Vol. 7 | No. 2 | July - September 2019

Kañch

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

Bi-lingual

Glass Industry 4.0
13th AIGMF International Conference

Special Feature

(Page # 56)

1st Prize (winning entry)
of "Drawing Competition 2.0" on the theme "Adopt a Glass Bottle"

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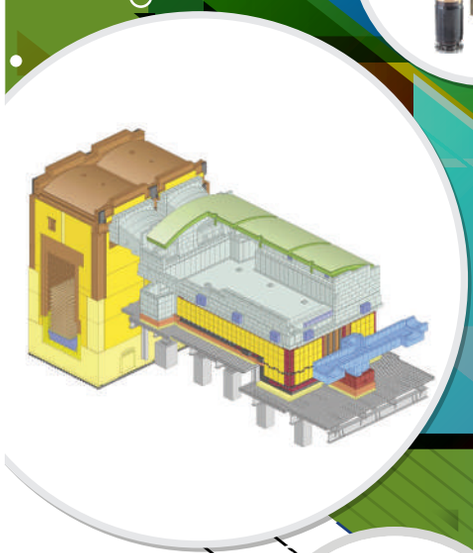




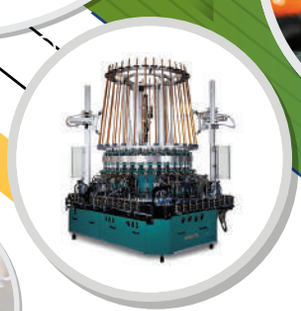


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Quarterly Journal of **THE ALL INDIA GLASS MANUFACTURERS' FEDERATION**

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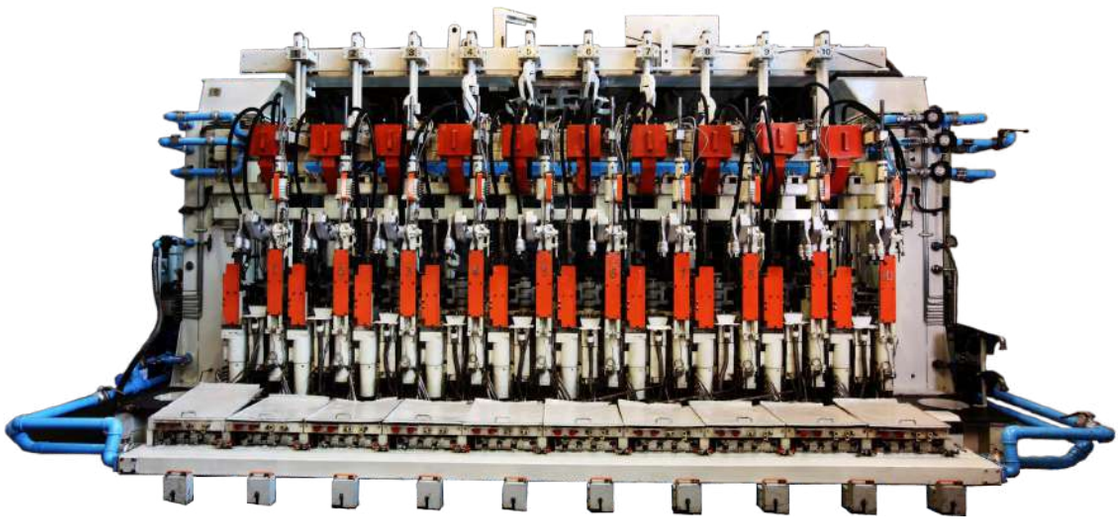
Shamvik Glasstech

Serving the Glass container industry since **1973**



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From President's Desk

To commemorate International Youth Day on August 12, AIGMF invited online entries from children between 7-16 years to participate in "Drawing Competition 2.0" on the theme "Adopt a Glass Bottle".

Former Presidents, Mr. Sanjay Somany and Mr. S C Bansal were jury members who adjudged top 3 drawings out of approx. 2000 entries received from all over India.

Parallel to Annual General and Executive Committee Meetings, AIGMF celebrated its platinum jubilee on Sept 27 at The Ashok Hotel, New Delhi. Hon. Minister of State for Jal Shakti as well as Social Justice and Empowerment, Mr. Rattan Lal Kataria, was the Chief Guest. Mr. Manish Asija, Member of the Legislative Assembly from Firozabad (Uttar Pradesh) accompanied the Hon. Minister showcasing full zeal and commitment for the Glass Industry.

