recycling Co., also specialises in offering similar sorting technologies and projects for non-ferrous metals of all grades for Aluminium, Copper & copper alloy scraps, Stainless steels, E-wastes, etc.
Navrang Refractories Pvt. Ltd. 14 Km, Ajmer Road, Raisingh Pura, Bhilwara Rajasthan 311001 Contact: Mr. Yash Mukhija, Director +91 91165 27200 & 97993 90263 navrangrefractories@yahoo.co.in	Manufacturer of Insulation Bricks, mortar, etc.

Membership of the Federation

Members of the Federation are classified into two categories; manufacturers of primary glass articles are enrolled as **Ordinary Members** of the Federation and suppliers to the glass industry viz., suppliers of machinery, raw materials, consultants and others connected with the glass industry are enrolled as **Affiliate Members**.

Foreign Companies supplying machinery etc., to the glass industry are also enrolled as **Affiliate Members**.

Membership forms can be downloaded from www.aigmf.com/membership.php

Members of the Federation are enrolled on the recommendation of Zonal Associations viz.:

- Eastern India Glass Manufacturers' Association (EIGMA)
- Northern India Glass Manufacturers' Association (NIGMA)
- South India Glass Manufacturers' Association (SIGMA)
- Uttar Pradesh Glass Manufacturers' Syndicate (UPGMS)
- Western India Glass Manufacturers' Association (WIGMA)

ADMISSION FEE / ANNUAL SUBSCRIPTION

Ordinary Members:

- Admission fee ₹ 5,000/-
- Annual subscription: Single Unit: ₹ 30,000 + GST as applicable
- More than one Unit: ₹ 1,20,000 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 1,40,000 for a single Unit and ₹ 5,50,000 for more than one Unit + GST as applicable

Affiliate Members:

- Admission fee ₹ 5,000/-
- Annual subscription: ₹ 12,000 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 55,000 (including admission fee) + GST as applicable

Affiliate Members from countries other than India:

- Admission fee US $ 200
- Annual subscription: US $ 500 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of US $ 1,800 (including admission fee) + GST as applicable ■

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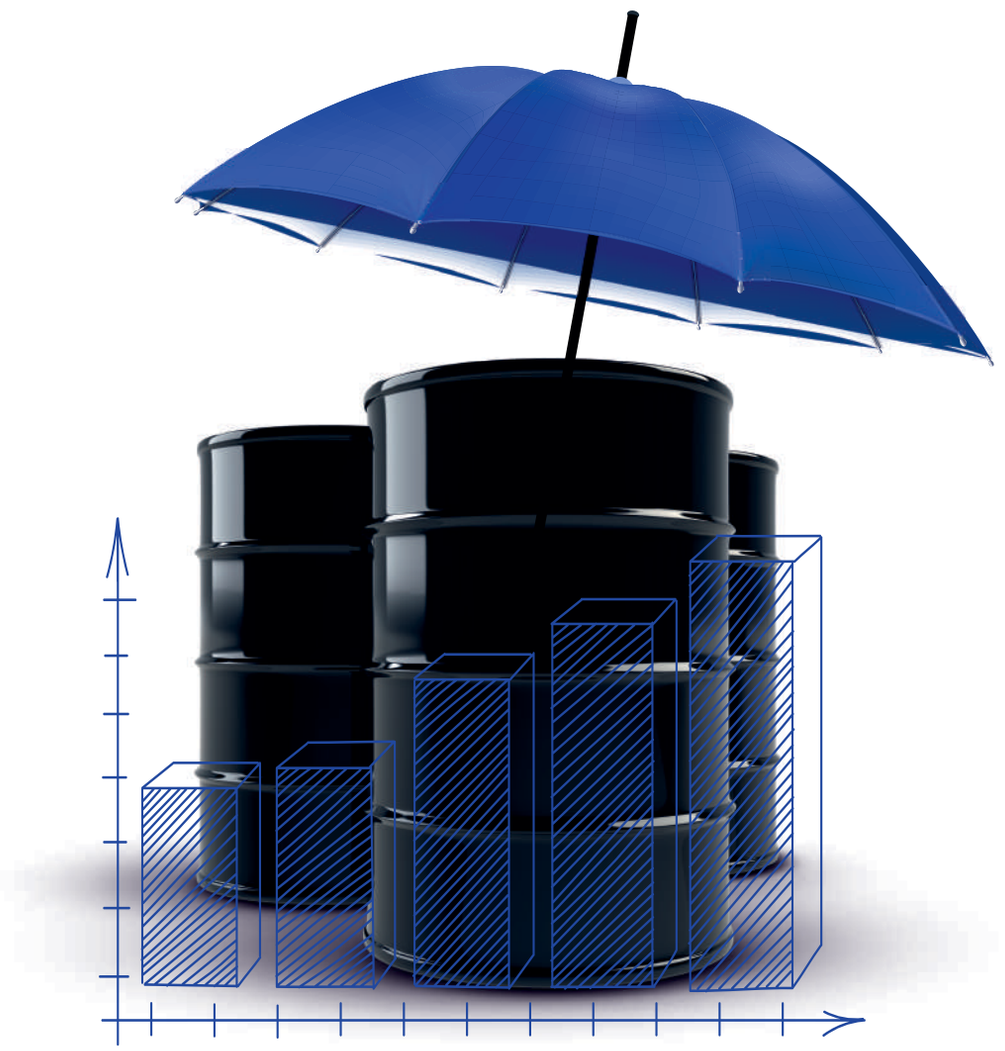

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HIGHLIGHTS OF UNION BUDGET OF INDIA 2023-24

The Union Minister of Finance and Corporate Affairs Ms. Nirmala Sitharaman presented the Union Budget 2023-24 in Parliament on Feb 1, 2023. The main highlights of the Budget are as follows:

- 30 Skill India International Centres to be set up across different States to skill youth for international opportunities.
- Revamped credit guarantee scheme for MSMEs to take effect from 1st April 2023 through infusion of Rs 9,000 crore in the corpus. This scheme would enable additional collateral-free guaranteed credit of Rs 2 lakh crore and also reduce the cost of the credit by about 1 per cent.
- Central Processing Centre to be setup for faster response to companies through centralized handling of various forms filed with field offices under the Companies Act.
- Rs. 10 lakh crore capital investment, a steep increase of 33% for third year in a row, to enhance growth potential and job creation, crowd-in private investments, and provide a cushion against global headwinds.
- Investment of Rs. 75,000 crore, including Rs. 15,000 crore from private sources, for one hundred critical transport infrastructure projects, for last and first mile connectivity for ports, coal, steel, fertilizer, and food grains sectors.
- More than 39,000 compliances reduced and more than 3,400 legal provisions decriminalized to enhance Ease of Doing Business.
- National Data Governance Policy to be brought out to unleash innovation and research by start-ups and academia.
- PAN will be used as the common identifier for all digital systems of specified government agencies to bring in Ease of Doing Business.
- 95% of the forfeited amount relating to bid or performance security, will be returned to MSME's by government and government undertakings in the cases MSME's failed to execute contracts during Covid period.
- Annual production of 5 MMT under Green Hydrogen Mission to be targeted by 2030 to facilitate transition of the economy to low carbon intensity and to reduce dependence on fossil fuel imports.
- Rs. 35000 crore outlay for energy security, energy transition and net zero objectives.
- Battery energy storage systems to be promoted to steer the economy on the sustainable development path.
- Green Credit Programme to be notified under the Environment (Protection) Act to incentivize and mobilize additional resources for environmentally sustainable and responsive actions.
- Setting up a single window IT system for registration and approval from IFSCA, SEZ authorities, GSTN, RBI, SEBI and IRDAI.
- Permitting acquisition financing by IFSC Banking Units of foreign bank.
- Establishing a subsidiary of EXIM Bank for trade re-financing.
- Amending IFSCA Act for statutory provisions for arbitration, ancillary services, and avoiding dual regulation under SEZ Act.
- To further improve tax payer services, proposal to roll out a next-generation Common IT Return Form for tax payer convenience, along with plans to strengthen the grievance redressal mechanism.
- Rebate limit of Personal Income Tax to be increased to Rs. 7 lakh from the current Rs. 5 lakh in the new tax regime. Thus, persons in the new tax regime, with income up to Rs. 7 lakh to not pay any tax.
- Tax structure in new personal income tax regime, introduced in 2020 with six income slabs, to change by reducing the number of slabs to five and increasing the tax exemption limit to Rs. 3 lakh. Change to provide major relief to all tax payers in the new regime.

New tax rates

Total Income (Rs)	Rate (per cent)
Up to 3,00,000	Nil
From 3,00,001 to 6,00,000	5
From 6,00,001 to 9,00,000	10
From 9,00,001 to 12,00,000	15
From 12,00,001 to 15,00,000	20
Above 15,00,000	30

- Proposal to extend the benefit of standard deduction of Rs. 50,000 to salaried individual, and deduction from family pension up to Rs. 15,000, in the new tax regime.
- Highest surcharge rate to reduce from 37% to 25% in the new tax regime. This will further result in reduction of the maximum personal income tax rate to 39%.
- The limit for tax exemption on leave encashment on retirement of non-government salaried employees to increase to Rs. 25 lakh.
- Deduction for expenditure incurred on payments made to MSMEs to be allowed only when payment is actually made in order to support MSMEs in timely receipt of payments.
- New co-operatives that commence manufacturing activities till 31.3.2024 to get the benefit of a lower tax rate of 15%, as presently available to new manufacturing companies.
- Proposal to limit income tax exemption from proceeds of insurance policies with very high value. Where aggregate of premium for life insurance policies (other than ULIP) issued on or after 1st April, 2023 is above Rs. 5 lakh, income from only those policies with aggregate premium up to Rs. 5 lakh shall be exempt.
- Excise duty exempted on GST-paid compressed bio gas contained in blended compressed natural gas.
- Customs duty exempted on vehicles, specified automobile parts/components, sub-systems and tyres when imported by notified testing agencies, for the purpose of testing and/ or certification, subject to conditions.

भारत सरकार का केंद्रीय बजट: 2023-24

केन्द्रीय वित्त एवं कॉरपोरेट कार्य मंत्री श्रीमती निर्मला सीतारमण ने 1 फरवरी, 2023 को संसद में केन्द्रीय बजट 2023-24 पेश किया। बजट की मुख्य बातें इस प्रकार से हैं:

– विभिन्न राज्यों से कुशल युवाओं को अंतरराष्ट्रीय अवसर उपलब्ध कराने के लिए 30 स्किल इंडिया इंटरनेशनल सेंटर स्थापित किए जाएंगे।

– एमएसएमई के लिए ऋण गारंटी योजना को नवीनीकृत किया गया है। यह पहली अप्रैल 2023 से कार्प्स में 9,000 करोड़ रुपये जोड़कर क्रियान्वित होगी। इसके अतिरिक्त इस योजना के माध्यम से 2 लाख करोड़ रुपये का संपार्श्विक मुक्त गारंटीयुक्त ऋण संभव हो पाएगा। इसके अलावा ऋण की लागत में करीब 1 प्रतिशत की कमी आएगी।

– कंपनी अधिनियम के अंतर्गत क्षेत्रीय कार्यालय में दाखिल विभिन्न फॉर्मों के केन्द्रीकृत प्रबंधन के माध्यम से कंपनियों की त्वरित कार्रवाई के लिए एक केन्द्रीय डाटा संसाधन केन्द्र की स्थापना की जाएगी।

– विकास संभावना एवं रोजगार सृजन, निजी निवेश में बढ़ती भीड़ और वैश्विक खिलाड़ियों को टक्कर देने के लिए 10 लाख करोड़ का पूंजी निवेश, जो निरंतर 3 वर्षों में 33 प्रतिशत की वृद्धि है।

– बंदरगाहों, कोयला, इस्पात, उर्वरक और खाद्यान्न क्षेत्रों में 100 महत्वपूर्ण परिवहन अवसंरचना परियोजनाओं के लिए 75,000 करोड़ रुपये का निवेश, जिसमें निजी क्षेत्र का 15,000 करोड़ रुपये शामिल है।

– स्टार्ट-अप्स और शिक्षाविदो द्वारा नवाचार और अनुसंधान शुरू करने के लिए राष्ट्रीय डाटा शासन नीति लाई जाएगी।

– स्थायी खाता संख्या (पैन) का इस्तेमाल विनिर्दिष्ट सरकारी एजेंसियों की सभी डिजिटल प्रणालियों के लिए पैन को सामान्य पहचानकर्ता के रूप में प्रयोग किया जाएगा। इससे कारोबार करना आसान होगा।

– कोविड अवधि के दौरान एमएसएमई अपनी संविदाओं को निष्पादित करने में विफल रहे हों, तो बोली या निष्पादन प्रतिभूति से संबंधित जब्त राशि का 95 प्रतिशत भाग सरकार और सरकारी उपक्रमों द्वारा उन्हें लौटा दिया जाएगा।