A roadshow on 'Adopt a Glass Bottle' was kicked-off, displaying select drawings by school children on Glass Packaging aiding the Swachh Bharat Abhiyan (Clean India Campaign), a vision set by the Hon. Prime Minister on the path laid by Mahatma Gandhi. Along with the paintings, an exhibition of glass water bottles and other packaging solutions were also put on display. The roadshow will travel to other cities showcasing the vital role of Glass, being the only 100% recyclable packaging material.

Winning students were given cash prizes by the Hon. Minister with 1st Prize (Rs. 10,000) to Archisha Shyam aged 13 years, Class 8 student of Orchids International School, (Jalahalli) Bangalore; 2nd Prize (Rs.7,000) to Pranav Singh aged 11 years, Class 6 student of Bal Bharti School, Bahadurgarh (Haryana) and 3rd Prize (Rs. 5,000) to Swastik Saha aged 10 years, Class 5 student of Bal Bharti School, Bahadurgarh (Haryana).

The Hon. Minister also gave the prestigious AIGMF Glass Awards- 'CK Somany Award for Innovation and Technology' to Mr. B.L. Kheruka of Gujarat Borosil Ltd., and 'Balkrishna Gupta Award for Exports' to M/s Firozabad Glass Shell Industries.

As a CSR initiative, The AIGMF gifted 100 Glass Water Bottles with the Swachh Bharat Abhiyan Logo to The Ashok Hotel. Also, as a token of appreciation, the first 100 drawing competition entrants were gifted a glass water bottle with the Swachh Bharat Abhiyaan (Clean India Campaign) Logo, (manufactured by Hindustan National Glass & Industries Ltd).

Next Executive Committee meeting along with touring exhibition (Adopt a Glass Bottle) and related events are slated to be held from Dec 20-22 at Hotel Royale de Casa, Guwahati (Assam). The meeting will be hosted by North East Sillimanite, an Affiliate Member of AIGMF. I invite all members to participate and confirm their participation at info@aigmf.com ■

(Raj Kumar Mittal)
President AIGMF
President U.P. Glass Manufacturers' Syndicate (UPGMS) **and**
Managing Director– Mittal Group of Glass Industries, Firozabad

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By using Tufcoat® RP 40 coating, the following results can be achieved:

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The optimum Hot-End Coating performance will be a tin oxide layer of 35 CTU min. Followed by a thin invisible layer of Cold-End Coating sprayed over the tin oxide substrate.

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GLASS News

ENGAGEMENTS WITH GOVT. OF INDIA MINISTERS

AIGMF delegation led by its President Mr. Raj Kumar Mittal & MLA Firozabad Mr. Manish Asija called on the Minister of Environment, Forest and Climate Change Mr. Prakash Javadekar on August 8 at Parliament Annexe.

Meeting with Health & Family Welfare Minister Dr. Harsh Vardhan was held at his residence office on July 29.

The other members included Mr. M K Bansal, Executive Committee Member and Secretary AIGMF Mr. Vinit Kapur.

The meetings were mainly organised to apprise Hon. Ministers on the platinum Jubilee Year (1944-2019) of the AIGMF and to brief them that Industry is fully committed towards Environment and Health. It was told that Glass is 100% recyclable which directly aids Swachh Bharat Abhiyaan (clean India campaign).

Presenting Eco-Friendly Glass Bottle to Minister of Environment, Forest and Climate Change Mr. Prakash Javadekar.

At the platinum jubilee of AIGMF, Chief Guest and Hon. Minister of State for Jal Shakti as well as Social Justice and Empowerment, Mr. Rattan Lal Kataria gifted 100 Glass Water Bottles to The Ashok Hotel under AIGMF's CSR initiative on Sept 27.

The All India Glass Manufacturers Federation (AIGMF) gifted glass bottles carrying logo of **'Swachh Bharat Abhiyaan'** *(specially manufactured by Hindustan National Glass and Industries Ltd.)* as part of its ongoing commitment for clean India campaign.

Ministers were also assured that Industry is fully geared to supply glass bottles that may be required to propagate sustainable packaging by user industries.

President Mr. Raj Kumar Mittal & MLA Firozabad Mr. Manish Asija Presenting a Glass Memento to Hon. Health & Family Welfare Minister Dr. Harsh Vardhan.

CHEMICAL AND ALLIED EXPORT PROMOTION COUNCIL (CAPEXIL) EXPORTS AWARDS

Union Minister of Commerce & Industry and Railways, Mr. Piyush Goyal gave way the export awards of CAPEXIL in New Delhi on Sept 18th.

Minister of State for Micro, Small and Medium Enterprises, Mr. Pratap Chandra Sarangi was also present at the award function.

Minister Goyal complimented the award winners and said that they must inspire others, who have not won an award today, to take bold decisions and risks and aspire to do extraordinary work in their industry. For this, the Minister added that the CAPEXIL Sector industries must embrace new technology and explore new markets, make value addition to the products that are being manufactured and not just remain in their comfort zone as manufactures and exporters of raw and basic products.

Commerce and Industry Minister urged industry to engage with the world, grasp all opportunities that are available through the free trade agreements that India has entered into with other countries but at the same time protect the national interest, their business interests and above all the interest of the consumers.

सरकार उद्योगों की सभी मांगों पर बात करने को तैयार-पीयूष गोयल

वाणिज्य और उद्योग मंत्री पीयूष गोयल ने कहा है कि सरकार उद्योगों की सभी मांगों पर बात करने को तैयार है और निर्यात के द्वारा अर्थव्यवस्था को बढ़ावा देने के लिए उनके सामने आने वाली सभी चुनौतियों तथा बाधाओं को हल करने के लिए प्रतिबद्ध है।

नई दिल्ली में रासायनिक और संबद्ध निर्यात संवर्धन परिषद-कैपेक्सिल पुरस्कार समारोह को सम्बोधित करते हुए उन्होंने कहा कि गुणवत्ता आने वाले उत्पादों के विनिर्माण के माध्यम से भारत मेक इन इंडिया पहल के लक्ष्यों को प्राप्त कर सकता है।

अर्थव्यवस्था में सूक्ष्म, लघु और मध्यम उद्यमों के महत्व पर उन्होंने कहा कि देश का भविष्य एम.एस.एम.ई. क्षेत्र में है।

इस अवसर पर सूक्ष्म, लघु और मध्यम उद्यम राज्य मंत्री प्रतापचंद्र सारंगी ने कहा कि प्रधानमंत्री नरेन्द्र मोदी के नेतृत्व में सरकार अगले पांच वर्षों में देश की अर्थव्यवस्था पचास खरब डॉलर करने के लिए प्रतिबद्ध है।

List of Awardees of Glass and Glassware Panel	
Top in 2015-16 & 2017-18	Piramal Glass Ltd.
Special in 2015-16	Bisazza India Pvt. Ltd.,
Special in 2015-16 & Certificate of Merit in 2016-17	GKB Hitech Lenses Pvt. Ltd.
Special in 2015-16 & 2016-17	Gujarat Borosil Ltd.
Special in 2015-16 & 2016-17	Hindusthan National Glass and Industries Ltd.
Special in 2015-16 & 2016-17	La Opala RG Ltd.
Special (SSI) in 2015-16 & Special in 2016-17	Firozabad Glass Shell Industries
Special (SSI) in 2016-17	Transparent Overseas
Certificate of Merit in 2015-16	Banaras Beads Ltd.
Certificate of Merit in 2015-16 & 2016-17	GKB Ophthalmics Ltd.
Certificate of Merit in 2015-16 & 2016-18	GKB Rx Lens Pvt. Ltd.
Certificate of Merit in 2015-16 & Special in 2016-17	GKB Vision Pvt. Ltd.
Certificate of Merit in 2015-16	Om Glass Works Pvt. Ltd.
Certificate of Merit in 2016-17	Goa Glass Fibre Ltd.
Certificate of Merit in 2016-17	Jagdamba Glass Works

XXVII ICG CONGRESS TO BE HELD IN KOLKATA, INDIA DURING 2025

India has won the bid winning proposal at Boston, USA to host ICG-2025 during January 20–24, 2025 at Kolkata.

CSIR-Central Glass and Ceramic Research Institute (CGCRI) has been instrumental of winning the bid to host prestigious ICG-2025 after 39 years (XIV ICG congress was hosted by India during 1986). It would be a great opportunity for Indian glass industries, R & D organizations and academic institutions to go hands-on with the global glass community for the betterment of our society.

ICG congress was organized in India for the first time in 1986, which was an overwhelming success. India gave utmost importance to this event which was inaugurated by the then President of India. In the year 2025, 39 years would have elapsed since the last ICG Congress in India and during this interval Indian science and technology have undergone tremendous growth making a high impact on Indian economy. Inspite of such rapid development, no major events related to ICG (even an Annual Meeting) could be held in India after 1986. Hence, it would be most appropriate to host the 2025 Congress in India.