– राष्ट्रीय हरित हाइड्रोजन मिशन की मदद से अर्थव्यवस्था को निम्न कार्बन सघनता वाली स्थिति में ले जाने, जीवाश्म ईंधन के आयातों पर निर्भरता को कम करने 2030 तक 5 एमएमटी के वार्षिक उत्पादन का लक्ष्य निर्धारित किया जाएगा।

- ऊर्जा-परिवर्तन तथा निवल-शून्य उद्देश्यों और ऊर्जा सुरक्षा की दिशा में प्राथमिकता प्राप्त पूंजीगत निवेशों के लिए 35,000 करोड़ रुपये का प्रावधान किया गया है।
- अर्थव्यवस्था को धारणीय विकास के मार्ग पर ले जाने के लिए बैटरी ऊर्जा भंडारण प्रणालियों को बढ़ावा दिया जाएगा।
- आईएफएससीए, एसईजेड प्राधिकारियों, जीएसटीएन, आरबीआई, सेबी और आईआरडीएआई से पंजीकरण और अनुमोदन के लिए एकल खिड़की आईटी प्रणाली की स्थापना की जाएगी।
- विदेशी बैंकों के आईएफएससी बैंकिंग इकाइयों द्वारा अधिग्रहण वित्त पोषण की अनुमति दी जाएगी।
- व्यापार पुनर्वित पोषण के लिए एक्जिम बैंक की एक सहायक संस्था की स्थापना की जाएगी।
- मध्यस्थ, अनुषंगी सेवाओं के लिए और एसईजेड अधिनियम के तहत दोहरे विनियमन से बचने के लिए सांविधिक प्रावधानों के लिए आईएफएसीए अधिनियमों में संशोधन किया जाएगा।
- करदाता सेवाओं में और सुधार करने के लिए करदाताओं की सुविधा हेतु अगली पीढ़ी के सामान्य आईटी रिटर्न फार्म लाने और साथ ही शिकायत निवारण तंत्र को और सुदृढ़ करने की योजना बना रहा है।
- नई कर व्यवस्था में निजी आयकर में छूट की सीमा को 5 लाख रुपये से बढ़ाकर 7 लाख रुपये कर दिया गया है। इस प्रकार नई कर व्यवस्था में 7 लाख रुपये तक के आय वाले व्यक्तियों को कोई कर का भुगतान नहीं करना होगा।
- नई व्यक्तिगत आयकर व्यवस्था में स्लैबों की संख्या 6 से घटाकर 5 कर दी गई और कर छूट की सीमा को बढ़ाकर 3 लाख रुपये कर दिया गया है। इस नई कर व्यवस्था में सभी कर प्रदाताओं को बहुत बड़ी राहत मिलेगी।

नई कर दरें

कुल आय (रुपए)	दर (प्रतिशत)
3,00,000 तक	कुछ नहीं
3,00,001 से 6,00,000 तक	5
6,00,001 से 9,00,000 तक	10
9,00,001 से 12,00,000 तक	15
12,00,001 से 15,00,000 तक	20
15,00,000 से अधिक	30

- नई कर व्यवस्था में वेतन भोगी व्यक्ति को 50 हजार रुपए की मानक कटौती का लाभ देने और परिवार पेंशन से 15 हजार तक कटौती करने का प्रस्ताव है।
- नई कर व्यवस्था में उच्च प्रभार दर 37 प्रतिशत से घटाकर 25 प्रतिशत करने का प्रस्ताव है। इसके फलस्वरूप अधिकतम व्यक्तिगत आय कर दर में 39 प्रतिशत तक की कटौती होगी।
- गैर सरकारी वेतनभोगी कर्मचारी के सेवानिवृत्ति पर छुट्टी नगदीकरण पर कर छूट की सीमा बढ़ाकर 25 लाख की गई।
- एमएसएमई को किए गए भुगतान पर हुए व्यय के लिए कटौती को उसी मामले में अनुमति होगी जब समय पर प्राप्त भुगतानों में एमएसएमई की सहायता के क्रम में वास्तविक रूप से भुगतान किया गया हो।
- ऐसी नई सहकारी संस्थाएं जो नई विनिर्माण कंपनियों को वर्तमान में उपलब्ध 15 प्रतिशत की कम दर का लाभ प्राप्त करने के लिए 31.3.2024 तक विनिर्माण गतिविधियां शुरू की है।
- गैर-पैन मामलों में ईपीएफ आहरण के कर योग्य भाग पर टीडीएस दर को 30 प्रतिशत से घटाकर 20 प्रतिशत किया गया।
- सम्मिलित कंप्रेस्ड बायो गैस, जिस पर जीएसटी भुगतान किया गया है उस पर उत्पाद शुल्क से छूट देने का प्रस्ताव।

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

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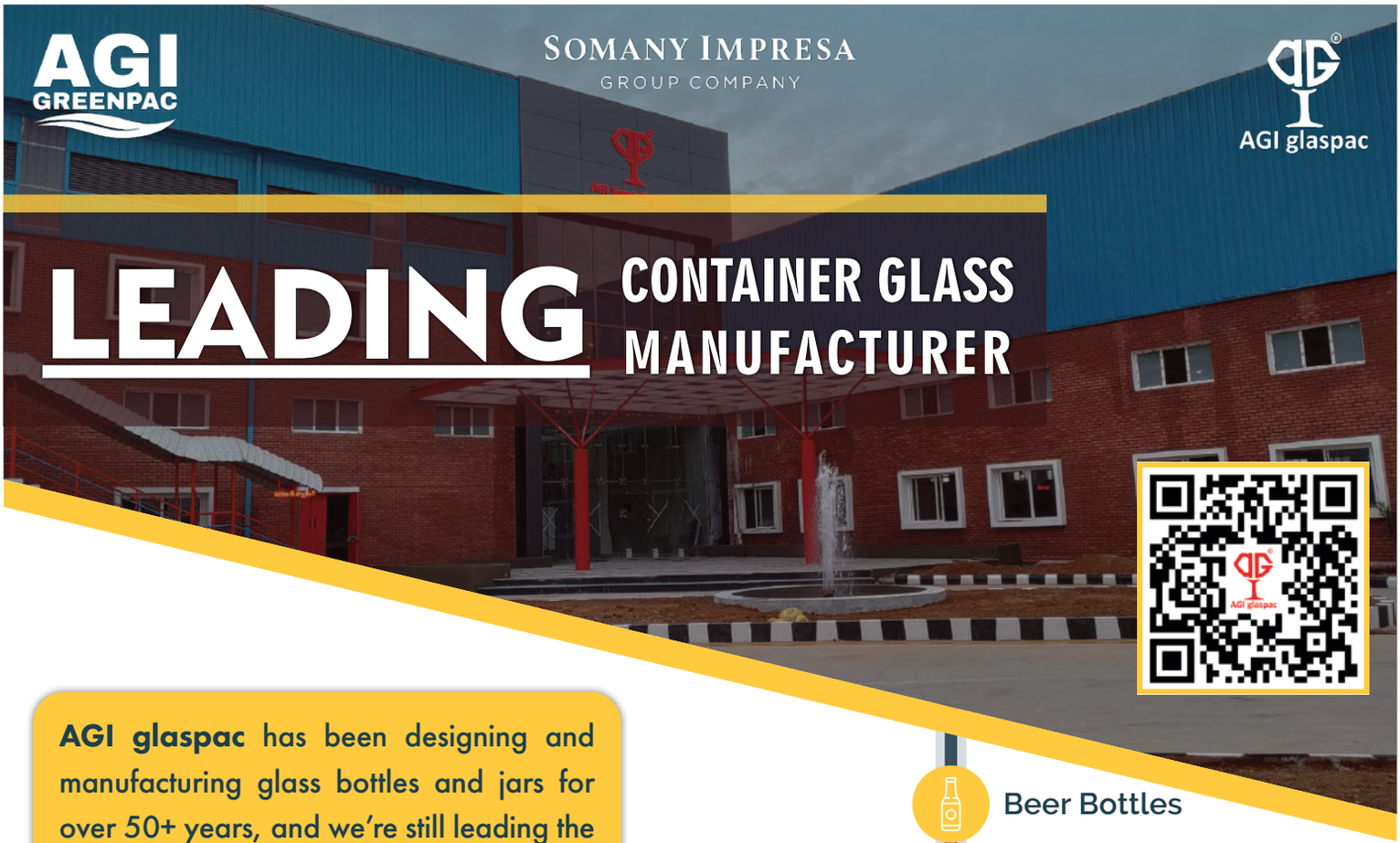

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Glass Industry Get-together to commemorate 80 Years of the AIGMF

(March 25, Jaipur)

The first quarter Executive Committee meeting of The All India Glass Manufacturers' Federation (AIGMF) started with 80 years celebrations, which was hosted by M/s Nirmal Glasstech Industries Pvt. Ltd., at Kundan Van, Jaipur, Rajasthan.

The session started with the welcome address by the President, Mr. Sanjay Agarwal who thanked everyone for their participation.

Past Presidents were felicitated and motto was set to reach 100-years' celebration in the flying colors.

Parallel to the Executive Committee meeting, a special session on investment opportunities in the state of Rajasthan was organized wherein Mr. Kulveer Singh, Additional General Manager, Rajasthan State Industrial Development & Investment Corporation Limited (RIICO) gave a presentation on the lucrative opportunities that could be made available in various RIICO Industrial hubs for the glass manufacturers.

Another special session was kept on the Innovative Glass Melting

Technologies – A patchwork of progress wherein Mr. Aston Fuller, General Manager and Mr. Masimba Toperesu, R&D Projects of Glass Futures Ltd., United Kingdom gave a presentation by covering the following main topics:

- Progress across the global glass industry for decarbonization
- The selection of technologies for different regions
- Discussions about how to drive global collaborations
- An update on the Glass Futures facility and what access Indian innovators can expect

The President AIGMF, Mr. Sanjay Agarwal acknowledged the support of M/s Nirmal Glasstech Industries Pvt.

Remembering Dr. R K Somany, CMD AGI Greenpac Ltd; Mr. Raghav Goel, son-in-law of President AIGMF and Mrs. Bina Bansal, family member of Hon. General Secretary who passed away on Jan 20, Dec 20 and Feb 4 respectively.

Ltd., Jaipur for organizing a power packed event for the benefit of Glass Manufacturers.

Special mention was also made for M/s La Opala RG Ltd., for sponsoring an elegant gift set specially designed for AIGMF on completion of 80 years.

The event saw participation of approx. 80 stakeholders comprising Glass Manufacturers, Machinery suppliers, consultants and research organizations thereby benefitting glass industry to debate on programmes aimed for the betterment of environment and health issues.

The event concluded with a Gala Dinner and a cultural show, which saw hundreds participate from Rajasthan

and pan-India to celebrate 80 years of the AIGMF as well as 25th birthday of Mr. Aditya Mundra, Executive Director, Nirmal Glasstech Industries Pvt. Ltd.

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

On March 26, the guests were taken for a sightseeing and visit to Amer fort.

As a token of appreciation, a glass memento gift set was given to all participants to mark the special milestone of the AIGMF.

The next Executive Committee meeting will be held at DoubleTree by Hilton on June 17 at Ahmedabad and will be hosted by M/s Gopal Glass Works Ltd.

The event at Ahmedabad will celebrate the World Environment Day where discussions will focus on Solar Glass, Cullet- Glass Recycling and Air Quality in Glass Manufacturing ■

glass WORLDWIDE
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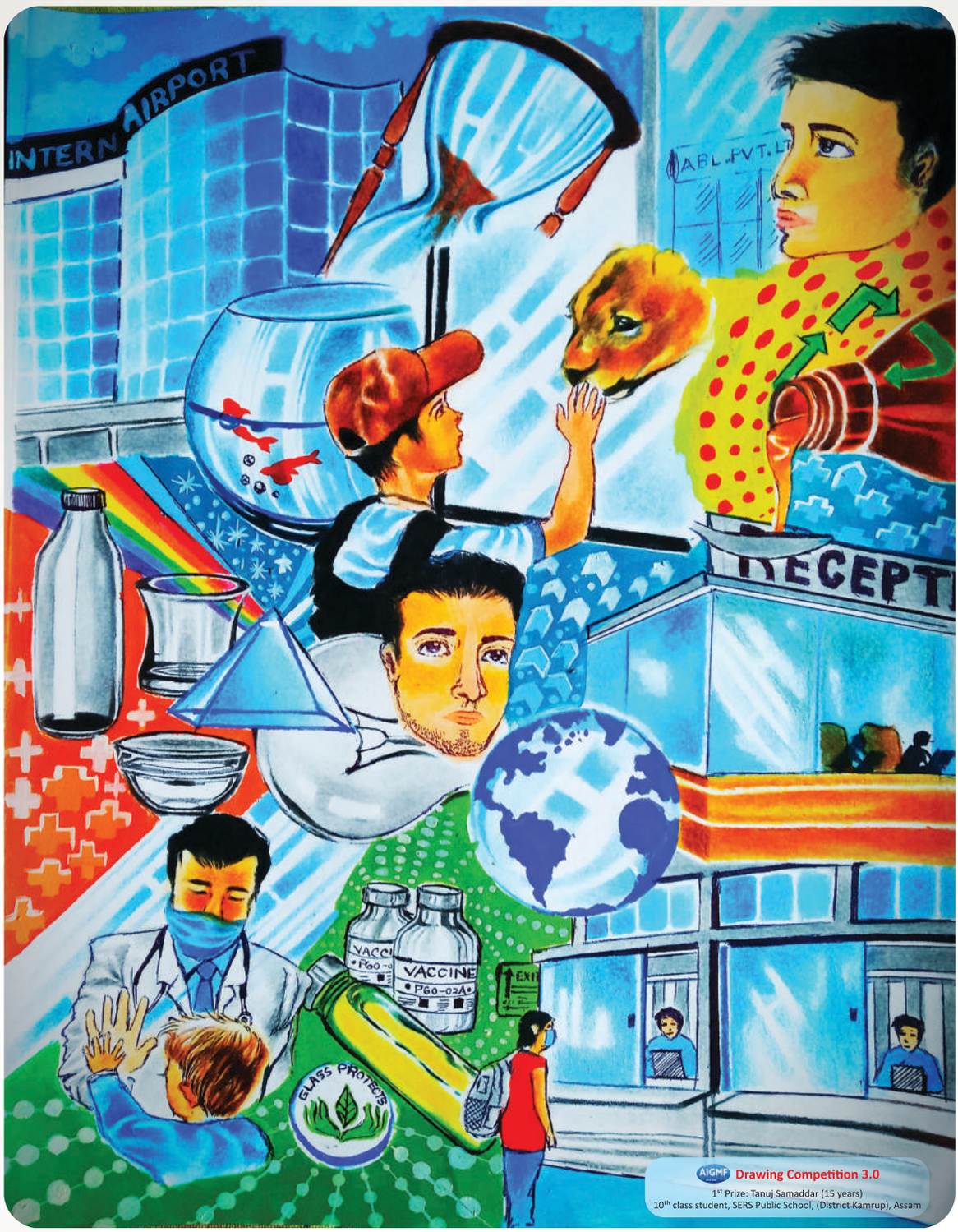
Celebrating 80 Years of AIGMF
The All India Glass Manufacturers' Federation

'Glass Protects'

... says School Children ...



AIGMF since 1944 - Catering to the needs of Glass Industry

The All India Glass Manufacturers' Federation

www.aigmf.com

The All India Glass Manufacturers' Federation

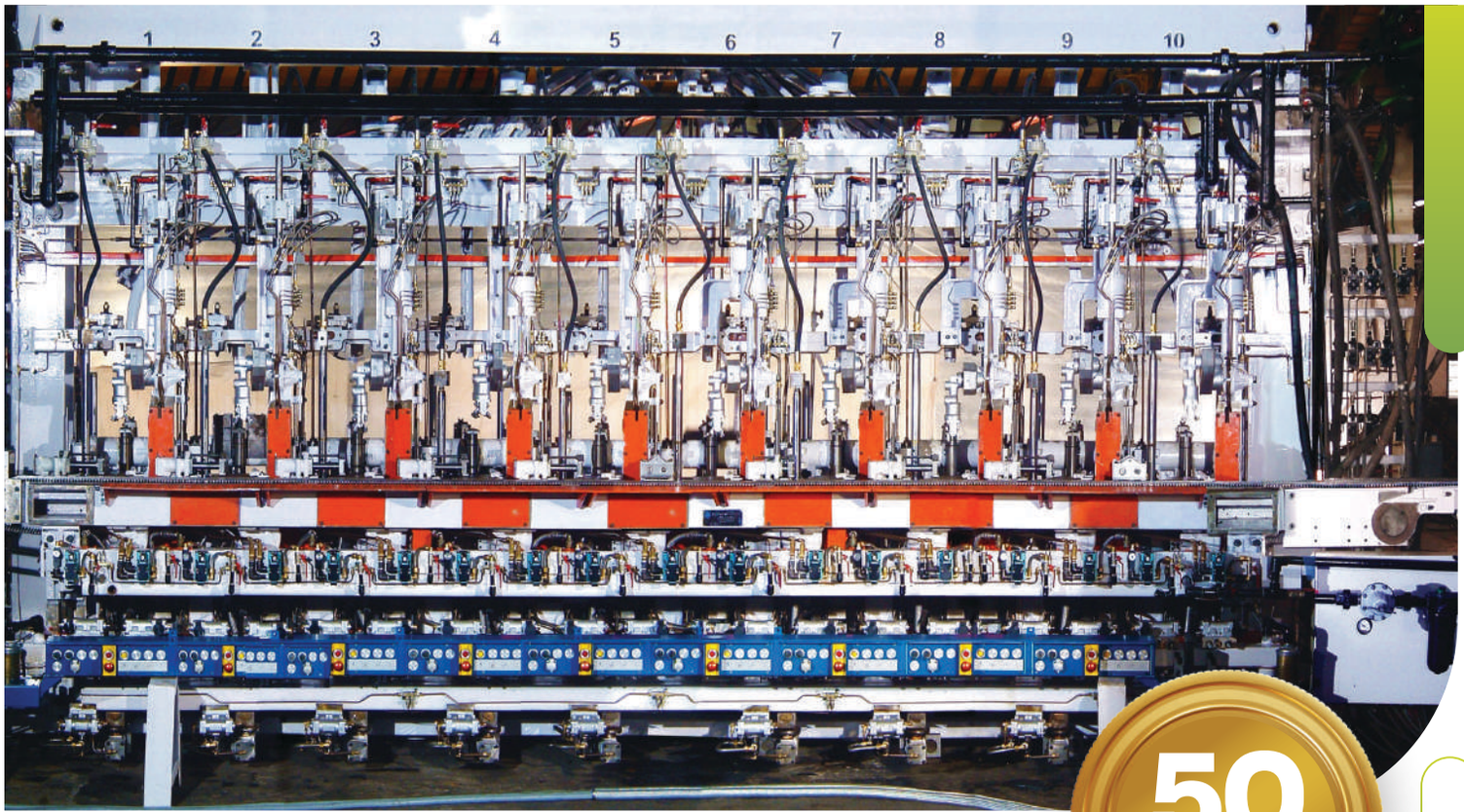
Celebrating World Environment Day
AIGMF's Executive Committee Meeting
(June 17-18, 2023)
at Double Tree by Hilton, Ahmedabad

Ambli Bopal Road, Near Vikram Nagar ISRO Colony, off S. G. Highway, Ahmedabad 380054

June 17 (Saturday)	
1300 hrs.	**Lunch**
1430 hrs.	Welcome address by: - Mr. Sanjay Agrawal (President AIGMF) - Mr. Purvish Shah (Treasurer AIGMF and Director, Gopal Glass Works Ltd.)
1445 hrs.	Executive Committee Meeting
1530 hrs.	**GLASS INDUSTRY's PLEDGE FOR THE WORLD ENVIRONMENT DAY:** A. Youth outreach program 2023- **Green Energy *via* Solar Glass** B. Presentations on: 1) **Cullet Sorting Technologies** By Mr. Kartik Morar, V&K Recycling Co. (*Affiliate Member of the AIGMF*) *By citing proper case studies* 2) **Air Quality in Glass Manufacturing Units** By Mr. Deepak Gahlowt, Practicing Architect and Secretary, Confederation of Construction Products and Services (CCPS) **Q&A**
1700 hrs.	High tea
1800 hrs. onwards	**Evening** at 'Vishala' ***Authentic village*** - Natural and Eco-Friendly Ambience - Restaurant serving premium quality Gujarati cuisine - Folk Art & Entertainment - Puppet Show - Variety of handmade gift products
June 18 (Sunday)	
0900 hrs. onwards	Early Checkout/s Sightseeing / Visit to: - Gandhi Ashram - Adalaj Stepwell - Swaminarayan Temple - Law Garden Market

Hotel stay at Double Tree by Hilton Ahmedabad:

- Members can book room/s on first-cum-first serve basis by sending request to Ms. Nakshita Gohil on +91 6359 890 643 or at events.amd@hilton.com by giving reference of M/s Gopal Glass Works Ltd., event
- The tariff for one night stay is Rs. 6,000/- per single occupancy plus taxes, with Breakfast
- Airport pick up and drop can be arranged on a direct request to the hotel



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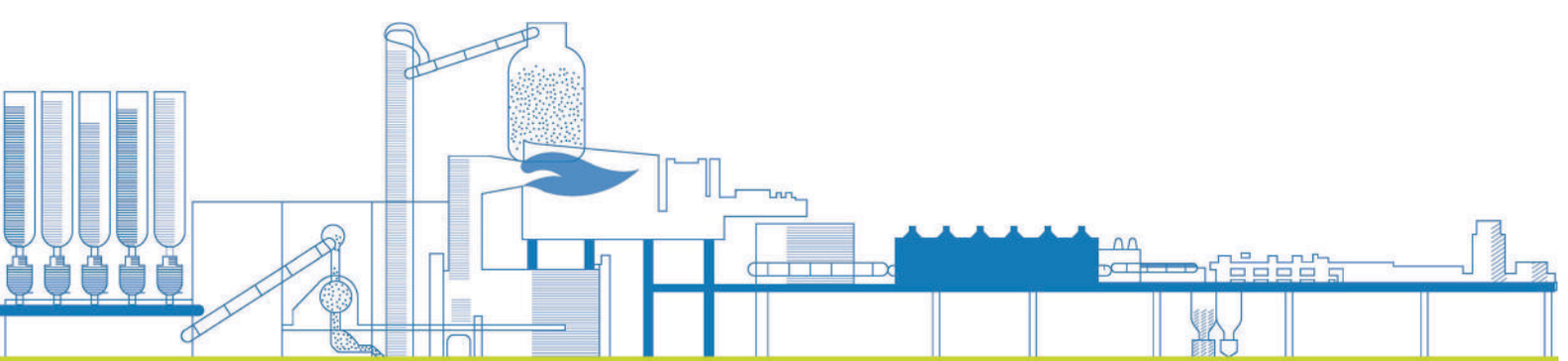

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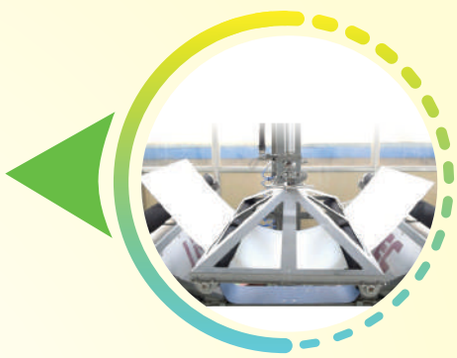

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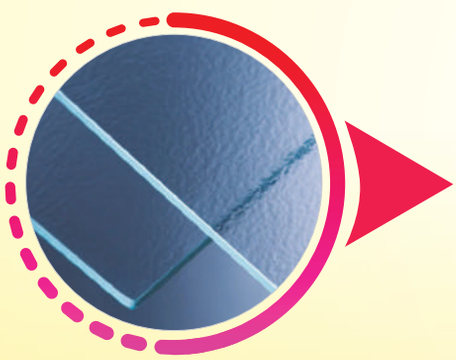

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Renewable Energy like Solar Power is the New Lexicon in the Industrial Horizon - Part I

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Member Editorial Board, Kanch
Technology Consultant & Ex-Principal, Govt. College of Engg. & Ceramic Technology
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Abstract

During the last 12 years in various issues of **Kanch** on glasses, many articles have been written on the nature and applications of various types of glasses. In 2016, it was decided by AIGMF to compile all such activities up to 2016 in the form of a proper book **[1]**. Some of these applications that were included in subsequent issues of **Kanch** after March 2016, also need to be further elaborated. Many such issues concerning solar power were also covered in those issues. For the benefit of readers, the most important aspects of 'renewable energy' like solar power are briefly compiled here so that a ready reference could be handy and dissemination of knowledge could be made to various government agencies as well as to various concerned Private sector entities. Among all the glasses the 'float' glass is the most popular and most versatile as well in terms of applications in building construction with huge consumption in the solar power plants or parks **[2-3]**. In Part - I of the paper some data are presented.