It has been proposed to organize the Congress in association with Indian Ceramic Society (InCerS), Tha All India Glass Manufacturers Federation (AIGMF) and Glazing Society of India (GSI). The proposed theme of the 2025 Congress is "Glass: A Smart and Indispensable Material for Sustainable Society", which will focus on emerging technologies that can bring an unprecedented transformation in the use of glass in various fields. The Congress will include key note address, several plenary talks, industry presentations and round table discussions devoted to the theme of the congress, focussing contribution of glass in creating a Green World. Further, it is proposed to host a Tutorial especially for the students and a mega exposition on glass and allied products with active participation of several reputed industry houses.

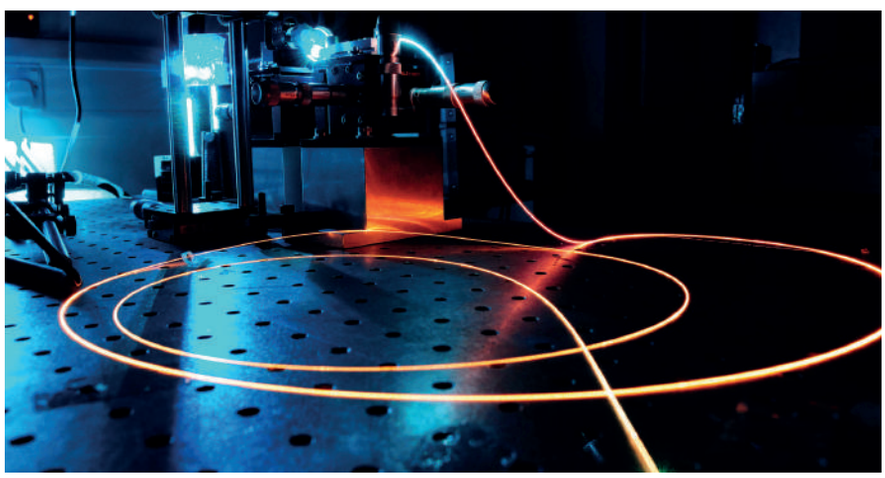
CSIR-CGCRI has gained enormous competency in organizing both national and international conferences, seminars, workshops and symposia related to glass and ceramics over the years. The Institute is having dedicated and highly experienced teams for managing technical programs and for providing all sorts of logistic supports essential for a mega event. This team would be supported by a reputed event management company and several other professional bodies to host this mega event in a majestic venue with all sorts of modern amenities including state of the art audio-visual infrastructure.

At the 25th International Commission on Glass congress (ICG-2019) organized and hosted by The American Ceramic Society (ACerS) at Boston, from June 9-14, 2019, it is customary to select the host to organize the ICG congress well before two terms (i.e., 6 years before) by vote. In this process, there was an invitation to bid in ICG-2019 congress to host the 27th ICG congress during 2025. For hosting ICG-2025, India and Japan have contested by submitting the bid documents followed by presentation before ICG members. CSIR-CGCRI which represents India has taken the privilege to propose InCerS, AIGMF and GSI as its technical associates in organizing the ICG-2025 in Kolkata, India.

International Commission on Glass (ICG) is a non-profit international Society of national scientific and technical organizations with particular interests in glass science and technology. The aim of ICG is to promote and stimulate understanding and cooperation between glass experts in the fields of science and technology as well as art, history and education. ICG has been providing valuable networking and collaborative efforts since the late 1980s. Every three years, the International Commission on Glass (ICG) organizes the International Congress on Glass.

UK FIRM CREATES NEW LASER GLASSES

Photonics, the 21st century light technology, makes our world of mobile phones, computers, international flights & cataract surgery possible. It underpins revolutionary work developing innovative products in medicine, telecoms, manufacturing, and construction.



Ultra-fast lasers are needed now for cutting edge work in countless key areas such as microscopy, micro-machining and materials processing, and the Sheffield-based research and development organisations Glass Technology Services has a growing reputation in developing glass materials for use in this field.

Now with sister company VitriTech it has developed two new types of laser glass which can bring significant cost benefits to the UK's £5.3bn photonics sector.

The companies, in partnership with Leeds and St. Andrews Universities and the photonics systems company M Squared Lasers, have built on earlier work by Glass Technology Services to produce two new laser glasses and are now at the point of developing a pre-prototype laser system using this material.

The new laser materials will be used for applications including secure communications ('quantum' or high-level encryption) and microscopy (fluorescence or higher intensity light microscopy). These laser materials, in tests at St. Andrew's University, have successfully produced ultra-fast laser pulses of 115 femtoseconds.