INTRODUCTION

Let us start this article with a piece of 'good' news. In this financial year from April to February, the demand for electricity has increased by about 10%, obviously due to higher industrial growth. The amount of electricity produced during this period was 1,375.6 Billion units (1 Billion unit = 100 Cr. unit). This was much higher than the entire 2021-22. In that period, the total amount of electricity was actually 1,374.0 Billion units. That's it!! If this was not the good news - what is so good in the overall energy landscape of India. There is another side to this news. More electricity by thermal power is somehow bad, particularly when the whole world is searching for 'Carbon Credit' by reducing emission by coal. This is where solar energy assumes special significance. Now, we are told that 10 new green field solar energy plants or solar parks are coming up into India - taking our total installed capacity to more than 175 GW.

As it is known that the general efficiency is about 20% for silicon wafer-semiconductor technology - our generation capacity will be over 35 GW - or taking 10 hours of full sunny weather during nine months of the year - it will be about 96 Billion units/year. That's not bad for such new projects, but there are other projects (w.i.p.) too in the pipeline - conceived some years ago, but held up due to Covid-19 and other issues. It must be pointed out that we need many more Billions of units of electricity to be generated by renewable methods in order to reduce our dependence on coal that causes pollution. Along with this effort, wind turbines have to be also installed in different areas, particularly in a 'coastal windy areas' to improve % Renewable in the total energy production in the country.

Although it is not quite true, it is said that India is one of the top ten countries in the world to use solar power with full enthusiasm. The country has been making rapid progress towards alternative sources of energy like solar and wind. So, India has set up a renewable energy installation target of 175 GW by 2022. The Government of India showed strong interest in production-linked incentives for manufacturers of solar items for both Indian as well as foreign companies working in India. Indian government plans to invest Rs. 4500 crore for solar modules and Rs. 18,100 crore for lithium batteries for energy storage purposes. It was a clever ploy as the latter would encourage not only MSEs but also a large number of SSIs creating new employment. It is preferable that more MSEs jump into the bandwagon of solar power - as the scale of production has to be high.

However, there are some issues that need to be considered in the 'Ministry of Revenue' regarding customs duty. Government must impose custom duty on 'solar cells' so that 'local manufacturers' feel comfortable - as the government shoots up its ambitious projects that are quite logical. To further such efforts, there should be more customs duty on Chinese 'solar modules' that are imported in large quantities. This assumes that local Indian manufacturers increase their speed of production for such modules, i.e. photovoltaic cells, that are not very hi-tech items.

The question of higher productivity could not be sacrificed due to heavy imports.

The relevance of renewable energy prominently comes to our mind mainly due to various eco-conferences around the world invoking lower emission even by developed countries. There is quite a long history of Ecological or Environmental conferences under the aegis of the United Nations. The 1972 United Nations Conference on the Environment in 'Stockholm' was the first world conference to make the environment a major issue. This was followed by the famous 'Rio Summit' in Brazil in 1992 and then by another important world event known as the 'Kyoto protocol' in 1997.

Many important resolutions were taken in the 'Paris conclave' in 2015 (called COP-21). This year, at the United Nations Climate Change Conference (COP-25) in 'Madrid', Spain, Global Climate Action (GCA) will be hosting a versatile set of dynamic events demonstrating how climate action is undertaken on the ground, through the fruitful collaboration of cities, regions, businesses, investors, and civil society. It is clearly noted that the words like 'business and investors' are mentioned for discussion. All these conferences under different names and formats gave rise to a single concept in terms of a very ambitious target of 'rising earth temperatures' by 1.5 degree celsius by 2050.

All the above conferences also concluded obviously on lower emission, i.e. lesser use of solid fuel as well as demanding 'carbon credit' and spread of renewable energy that might keep the earth 'cooler'. This is precisely the reason for expanding various means of producing renewable energy, such as solar, wind, medium hydro-power and biomass. This is also the reason for mentioning the above ecological conferences to bring 'relevance' to this article on renewable energy, like solar energy **[4]**. It should be mentioned that 'activities' in this field excite further activities, and hence some points are mentioned below.

TOP TEN SOLAR COMPANIES

At this point, it is important to mention about the top ten companies in India that deal with the latest solar panels:

1. **Waaree Energies Ltd.** (Established in 1989, Location=Mumbai)

   They have a significant presence of over 360+ locations in India and 68 foreign countries. With their wee-organized 2 GW module manufacturing unit at Surat.

   With NABL Lab facility, they also have an in-house facility. They offer EPC services, project development, solar water pumps, solar rooftop solutions, independent powerhouses and much more. This company has a total of 32 years of experience. It has a presence in pan-India as well as in 68 countries globally, Waaree Energies Ltd. is one of the top solar panel manufacturers that is relied on by many.

2. **Tata Power Solar Systems** (Established in 1991, Location=Bangalore)

   This solar power company has achieved a leadership position in manufacturing Solar Panels that are of good quality in India. Tata Power Solar operates in three distinct segments – cutting-edge manufacturing, EPC services and creating innovative solar products. There is a rising demand on roof-top solar units for houses, residential complexes, small commercial units, etc. The company boasts a stronghold on such residential and other rooftop solar units. They already supplied about 1.42 GW of solar modules worldwide over the past 20 years.

3. **Vikram Solar** (Established in 2006, Location=Kolkata)

   This company is spread over six continents. Both mono and bifacial solar panel modules are manufactured by Vikram Solar, which is the largest solar energy company in this lucrative segment. They have installed and commissioned over 1.36 GW of solar projects across India. They have over 1 GW solar panel manufacturing capacity and a 10 kW floating solar plant in Kolkata. They are more specialized in Engineering, procurement, and construction (EPC) management, and solar power plant operations and maintenance.

4. **Adani Solar** (Established in 2015, Location=Mundra)

   This is a subsidiary of Adani Enterprises Ltd. Adani Solar belongs to the 15 largest utility solar power developers worldwide. In their exclusive facility, they manufacture solar cells and modules with 1.5 GW+ of cell and module capacity. Moreover, in this location they have "Research and Development (R&D)" facilities within an "Electronic Manufacturing Cluster (EMC)" facility. Adani solar is one of the largest solar panel installers in India.

5. **Microtek Solar Solutions** (Established in 1986, Location=New Town; Kolkata)

   For retail and commercial users of various solar products, the company offers a great range of such products. Microtek Solar Solutions have a technological edge as the products are manufactured with the most recent solar technologies to deliver solution for the best results. These products are PhotoVoltaic Modules, Solar Combo Packages, Power

Conditioning Units, and Solar Management Units.

6. **Loom Solar Private Ltd.** (Established in 2018, Location=Faridabad)

   This is a company that manufactures mono perc solar panels and lithium batteries, with a manufacturing capacity of 100 MW. This is one of the fastest-growing solar panel manufacturers in India because of a wide range of solar panels from 10 watts to 450 watts super high efficiency panels.

7. **Moser Baer Solar Ltd.** (Established in 1988, Location=Delhi)

   This is an energy-focused organization that provides solar-powered PhotoVoltaic cells and EPC solutions. Their robust R&D department enables them to manufacture one of the best solar panels in India with two times magnified standard warranty. It is also the 2nd largest manufacturer of 'Optical Storage Media'.

8. **EMMVEE** (Established in 1992, Location=Bangalore)

   The company has grown up to be the largest manufacturer of solar water heating systems (solar water heaters) across Asia. They have also installed and commissioned solar PhotoVoltaic projects 14 MW in North of Germany, and 13 MW rooftop and 140+ MW in India.

9. **RenewSys Solar** (Established in 2011, Location=Mumbai)

   When we look for an integrated manufacturer of solar modules and key components like solar PV cells, black sheets, encapsulants, etc., we think of this company. They have two manufacturing units in India, supplying over 40 nations worldwide.

10. **Icomm Tele Ltd.** (Established in 1989, Location=Secunderabad)

    Founded in 1989, the company has emerged as a prime business in terms of profits and new utilization methods. Their business is spread across neighboring countries, the Middle East, and Africa.

    These all fulfilling solar companies not only focus on the aim set by the government but also pay attention to our environment and its condition. They understand their responsibility of keeping the environment clean and green very well.

As the government focuses on renewable energy sources, these solar energy companies understand and help fulfill the void. As more and more people come forward towards solar energy, India might soon be declared a solar-powered nation. This is quite ambitious, but achievable. In any case, in a business venture one should look for achievable targets **[5-7]**.

For India to be a solar powered nation, it is important for us in choosing a mission by choosing to go solar and create our own electricity. And from the list of top solar companies it must be clear that one

can trust some of these companies for Solar Systems - be it Batteries, Solar inverters, PV modules, Power bank, etc. **[5]**. It is time we also appreciate our responsibility to protect the environment as well as electricity for our future generations.

In order to be able to do that it is important to shift to solar energy power generation and evolve ourselves accordingly, since thermal resources for power generation are not renewable, and it is expected to be extinct by 2050, when the rise of 'earth temperature' will be 1.5 degree celsius - as mentioned above. So let us make sure that even after the extinction of thermal power generation resources - our future generation can have electricity through Solar Energy.

It should be made clear that with a series of government incentives, if any company now enters this lucrative field, it will have quite a high ROI in the near future that is coupled with low 'maintenance' with a lot of new solar products as well as very good EPC services.

CONCLUSIONS

A glimpse of renewable energy is described here in terms of many different aspects, such as higher energy output at present in India and its consequences on the overall energy scenario as ten new investors are coming up for newer solar parks to be able to push up the total energy output even higher. Importance of various world eco-conferences are highlighted to show great concern for rising earth temperature that needs to be controlled or rather reduced per year. This is definitely more relevant for going further into renewable energy sources. All these are good if we look into the present scenario in India in terms of activities of top ten companies in the solar power business.

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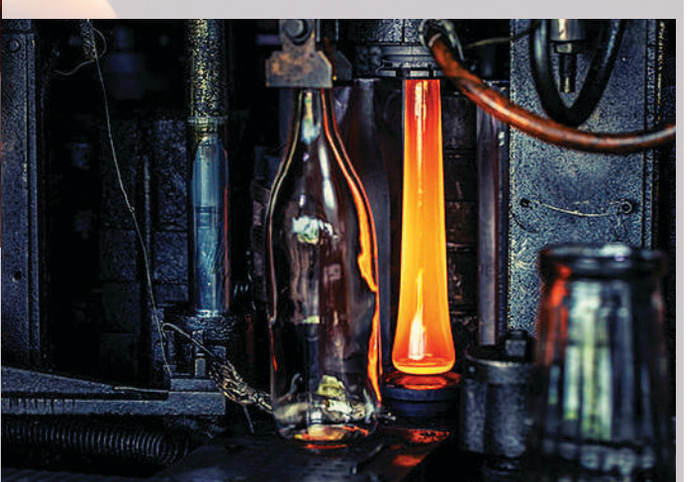

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On the Spot... Arun Varshneya

Following his election as the Society of Glass Technology's 58th President, Arun Varshneya of Saxon Glass Technologies exclusively outlined to *Glass Worldwide* the organisation's current priorities and the ambitions for his tenure.

GW: What does it mean to you personally to be elected as the new SGT President?

My first reaction is to thank my late father in India who had the vision way back in early 1962 to ask me to join the Department of Glass Technology ('Elmfield') [at the] University of Sheffield as a B.Sc. student. He must be feeling very proud today and saying, "See, I told you so!" from the heavens. Soon after I arrived, I watched the SGT staff in the Elmfield library working hard with the abstracting service for the *Journal of the Society of Glass Technology Transactions*. It was impressive to watch their dedication. Sixty years later with [… myself] becoming the SGT President, those library meetings have now come around in full circle. It is a great personal honour.

GW: How long have you been involved with the Society and in what capacities?

You can argue that I have been involved with the SGT since August 1962. In 1968, I helped with the organisation of the International Congress on Glass in London in some small way. My active involvement since has been the major undertaking of having my textbook, entitled *Fundamentals of Inorganic Glasses* second edition, published by the Society. They did a marvellous job. Other activity has been publishing, reviewing and teaching a short course on glass on behalf of the Society and continuing to help organise and participate in technical meetings.

GW: What challenges and opportunities come with presiding over a UK-based body from America?

The 'Big Pond', I hope, won't deter my staying connected with the membership. I hope to use 'cyber technology' to communicate frequently. Physical presence could be a bit difficult, but I hope to travel to the UK for important occasions. Remember though:

'How fleet is a glance of the mind,
Compared with the speed of its flight
The tempest itself lags behind,
And the swift-winged arrows of light.'
(From *The Solitude of Alexander Selkirk* by William Cowper)

All we have to do is to just 'think about each other' frequently to stay connected!

Arun Varshneya (right), Saxon Glass Technologies President and new SGT President with Stuart Hakes, FIC CEO and outgoing SGT President.

But, since I am also quite active in the American Ceramic Society and the International Commission in Glass, my feeling is that opportunities for 'cross-pollination' of ideas can only help.

GW: What legacy does immediate past President Stuart Hakes leave behind?

Stuart clearly worked hard to guide us through the pandemic. I was concerned that the SGT could go ▸

SGT gathering at a recent GPC event in America.

Originally published in Glass Worldwide, preferred international journal of AIGMF

glass WORLDWIDE

under but he managed to keep us afloat; he managed to retain the key (hardworking) staff. That is a unique experience I hope the SGT doesn't have to go through again. [Among other] wonderful things he did was to establish great relations with *Glass Worldwide* and Glass Futures. In time, these working partnerships should prove to be invaluable.

GW: What do you consider to be the SGT's primary objectives?

Like all non-for-profit organisations, the primary objective has to be the dissemination of sciences, technologies, the arts, and the history to the benefit of the society-at-large. This is usually accomplished by way of timely publications and organising technical meetings with regular frequency. A corollary of the primary objective is also to outreach the young and [older candidates] to encourage them and motivate them to find careers in glass and to stay connected.

GW: What will be the main focus of your tenure?

1. Increase membership. We may need to review what benefits are being provided in lieu of the membership dues.
2. Develop a 'Glass Alliance', much like 'Star Alliance' [the world's largest international airline alliance, comprising 26 member airlines]. SGT members should be 'cross registered' in other societies such as the American Ceramic Society to be able to attend their meetings at 'membership rates'. Likewise, ACerS members should be able to attend an SGT meeting at membership rates. There may be options to [allow] online access to 'other society' publications at reduced rates. We already have an alliance with the Deutsche Glastechnische Gesellschaft for the common publication of technical journals and close working relations with *Glass Worldwide* and Glass Futures. I would like to expand on them.
3. Enhance the technical quality of publications and invite increased submissions. To this end, I welcome Professor Alastair Cormack as the first step in this direction.
4. Develop 'Sustainability Through Glass' symposium at the annual meeting, or in conjunction with Furnace Solutions. On the US side, a glass conference relevant to the glass industry is the Glass Problems Conference (GPC) offered by the Glass Manufacturing Industries Council (GMIC) and the Alfred University. The conference is endorsed by *Glass Worldwide* and the American Ceramic Society. The GPC is very broad in its coverage. I would like to offer a more focused conference on 'Furnace Solutions and Sustainability through Glass' covering energy solutions, zero carbon approach, resource conservation, environmental protection and recycling. I think that we could be unique in such an offering on the eastern side of the Atlantic.

Alfred's Ceramics Corridor Innovation Centre, which houses Saxon Glass Technologies Inc.

GW: How relevant is the SGT to young glassmaking professionals and students, and how can glass compete with other industries to attract future workers from the graduate pool?

Well, if I look back, the SGT was very relevant to me (and I seem to have done alright). I found excitement in reviewing and proof-reading the late Professor Alfred R. Cooper's papers in SGT's *Phys Chem Glasses*. The discovery that alkali ions can move under the influence of an electron beam while analysing quantitatively for constituents using an electron microprobe hooked me [on] glass research and to connect with the glass professionals through the SGT. I do believe the young will be motivated through SGT to seek careers in the glass profession. I also think that glass as a material will gain more importance relative to other materials in our conversations over a pint.

GW: In recent years, *Glass Worldwide* has assisted in facilitating and promoting SGT get-togethers at international events such as the Glass Problems Conference. Can we expect an even greater global presence from the Society moving forward?

Certainly. The wonderful relationship with *Glass Worldwide* has been invaluable to the SGT. I have already had a preliminary conversation with the Director of the GMIC who, along with Alfred University organises the GPC, over our closer collaboration. There are some other notable glass industry-related international conferences which are more of the trade show type. Among these, Glassman, glasstec, and Glass Performance Days are quite well-known. We will need to explore new ways to interact with some of these to increase our global presence. ▸

The SGT's Furnace Solutions conference in June 2022 attracted a record audience.

Originally published in Glass Worldwide, preferred international journal of AIGMF

GW: How will the Society co-operate with other international bodies for mutual benefit, such as the American Ceramic Society (ACerS)'s Glass and Optical Materials Division (GOMD)?
The same applies to the GOMD. Since I have a fair standing within the GOMD, I have had many individuals who have offered to help. All do feel that the SGT, ACerS, perhaps the Indian Ceramic Society and maybe even the Japanese Ceramic Society should come closer. Perhaps my concept of a 'Glass Alliance' will take form, hopefully before my term is over.

GW: How do the SGT's publications contribute to the industry?
SGT is fortunate in having a partnership with the Deutsche Glastechnische Gesellschaft in bringing joint publications which cover European glass industry. In the USA, the *International Journal of Applied Glass Science* focuses on applied glass topics of interest to the industry. I also think the close working relationship with *Glass Worldwide* is a huge plus in connecting with the glass industry. We perhaps need to cultivate these relationships with more and more publications and gear ourselves to organise conferences on topics relevant to the glass industry.

GW: What role do SGT events play in proceedings, especially the Furnace Solutions Conference which attracted a record audience in 2022?
Furnace Solutions of the SGT is about the only platform where issues of glass furnaces are the central theme. As I mentioned previously, a close 'competitor' would be the annual Glass Problems Conference in Columbus OH. I think that [… large] distances often deter physical attendance in light of the issues initiated by Covid-19 pandemic. There is room for regional-focus conferences to satisfy the membership.

GW: What are the Society's plans for events in 2023?
Currently, I understand the Furnace Solutions and the Annual General Meeting with technical presentations are being organised – somewhere I would like to insert a 'Sustainability through Glass' symposium. Additionally, I would want to have a regular meeting on glass in healthcare.

GW: If a reader of *Glass Worldwide* was considering becoming an SGT member, what advice would you offer?
My advice to potential members has always been, "Walk with us" and start spending volunteer time to help with the organisation of symposia on various topics and actively participate in committees to make yourself visible. Make yourself heard in the process. SGT members often enjoy lots of camaraderie. You could learn to smile end-to-end!

GW: Following on from your Personality Profile interview in the May/June 2019 issue of *Glass Worldwide,* what are the latest developments at Saxon Glass Technologies?
Our focus has always been on glass in healthcare. I take pride in the development of the chemically-strengthened glass cartridge that created a market revolution, more so because the device helps save thousands of human lives each year. (Do you recall Alan L., Manager at the Las Iguanas Restaurant in Quayside, Cambridge, September 03, 2018?). Interestingly enough, we are working on yet another 'life-saving' glass product which we hope will make a revolutionary change in the way surgeons treat injuries. We are, however, several years away from the marketplace so I can only be hopeful.

GW: What pointers on lightweighting would you pass on to the wider glass container industry following the success of chemical toughening at Saxon?
Immersing in a bath of molten salt is not the only way to strengthen a glass product. Please read my series of three articles with "Lessons Learned and Yet to be Learned" ending in their titles in the *International Journal of Applied Glass Science.* The most pertinent publication is the "Stronger Glass Products: Lessons Learned and Yet to be Learned" in *IJAGS* 2018; pp140–155. Look forward to a 'high-view'-type publication encompassing the three articles, where I may be analysing the various lightweighting techniques and discuss the plusses and the minuses, hopefully in *Glass Worldwide.*

GW: Is there anything else you would like to add?
"Learning is a never-ending pleasure" is my usual tagline whenever I autograph my textbook. But beyond that, I would like to see all of us glass professionals develop a sense of responsibility towards Mother Earth for her protection for generations to come. These generations ought to be able to "sing Heigh-ho! unto the green holly, this life is most jolly" (from *As you Like It* by William Shakespeare). ●

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SCHOTT maintains a manufacturing hub for the pharma industry in India.

On the Spot... Eric L'Heureux

Having launched state of the art plants across the country, SCHOTT Pharma with its Indian joint venture SCHOTT Poonawalla has received external recognition as a manufacturing hub for India's pharma industry. Eric L'Heureux, Managing Director of SCHOTT Poonawalla Pvt. Ltd., spoke exclusively to *Glass Worldwide,* preferred international journal of the All India Glass Manufacturers' Federation (AIGMF).

GW: What did it mean to you personally to be awarded the 2022 C K Somany Award by the AIGMF and for SCHOTT Poonawalla to be the recipient of the sister 2022 award, the Balkrishna Gupta Award for Exports?
It is truly a great honour to be awarded the 2022 C K Somany Award by the All India Glass Manufacturers' Federation (AIGMF) and for SCHOTT Poonawalla to be awarded the Balkrishna Gupta Award for Exports. It is our mission to provide the pharma industry in India with the highest innovative drug containment and delivery solutions based on cutting-edge technology. This is a reward for the hard work that we have done throughout the years.

GW: What do you consider to be the key factors in SCHOTT Poonawalla receiving such external recognition?
We are proud to say that at SCHOTT Poonawalla we combine German product engineering skills with industry expertise from India. A key factor is also the high quality of our product solutions. All our plants fulfil the high requirements from the pharma industry.

GW: What first attracted you to a career in the glass industry and what would do you consider your career highlights to date?
Specialty glass has always fascinated me and I'm proud to be able to look back on 30 years that I've spent working in this industry and within the SCHOTT and SCHOTT Pharma network. I've held several managing positions in Belgium (QA manager), Indonesia (Technical Director and President Director), Hungary (General Manager), Singapore (Vice President Asia), and India (Director Operation and now Managing Director). In India, I was part of the management team of the joint venture that is now SCHOTT Poonawalla following Serum Institute of India acquiring the 50% stake of the company. This development is one of my highlights to date. As a side note: my son has also managed the ampoule production in India before moving back to Belgium working now in Pharma Industry, so the fascination for specialty glass and Pharma runs in the family.

GW: What position does SCHOTT Poonawalla currently hold in the Indian glass industry?
SCHOTT Poonawalla is a leading Indian manufacturer of pharma drug

Eric L'Heureux with the AIGMF's 2022 C K Somany Award, supported by *Glass Worldwide.*

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glass WORLDWIDE

containment and delivery solutions, such as prefillable syringes, cartridges, vials, ampoules and ready-to-use drug containment solutions. These products are used to store life-saving medications. We serve the Indian pharma market and thereby also support the export of pharma products of Indian drug manufacturers.

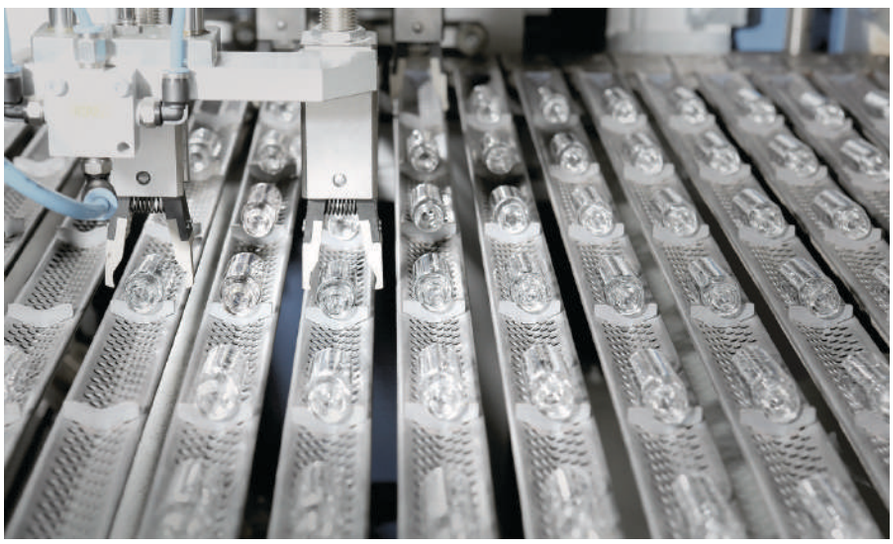
The joint venture with Serum Institute of India is an excellent example of shifting towards new cooperation models, with greater synergies between pharma manufacturing and drug containment production.

GW: What is SCHOTT Poonawalla's role within the wider SCHOTT Pharma company and what are the main benefits of being part of such a global conglomerate?
Our manufacturing sites in India are part of SCHOTT Pharma's global network that spreads across 14 countries. It has always been SCHOTT Pharma's strategy to manufacture pharma drug containment and delivery solutions close to the customer. In recent years, India has emerged as one of the large mass production clusters for vaccines in Asia. Simultaneously, we have established a strong base in India that functions as a manufacturing hub for the pharma industry in India and supports the export of products of Indian pharma companies.

In my role, I drive our business growth together with customers from the industry. We focus on innovations and technology developments to further advance the industry and to strengthen the high quality standard in India.

GW: Are there any particular examples of recent or impending product innovations from the Indian operations that you are particularly proud of?
Generally speaking, we follow SCHOTT Pharma's global innovation strategy. One highlight, for example, is in the field of ready-to-use (RTU) containment solutions that relieve pharma companies from preparatory process steps. These RTU solutions enable pharma companies to efficiently perform pre-clinical and clinical trials as well as commercial filling.