The research and development work on the two laser glasses at Glass Technology Services have been produced in a project called 'ULTRA-Glass', one of a large portfolio of work by Glass Technology Services which is able to develop bespoke photonic glasses for use in lasers, optics, wave guides, and related applications.

GLASS WASTE SHOWS ROAD TO RECYCLING WASTE

Thanks to scientists based in South Yorkshire and 27 European partners working together on a £9 million project, glass is helping to build a new highway to sustainability.

Researchers at Glass Technology Services, and its sister company British Glass which represents the UK's £1.6bn glass manufacturing sector, are leading on the glass element of a project which aims to work out ways to completely recycle – or close the loop - on all types of waste from the construction industry including glass, wood, ceramics, plastic and rubber.

Together with the construction company Acciona and other industry and research partners in Spain (Tecnalia), Turkey (TCMA) and Sweden (RISE CBI), they have shown that glass construction waste can be transformed into valuable reusable raw materials. One application blends finely ground waste glass - which cannot be reused in a glass furnace - with other industrial waste to produce an 'eco cement'.

Eco cement has been used to build roads and made into pre-cast concrete blocks and other shapes for building homes and roads.

Using waste materials such as the finely ground glass has multiple benefits, improving the performance of the cement, reducing the energy requirements of cement manufacturing, and preventing waste materials from ending up in landfill. Currently the EU produces 1.5 million tonnes of architectural glass waste annually. Less than a third is recycled: the rest either goes to landfill or is used as backfill on construction sites.

Mr. Chris Holcroft, senior technologist and technology development lead for Glass Technology Services, said: "This is an exciting project with a huge amount of potential for sustainable building. The more glass we can save from landfill the better it is for the environment."

In this project Glass Technology Services specialised in early work looking at the available materials, while the partner teams then successfully demonstrated the new cement production in a laboratory, in a pilot study, and on an industrial scale. The finished products are now being tested at a number of case study sites.

This activity is part of the FISSAC project funded by the EU's H2020 programme. FISSAC stands for 'Fostering Industrial Symbiosis for

a Sustainable Resource Intensive Industry Across the Extended Construction Value Chain'.

FISSAC, a group of stakeholders at all levels of the construction and demolition value chain, is developing a pioneering approach to bringing industries to work together to avoid waste – known as industrial symbiosis. Glass Technology Services and British Glass are key members of FISSAC.

FISSAC is currently building a software tool which shows where waste construction material is available, what type, and the environmental impact of possible ways of reusing it. The database will help cut costs for manufacturers, support them in complying with environmental regulations, encourage cross-sector resource efficiency, and help the industry with cleaner production strategies.

ORGANIZATIONAL CHANGES AT MASCOT ENGINEERING COMPANY

Mascot has announced a series of Organizational changes aimed at a better alignment with Company's growth strategy and strengthening certain areas of management.

Mr. Mohit Lalvani, Managing Director, with his wealth of knowledge and expertise and dedication to the business will play a key role to strengthen our bond with Principals and prime Customers.

Mr. Rupesh Shelke was recently appointed as Business Manager with his extensive international and domestic project experience and becomes a member of Mascot's executive team. Mascot's mission is to build on the strength of eternal relationship with Principals and customers and cement link with them. *Mascot celebrated its Golden Jubilee this year and will continue to function with Mr. Mohan Lalvani as the Founder Chairman with his vision and leadership qualities which have taken the Company to stratospheric heights over the last fifty years*. The vision being to bring interconnected Project and Product services to the Customers within the glass industry and create a world of whole new possibilities.

Mr. Shivpujan Singh and Mr. Shibu B are no longer working with Mascot.

TOWARD A UNITED NATIONS DECLARATION OF 2022 AS THE INTERNATIONAL YEAR OF GLASS

Over the past 60 years, the General Assembly of the United Nations has recognized important global initiatives and their contributions to society with declarations of United Nations International Years. Across the globe, United Nations resolutions have enabled professional societies, museums, journals, and academia to recognize and celebrate their history, their current state, their future, and their major contributions to society.

These United Nations declarations of major fields of international endeavor have stimulated renewed contributions to society world-wide. In the 21st century, the United Nations has recognized the International Year of Astronomy (2009), the Year of Chemistry (2011), the Year of Light and Light-Based Technologies (2015), and, in 2019, the Year of the Periodic Table and the International Year of Indigenous Languages.