GW: What are the origins of SCHOTT's activities in India and highlights of major investments projects that have been completed in recent times?
SCHOTT has been present in India for several decades. In 2008, SCHOTT founded a joint venture, which today operates as SCHOTT Poonawalla. The JV has been successful since the very start and we look forward to continuing on this path together.


SCHOTT Poonawalla is a domestic and international supplier of vials for Covid-19 vaccines.

Over the last three years, we have invested roughly INR 600 crores to significantly increase our production capacity in India. We set up two new plants in Umarsadi, Gujarat and Baddi, Himachal Pradesh, to secure supply for the pharma industry.

GW: How closely do manufacturing operations in the India now fit the ideal SCHOTT Pharma model?
All SCHOTT Pharma plants around the world follow an international standard. Our production sites in India are already equipped with cutting-edge technology.

GW: How many people are employed at your sites in India, what levels of expertise are employed and how does the company invest in its workforce?
Today, across our plants and the head office in Mumbai, the total headcount of SCHOTT Poonawalla is 2,350. Three key fields of expertise are Quality, Engineering and Marketing & Sales (including Product Development). We constantly develop the workforce through internal and external training.

GW: What role did SCHOTT Poonawalla play in supporting the fight against the Covid-19 pandemic, both domestically and internationally?
We have delivered an important contribution to the global efforts to combat Covid-19.

During the pandemic, SCHOTT Poonawalla was the supplier of vials for Covid-19 vaccines, not only for India but also supported the global vaccination drive by exporting vials across the globe.

GW: Is there still potential for quantum improvements in glass manufacturing methods and production efficiencies or more gradual refinements? In either case, where should the industry's priorities lie in India?
As you can imagine, the pharma industry requires unique solutions to safely store life-saving drugs. The glass is mainly Borosilicate glass. It is chemically inert, meaning it avoids the interaction between the container and the medication, preserving the drug's effectiveness. This is why it has been the gold standard to store drugs for a long time.

SCHOTT Pharma has been producing pharma drug containment and delivery solutions for almost a century and sees huge potential in adding deep tech such as Big Data or AI to continuously push the cosmetic and dimensional quality of the products to higher levels.

GW: In general, how important are technological advances from your suppliers to assist SCHOTT Pharma reaching its goals in India?
Overall, we work together closely with our partners and customers. As you can imagine, sourcing the right drug containment and delivery solution is a strategic process and we have signed NDAs with our customers and cannot share further details.

GW: What is your role personally now and in the past with the AIGMF and what are the main benefits of membership for SCHOTT Poonawalla?
This is my first time interacting with AIGMF, as in the past, it was managed by our previous Managing Director. Our collaboration with AIGMF gives us more visibility in the glass industry, developments therein and more interactions with other players in this segment. The federation also lends active assistance and support when needed. ●

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Maximising power resilience and energy independence

Founder and CEO of UK-based smart energy solutions manufacturer Powerstar Dr. Alex Mardapittas highlighted to *Glass Worldwide* (preferred international AIGMF journal) the importance of battery energy storage systems to help glass manufacturers alleviate pressing energy issues.

Dr. Alex Mardapittas, CEO at Powerstar.

Inside a battery energy storage system (BESS).

This winter is the toughest that the UK economy has faced for decades, and energy supply is right at the heart of the problem. As an energy-intensive sector, the glass industry needs resilient, secure and affordable power – the three arms of what Powerstar has identified as the 'Energy Trilemma'.

Although "cautiously confident" that there are adequate supplies of gas, Britain's National Grid Electricity System Operator (ESO) has admitted that it may be necessary to limit power supplies and, in the event of shortages, load shedding or voltage control will have to come into play, meaning that some [UK-based] companies may be forced to alter production schedules, shifting manufacturing outside of peak times, or reducing energy consumption. For heavy energy users such as glass manufacturers, the impact of this will be severe, with the potential for damage to product and interruption to workflow that may have significant costs – both financial and reputational. It is unsurprising, then, that many manufacturers are taking matters into their own hands, investing in sophisticated energy management technology to mitigate the worst issues in the current economic and geopolitical climate. Many are protecting their assets with battery energy storage systems (BESS), technology that offers greater flexibility than more traditional options in terms of energy management and usage, while also helping to offset price increases by facilitating access to grid balancing – a whole new revenue stream.

Parkinson-Spencer Refractories' 250kW BESS provides an uninterruptible power supply in the event of Grid disruption.

Employing battery power

For one leading manufacturer of refractories and glass solutions, Parkinson-Spencer Refractories (PSR), the implementation of BESS technology is already paying dividends – so much so that it is anticipated the project with Powerstar and GridBeyond will have paid for itself within 24 months. From its Yorkshire base, PSR supplies around 1,500 tonnes of refractory products into 78 markets, globally. When the company approached Powerstar, it had already been suffering interrupted energy supply from the National Grid – with six blackouts over one six-month period. As a high-value manufacturer of glass industry solutions, each incident was costing between £20,000 and £100,000 in destroyed product, labour time and production downtime. Having invested in renewables, installing wind turbines onsite as part of a commitment to sustainability, the company sought Powerstar's expertise to maximise power resilience and ▸

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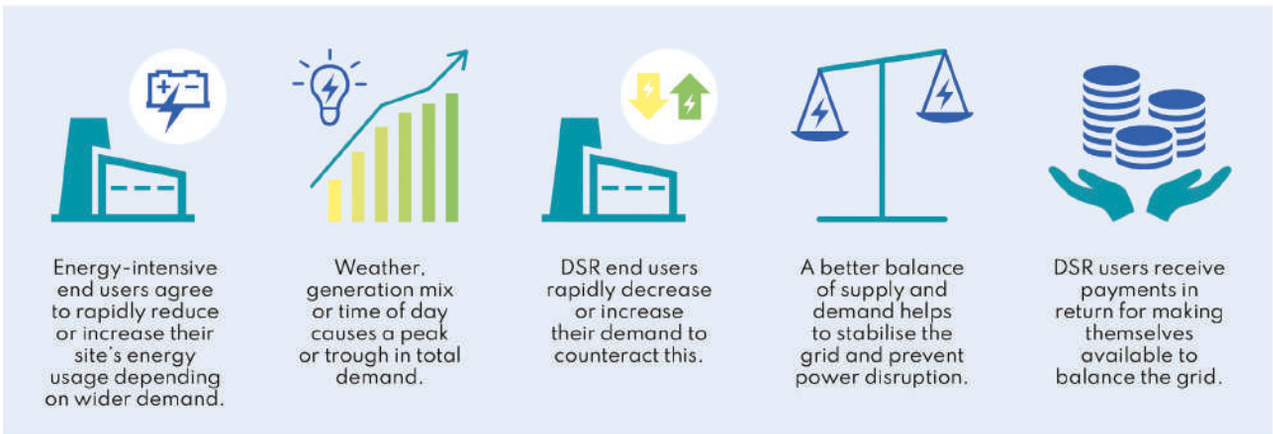
Understanding Demand Side Response

Demand Side Response (DSR) is used by National Grid to balance electrical supply and demand – this is needed due to the unpredictable nature of renewable energy sources. Individual organisations can engage with DSR mechanisms to help dynamically balance the grid and generate additional revenue for doing so.



Battery Energy Storage Systems are ideal for engaging with DSR services as they are able to rapidly supply power back to the grid or store it for later use, allowing battery owners to generate significant additional revenue from grid services.

Intrinsic to battery storage is the opportunity it gives to engage with demand side response and firm frequency response contracts.

energy independence with its own power generation, while making cost savings and generating new revenue, for the most affordable energy.

As part of the solution for PSR, Powerstar installed a 250kW BESS, to provide the uninterruptible power supply (UPS) that is critical for continued workflow in the event of supply disruption from the Grid. As a powerful asset, a BESS has many advantages over a traditional UPS, which will be constantly switching between AC and DC, even though it is idle much of the time. This means losses of between 10 and 15% – completely wasted energy. In contrast, a BESS loses only around 3% – a significant reduction in energy wastage.

While the security of power supply is clearly vital for the glass manufacturing sector, as a high consumer of energy, the legally-binding commitment to achieve Net Zero by 2050 [in June 2019 the UK Government passed a law setting a deadline for achieving net zero greenhouse gas emissions] is also a looming issue. And here, again, BESS technology proves a powerful asset. Where companies such as PSR are investing in on-site renewables, such as wind turbines, these offer a cost-effective and sustainable energy source. However, [this form of] renewable energy is inherently inflexible, relying on weather conditions. Where companies invest in BESS technology, they can store renewable energy as it is produced to use when needed – and can also store energy purchased from the Grid at off-peak times to use at peak times, meaning further cost-savings and greater control over energy budgets.

Engaging with grid balancing

As the third arm of the Energy Trilemma, affordability is a critical issue – nowhere more so than in a high consumption sector such as glass manufacturing. The ability to generate new revenue through engaging with grid balancing [the National Grid's system of stabilising supply/demand by paying electricity generators to adjust their output as required – see below] presents a compelling case for investment in BESS.

For PSR, Powerstar worked with GridBeyond, connecting the BESS to GridBeyond Point, an AI-powered energy platform which enables the locally-generated renewable energy to be integrated into the Grid. Intrinsic to battery storage is the opportunity it gives to engage with demand side response (DSR) and firm frequency response (FFR) contracts, whether through direct relationships with the National Grid, with the distribution network operator (DNO) or thorough an aggregator service. At the forefront of the move from fossil-fuelled, centralised energy supply to the more distributed, localised energy generation model that will play an increasing role in the UK's energy supply for the foreseeable future, manufacturers investing in BESS and taking up these income-generation opportunities are making the most of stretched budgets, while also helping the country to achieve its Net Zero ambitions.

Contractual obligations for grid balancing are met by turning up, turning down, or offsetting energy demands in real-time, which helps the Grid to smooth out peaks and troughs in the UK's overall electricity demand. While generally the more lucrative of the two options, FFR contracts are stringent, requiring response times of 30 seconds or less, and BESS technology is the ideal solution to meet these demands, given its instantaneous response time.

For PSR, the relationship with GridBeyond is enabling them to engage with DSR as, even though their battery is sub 1MW, the aggregation service means that they join with other companies to create a meaningful supply to the Grid, providing them with regular revenue.

The issues of energy security, affordability, and sustainability are more pressing now than they have been for decades. In this context, companies harnessing the power of BESS technology can mitigate the risks, both this winter and for the future. ●

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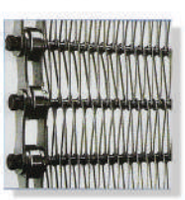
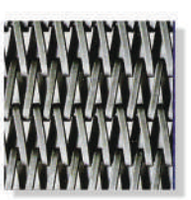
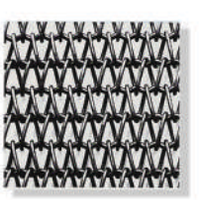
Mr. M.D. Farooq, the founder of Umda Enginering, brings to the table more than 35 years of expertise in the manufacturing industry. Starting from humble beginnings, today more than 350 of Mr. Farooq's Lehr machines are successfully installed around the world.

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 Enginering.

Belts







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The key to uber lightweighting of glass containers

Due to worldwide focus on manufacturing operations becoming carbon neutral, there is an increasing drive to create the lightest possible glass containers to help conserve the earth's resources and reduce energy requirements for manufacture, transportation and distribution. Glass Futures Consultant Peter J Firth explained to Glass Worldwide (preferred international AIGMF journal) why new glass coatings are crucial to achieving this.

The coating of a glass container is required to give the glass a smooth surface that resists scratching and other surface damage. Since glass bottles and jars often travel through conveyors, this coating stops the glass sticking together and prevents scratching from abrasive contact during transit. It is also known that water on the surface of uncoated glass contributes to container strength reduction. The glass chemically absorbs the water and forms bonds with silica which tends to weaken the bottle, particularly at the site of any flaw in the glass.

Problems with even minor flaws in the glass and degradation of bottle strength are particularly heightened with bottles that contain pressurised contents such as carbonated liquids, like beer, soda and sparkling wine. Bottles with such contents are under substantial internal pressure, and the weakened surface flaws can lead to bursting of the bottle even at relatively low internal pressure. Bursting can be triggered either spontaneously or as the result of a small impact load that would not have affected a container without a flaw in it. As well as losing the contents of the bottle, the bursting of the container also poses a threat of injury to anyone in the vicinity from glass fragments, not to mention the mess that has to be cleaned up.

The purpose of a coating is therefore to retain the strength of the glass from manufacture to the highest practical level by protecting the surface, and to minimise the occurrence of scratches and similar flaws during the post-forming process, thereby reducing degradation of bottle strength.

Contact issues

The container strength decreases as the glass articles come into contact with each other and with other surfaces in the course of manufacturing, packaging, filling and shipment. The glass coating therefore gives surface protection and reduces the magnitude of the degradation in container strength during these further processing steps as well.

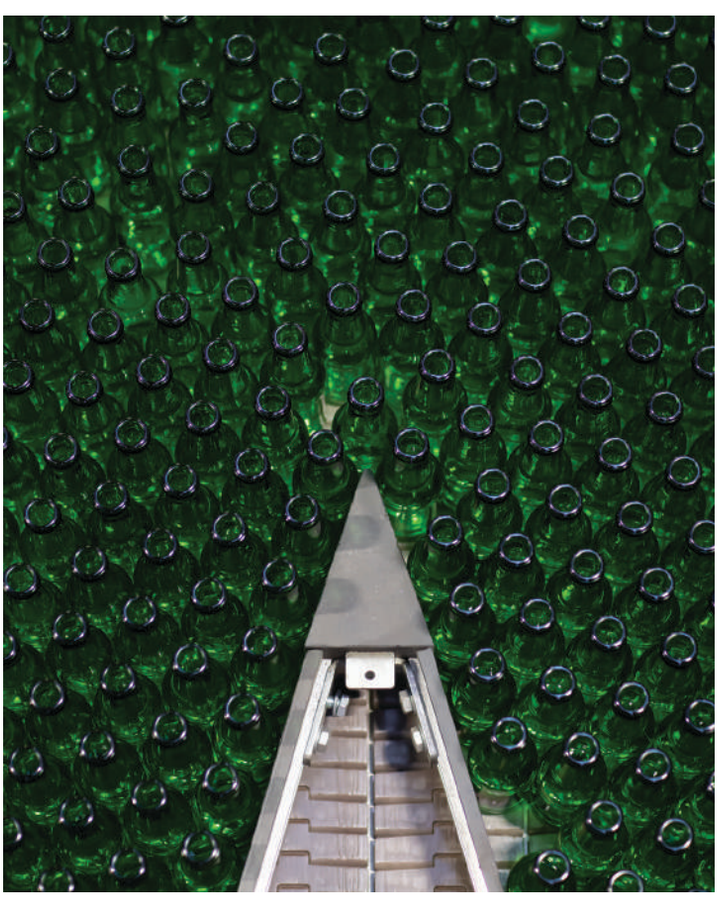
Due to the nature of raw glass surfaces, abrasion occurs whenever two glass surfaces come into contact. Any subsequent scratches or flaws may cause a decrease in the strength of the glass, quite possibly reducing this to as little as 25% of its original strength. In fact, a good way to check for any problems with cold-end coatings is to subject the containers to internal pressure resistance testing at the end of the lehr and [at] the end of the inspection line. If there is a significant reduction in average bursting pressure then it is likely the coating is not being applied correctly and corrective action needs to be taken.

Other factors could be at play such as unintended metal-to-glass contact during transport, but without this exception, this comparative testing works well as a monitor for coating effectiveness.

Assessments such as the so-called "slip-test" and simple manual bottle-to-bottle abrasion testing (discussed later) generally provide adequate coating control. The lubricating effect of the cold-end coating enables bottles to 'slip' or roll past one another when coming into contact, which is required to smooth the transition of the bottles from the lehr exit. Here, bottle-to-bottle contact could easily cause the containers to stick together, as the bottles are funnelled into single line conveyors for automatic inspection followed by bulk packaging. Without the presence of a good quality coating, the bottles are liable to 'stick' or jam, blocking the entrance to the conveyors, and sustaining scuffing or other surface damage. The same goes for when the containers are run down the customers' filling lines.

Current container coating technology

Under current operating methods, it is normal to have both a hot-end coating and a cold-end coating that work together to give the required overall coating performance. The performance



Friction-reducing coatings are key to the lightweighting of glass containers.

Originally published in Glass Worldwide, preferred international journal of AIGMF

required from the coatings is to provide permanency, low coating thickness, visual clarity, lubricity, abrasion resistance, corrosion resistance, resistance to hot water washing, compliance with food standards (where risk of internal contamination of the container is possible), and also not to adversely affect any label adherence and decorating or printing inks that are required in any secondary processing activities. And all at a very low cost. So, as you can see, we are not asking much from such a glass coating here, are we?

The coating at the hot-end simply but essentially provides a bonding agent for the cold-end coating to bind to the glass surface. This is achieved by exposing the hot glass to a vapourised tin compound which is applied shortly after the glass has been formed and transported along the hot-end machine conveyor, just prior to entering the lehr. At this stage the temperature of the glass container is typically between 400 and 600°C which is a good temperature range for the application of the tin compound.

The tin oxide deposited on the container then forms the bonding required for the cold-end coatings that will be applied after container annealing has taken place, typically at lower temperatures of between 50 and 200°C, depending on the particular cold-end coating being applied.

MTBC

It was common in the past for tin coatings to be applied using stannic chloride. This was applied to glass surfaces by exposing the heated glass to the vaporised tin compound. At the temperatures stated above, the tin compound was converted to stannic oxide almost immediately upon coming in contact with the heated glass. This has been replaced for many years now by the use of Monobutyltin Trichloride (MBTC) which comes in soluble form and is applied to the coating hood and then vapourised to apply to the glass container external surface.

MBTC is preferred as it is much less aggressive than the stannic chloride which was not popular for health reasons. I don't know the details of the health concerns associated with the use of it, but I do remember having a bad burn on my forearm after making contact with a deposit of material on a metal girder in the hot end of one plant when I was new to the industry (many years ago!). When I reported that to the on-site doctor at the time, it was attributed to a deposit from stannic chloride that had not been contained within the hood extraction system. How true that is, I will never really know. However it was well-known that the decomposition products of such hot-end coating compositions produced corrosive vapours. Needless to say, it certainly etched the name 'stannic chloride' in my memory (the markings on my arm have long since disappeared).

I can certainly recall special precautions being exercised to minimise the health hazards to personnel operating the coating equipment, such as breathing apparatus and specific protective clothing. This also still applies with the use of MBTC. The extraction systems are more effective nowadays, although not sufficient to avoid a pungent smell close to coating hoods if the hood or extraction is not set up correctly.

Checking thickness

The residence time of each container in the coating area is sufficient to deposit an oxide film that is of the order of 0.5µ in thickness. Thicker coatings are undesirable as they cause the glass to give an unsightly iridescent appearance, often termed in the industry as 'blooming'.

Periodic checks for the thickness of the hot-end coating are carried out as part of the manufacturing process, although the units of measurement are commonly known as CTUs. This stands for Coating Thickness Units and is not a universal standard measure of thickness as such, but one defined by the American Glass Research Inc equipment used to measure it. However, this proves sufficient as a process control measure.

Also, if any of the tin oxide gets onto the finish of the glass containers – and if these are subsequently given screw caps or crowns in a different metal, this results in cap or crown corrosion problems even during normal expected shelf life. Therefore, it is undesirable to have any significant amount of hot-end coating detected on the finish of the container. Coating measured above 10 CTUs on the finish is considered excessive and corrective action will be required to reduce it to less than 10 CTUs. Regular checks [should be] made to adequately control the level of coating on the finish.

Cold-end coating

The cold-end coating material to be bonded to the hot-end coating at the cold-end may be selected from a large range of materials/chemistries. The specific material/chemical is selected to provide the required properties for the future processing of the container. The compositions of such coatings include polyethylene waxes, acrylic-ethylene copolymers, complex stearates, fatty acids, polyurethanes, vinyl copolymers, and silicones. However, the current basic range of types of cold-end coating most commonly used are stearate spray (water soluble used for pharmaceutical containers), oleic acid vapour (often used where required for good labelling performance), and polyethylene spray (the most permanent kind of

coating giving best container strength retention).

For the spraying technique, the spray is delivered onto the container from above and sometimes below the lehr belt. Care has to be taken so that the inside of the bottle is not sprayed/contaminated, which could cause so-called 'foaming' during filling – and subsequently contaminate the filled product.

One of the properties that is measured at this stage is lubricity. This is measured by determining the angle at which the top bottle in a triangle of three horizontally stacked bottles will start to slide when the bottom supporting platform is tilted upwards. Uncoated bottles will reach an angle of 35° to 40° before sliding, whereas a good cold-end coating will let a dry bottle slide at between 8° to 16°.

Quality control

Bottles treated with cold-end coating are also tested with a scratch test. There are machines that can calibrate and measure the effectiveness of the applied coatings, such as the scratch test machine which abrades the surface of one glass against the surface of a similar bottle at increasing loads until a scratch becomes evident. However, it is common to simply manually carry out this test and, in this case, it should be hard to create a scratch by manually rubbing one container against another. These approaches to testing cold-end coatings in the manufacturing process are adequate for quality control purposes.

For lightweight one-trip containers, these articles require a more permanent coating in the form of polyethylene. This is used in combination with the narrow neck press and blow (NNPB) forming process to give the thinnest and most consistent glass wall thickness necessary to guarantee the required duty strength of the container, at minimum weight.

Due to restrictions in the function of the NNPB process, not all containers can be produced this way and recently the approaches to producing lightweight blow-blow (LWBB) have been a focus for such containers. For example, where corkage control is required in the mouth of wine bottles, as well as where bottle shapes are required which are not suitable for NNPB production.

Generally, however, glass containers are strongest when freshly formed and after the controlled cooling (annealing) process has been carried out. It is well known that flaws on the surface of a glass container such as chips, cracks, scratches and other surface imperfections result in significant reduction in the strength of the bottle.

The flaw sites on the surface of a bottle are stress concentrators, and breakage tends to occur at such stress concentration locations and often in combination with the glass surface profile of the container at the location of the stress concentrator. This is true even at a micro level. Therefore, the more perfect the quality of the glass surface we can make a container, the stronger it will be. Current coating technology can only serve to preserve the strength of the container that we have produced.

Future coating technology and uber light-weighting

Having discussed the current widespread application of best coatings technologies, which in combination with the NNPB forming process produce the lightest containers possible, we are now at a juncture where we need a step change to push the boundaries of reducing container weight-to-capacity ratios beyond what we can currently conceive is possible.

The reason for this is the worldwide focus on manufacturing operations becoming carbon neutral. Not only that, it is a large part of the supply chain for drinks companies, who also want to reduce the environmental impacts and scope 3 emissions associated with their packaging.

With the primary purpose of the glass container being a holding pot for its contents, it is clearly more efficient in function if the volume of material used to perform this function is minimised. This means less glass, less drain of the earth's resources, and less energy required to manufacture and provide this basic function. In fact, the lighter a container is made for the given function of holding a specific amount of content, the more benefits that are also realised – in terms of less energy required in transportation from the manufacturing plant to the filling line, and subsequent distribution after filling.

The future will therefore [involve] improved glass coatings and radical light-weighting of glass containers. Both of these will provide significant challenges.

Adapting to new requirements

We have already discussed the basic requirements of coatings which need to be met, in addition to that we are looking for strength enhancement qualities of a coating, not just preservation of post-forming strength. Therein lies the main challenge, coupled with delivering on the other qualities of the current coatings. This could mean a different hot-end coating, a different cold-end coating, or different coatings overall. In an ideal world there would also just be one coating. This could be applied at either the hot end or cold end, or even during the annealing process.

Elimination of the use of hot-end surface treatment is an added bonus if that can be achieved, because it will free up some space on the hot-end conveyor which will allow the future installation of more hot-end inspection equipment. In addition, the hot-end coating process requires expensive exhaust systems and filters or even scrubbers to remove the potentially toxic vapours produced from the decomposition products used in the hot-end coating compositions.

The method of application of the new coating will have to keep up with production speeds, or be applied post production as a form of secondary processing. However, the latter would be a challenge for some plants due to lack of space for additional production equipment.

Assuming we eventually see such a new 'super-coating', which enhances glass strength and enables much thinner glass to [be used for container manufacture], we are then faced with the challenge of ensuring the consistency of this glass' wall thickness. (Keep in mind that such a coating also must fulfil the many other functions stated earlier in this article.)

The manufacture of containers with thin and consistent glass wall thickness is a mighty challenge in itself, but one that has to be dealt with concurrently in order to realise the full package (no pun intended) of having uber-lightweight yet strong glass containers. The shape of the container will have a significant effect on what will be possible in this regard, with the more basic shapes being the easiest to achieve in the first instance. Progressing to the more complex shapes and features will bring more challenges for any step change in light-weighting.

Discussion about glass distribution control issues of uber-lightweight containers is a topic in its own right; a story that will have to be written about in hindsight at some stage; at least if we are to realise the benefits of any future strength-enhancing coatings that prove their worth.

UK-based industry-backed research and technology organisation Glass Futures' forthcoming R&D pilot plant in St Helens will provide an ideal testing ground for developing and proving new coating technologies as well as a platform to develop new production methods for manufacturing the uber-lightweight containers for which the new 'super-coating' will serve. Anyone with ideas on such future coatings and container development would be welcomed in discussions for testing and development work. ●

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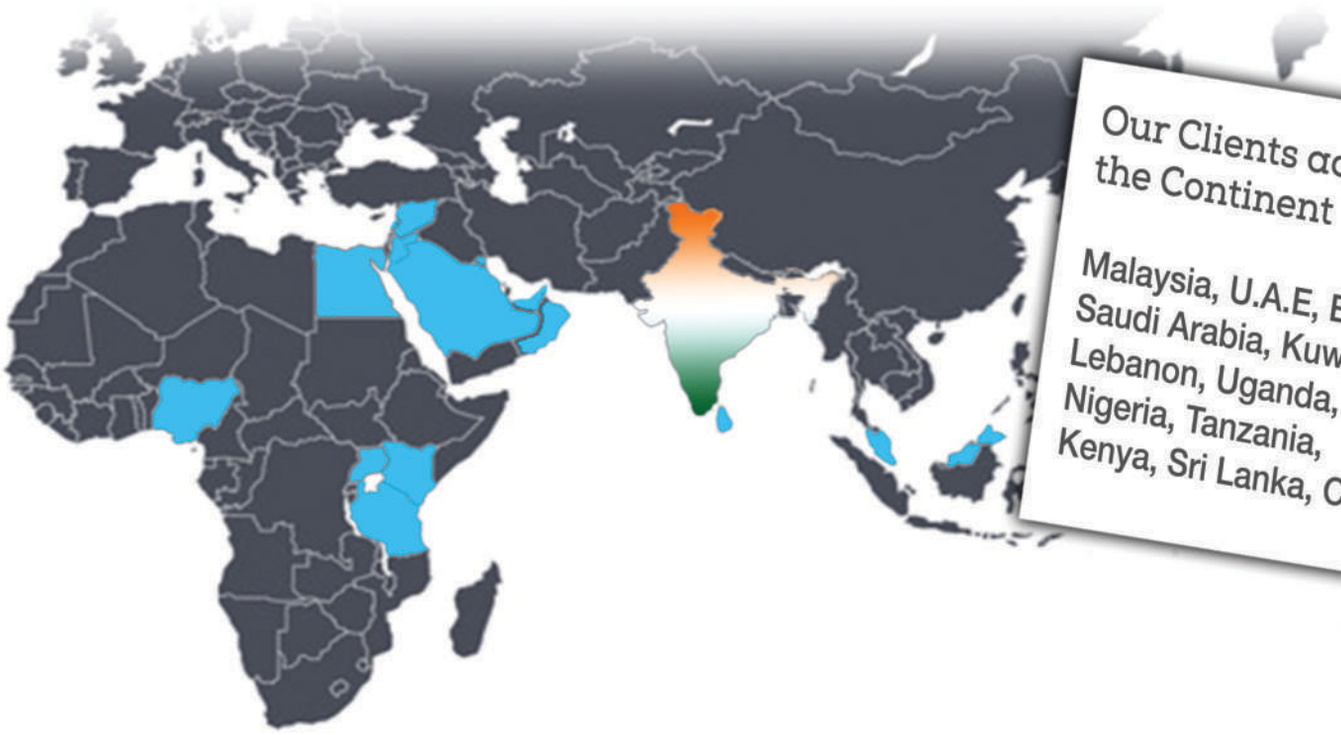

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Consistency and continuity mark Heye's 20-year collaboration with Orora

Heye is celebrating the 20th anniversary of its supplier partnership with leading sustainable, innovative packaging solutions provider, Orora Limited in Australia.

Anniversary celebrations took place on February 7 and 8 at Orora's glass manufacturing plant in Gawler, South Australia. The event, attended by employees of both companies, reflected on the beginnings of the partnership in 2002 and looked to future collaborations.

Throughout the past two decades, Heye has provided continuity of supply and technical support for Orora, a fact confirmed by a large new order placed with the German equipment manufacturer just before Christmas 2022.

START AS YOU MEAN TO GO ON

In 2002, Orora entrusted Heye to design and supply the first furnace and two production lines when it established its Gawler glass manufacturing plant. The plant was built to supply the rapidly developing wine industry in the nearby Barossa Valley and other prestigious wine regions across Australia.

This was a new plant, so Heye also helped train glass operators and delivered technical support once the plant was up and running. This support has continued to this day according to Orora Technology and Business Development Manager, Mr. Andrew Barreau, "*Having a responsive world-class technical partner like Heye makes a big difference to our operations. Our plant operates 24/7, so it is critical to have consistent and reliable support, which our partnership with Heye delivers. Together we have developed some clever remote solutions and this collaborative approach to innovative solutions is key to our long and successful partnership*".

When the glass plant was commissioned in May 2002, Heye's 450 tonne furnace fed two 16 section double gob IS machines, which produced a yield of over 90% and sales soon exceeded the initial target of 200 million wine and champagne bottles a year. As a result, Orora added a second furnace two years later. Again, Heye supplied furnace, feeder, two 16 section 6 1/4" DG IS machines (blow-blow process) and cold end equipment.

The wine industry has sustainability at its core and has been pioneering light weight wine bottles. Orora used this opportunity to diversify its glass offering and, in 2010, asked Heye to supply another furnace equipped, for the first time, with NNPB technology on its IS machines to supply the beer market as well as ultra-light weight wine bottles.

The two 20 section NNPB machines were supplied with a triple gob conversion kit giving the plant the flexibility to run double or triple gob production. As Heye is the inventor of the NNPB production process, it was clearly the best supplier for the job. NNPB is now applied throughout the plant, with commercial wine brands benefiting from 75cl bottles weighing as little as 330g.

By 2020, all lines had been converted from 16 section to 20 section. Heye supplied compact 20 section IS machines which were built to fit within the footprint of the original 16 section machines. This dramatically reduced the civil engineering required to fulfil the project. The latest order, received

in December 2022, will see Heye install the first SpeedLine IS machines to Orora's Australian operation.

From the very beginning, Heye supported Orora with a comprehensive Technical Assistance Agreement that has been renewed and extended over the years. This includes training of Orora team members in Australia and Germany, production- and yield-support, furnace inspection, job- and colour-change support, mould design / light weighting and a host of other areas to boost the efficiency of the customer's operations.

During the pandemic, the company supported Gawler as it rebuilt the G2 furnace first completed in 2004. Currently Gawler has a capacity of around a billion bottles a year from its three furnaces and six production lines, depending on product mix and colour schedules.

BUILT ON DEMAND, EFFICIENCY AND TRUST

A combination of market demand and opportunities for operational efficiencies have kept the relationship expanding throughout its 20-year history. In the year to 2022, the flexibility built into the lines supplied by Heye helped the glass business successfully expand into new product ranges to mitigate the impacts of lower wine volumes.

The plant's expansion and Heye's innovative technology have made it increasingly efficient. For example, the early furnaces had to change colour quite often to react on the market demands. With three furnaces, Orora became more flexible and generated more stability.

Heye International CEO Mr. Hans-Peter Müller says, "*To realise such complex projects and keep a strong relationship in place requires trust between the partners, exemplified by the continuity and the level of professional excellence both parties show*."

The development of personal contacts between the experts in all departments enhances communications and reduces bureaucracy. There are no bottlenecks caused by enquiries having to channel through a single account manager.

A WIN: WIN SITUATION

Mr. Hans-Peter Müller explains, "*This is the kind of relationship we want to build with all our customers. Glass is a capital-intensive business so glassmakers seek partners like Heye who will be with them for the long haul and provide fresh solutions for the challenges they face*."

The ongoing collaboration has been a win-win-situation for both parties and has helped Orora prove to be a reliable partner for the wine, beer, spirits and olive oil industries in Australia.

Looking to the future, Orora continues to work with Heye to pursue the glass industry's evolution. Mr. Andrew Barreau says: "*We are actively seeking to improved flexibility around run lengths, further light weighting and sustainability around low CO_2 glass manufacturing. We are confident that Heye will play a key role in helping us address these challenges*." The relationship with Heye will assist Orora in achieving its interim Climate change target of reducing Scope 1 and 2 greenhouse gas emissions by 40% by FY35 from an FY19 baseline.

Orora *is a leading manufacturer and distributor of sustainable, innovative packaging and visual solutions. Listed on the ASX and headquartered in Melbourne, Australia, the company is focused on designing and delivering products and services that enable its customers' brands to thrive. Every day, millions of consumers buy and use goods in packaging proudly designed, developed, manufactured or distributed by Orora*.

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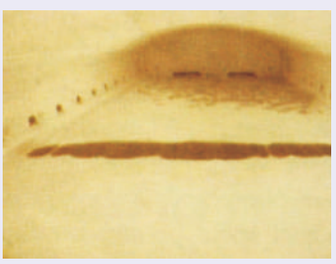







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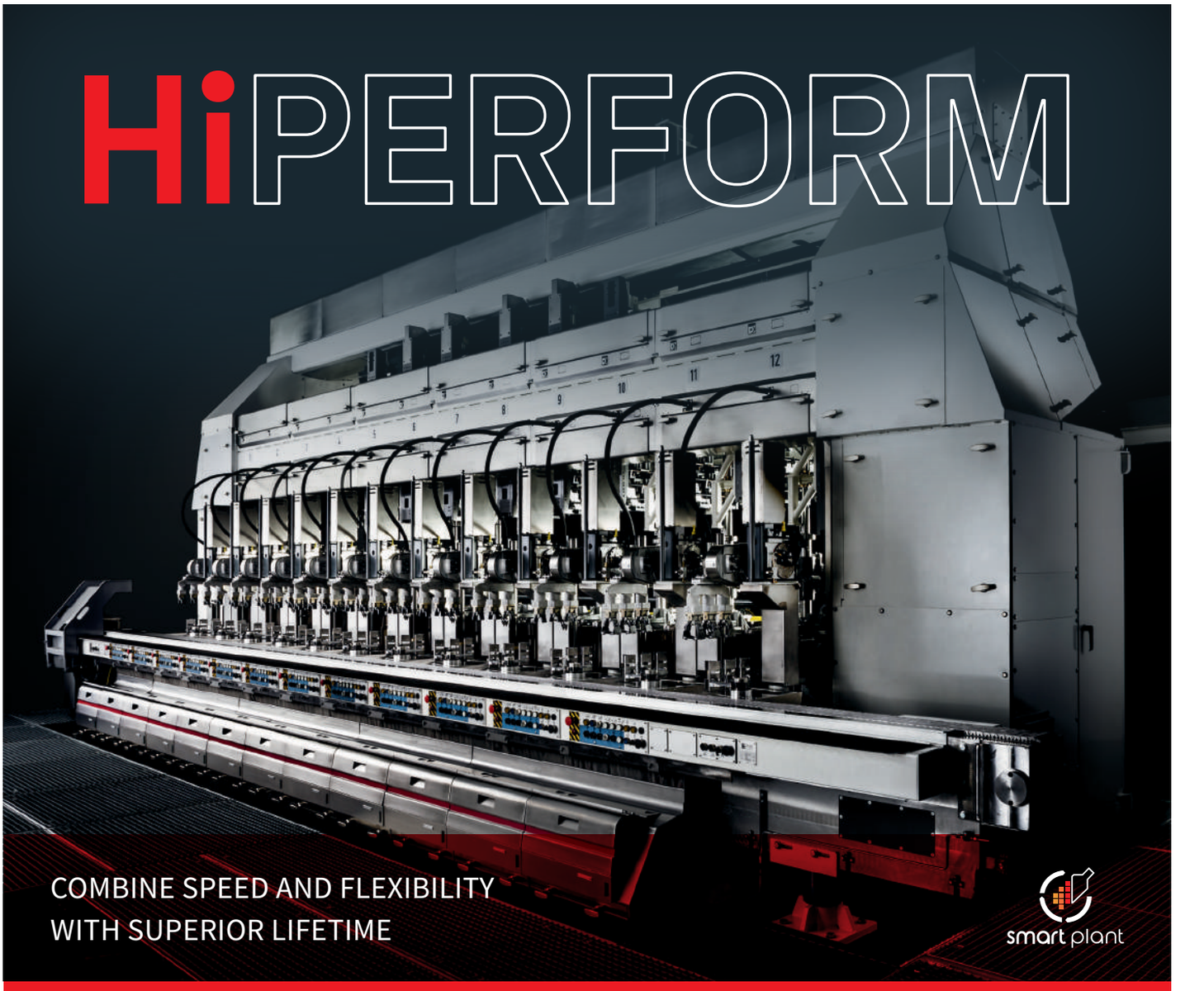

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