Against this storied background, an international groundswell has arisen to pursue a United Nations International Year of Glass for 2022 that will underline the technological, scientific and economic importance of glass—the transparent material that can facilitate emergence of a more developed, just, and sustainable societies to meet the challenges of globalization. There are plenty of arguments supporting the significance of glass as an enabling material for building a sustainable society.

With its unparalleled versatility and technical capabilities, glass material has fostered numerous cultural and scientific advancements in communications, optics, energy, and medicine.

ŞIŞECAM FLAT GLASS INTRODUCES 'ŞIŞECAMTENTESOL' IN INDIA

Europe's largest flat glass producer Şişecam Flat Glass has launched its reflective solar control glass in the Indian market under "ŞişecamTentesol" brand.

Şişecam Flat Glass came together with its customers in New Delhi, Ahmedabad and Jaipur to introduce its silver, grey, green, bronze and blue colored reflective solar control glass launched in the market under "ŞişecamTentesol" brand.

Having strengthened its presence in India by acquiring its half-owned affiliate in India in full last year, it is operating in the Indian market under the name Şişecam Flat Glass, India.

Şişecam Flat Glass develops and diversifies its product range based on the local market demand and needs in India and continues to develop innovative solutions.

GLASS PACKAGING INSTITUTE APPOINTS NEW PRESIDENT

The Glass Packaging Institute (GPI) has appointed Mr. Scott DeFife as its President.

Mr. DeFife will spearhead the association in a time of great opportunity, as the glass container industry continues to develop and sharpen its focus in many areas.

Most recently Mr. DeFife served as Vice-President of Government Affairs

for the Plastics Industry Association where he worked to advance the organisation's new sustainability advocacy work, including upgrading the U.S. domestic recycling infrastructure.

Prior to that, Mr. DeFife led federal and state government affairs, as well as communications activity for the National Restaurant Association.

Mr. Richard Crawford, GPI Board of Trustees Chairman, said: "Mr. Scott has a terrific mix of experience and expertise in the packaging, food and beverage and government arenas.

"His collaboration with industry stakeholders and policymakers will provide tremendous benefit to our member companies and the broader glass packaging industry.

Mr. DeFife said about his appointment: "I am honoured by the trust the GPI Board of Trustees has given me with this role, and am excited to represent this great industry, and its member companies.

"Glass has been recognised through history as one of the best packaging materials for many consumer products, and the glass packaging industry has a tremendous story to tell. There is incredible opportunity to help our member companies grow the industry in this era of increased attention to sustainable materials and manufacturing in a circular economy."

The Board of Trustees also expressed the organisation's gratitude to Mr. Joseph Cattaneo, who assisted in the association's executive search and governance over the past 11 months.

GLASS MILK BOTTLES MAKING COMEBACK AS MORE KIWIS TURN THEIR BACKS ON PLASTIC

Grey Lynn Farmers Market in Auckland has a thriving refillable glass milk bottle initiative with milk supplied by Jersey Girls Organic.

Small dairy businesses say sales of milk in glass bottles are soaring as more Kiwis try to reduce plastic waste.

Some have seen sales of the white stuff more than triple in the last year to customers who buy and return glass bottles.

The resurgence suggests many New Zealanders would happily return to a time when leaving the glass milk bottles out to be refilled was the chore of Kiwi children.

Mr. John Vosper sells his organic milk, Jersey Girls Organic, at the Grey Lynn Farmers Market in Auckland where most of his customers come to re-fill their own glass milk bottles from his milk vats.

ŞIŞECAM FLAT GLASS LAUNCHES ITS NEW PRODUCT ŞIŞECAM EXTRA STRONG LAMINATED GLASS

Şişecam Flat Glass, which offers innovative solutions based on the market's changing and developing needs through continuous R&D and investment activities, offers architects the opportunity to develop creative solutions in structural glazing systems such as balustrades, facades, skylights with its new product Şişecam Extra Strong Laminated Glass. Şişecam Flat Glass completed its work to develop 'Şişecam Extra Strong Laminated Glass' and launched its new product to the sector professionals in Eurasia Glass Fair with the slogan "Extra Strong, Extra Performance".

Compared to conventional laminated glass, security performance level of Şişecam Extra Strong Laminated Glass is improved, which is produced by combining two or more panels of glass with stronger and more durable special binding agency extra stiff polyvinyl butyral (PVB) interlayer under heat and pressure.

While offering architects the opportunity to design wide glass openings with more freedom, Şişecam Extra Strong Laminated Glass also provides extra strength and safety in structural glazing requiring more safety such as facades, glass flooring, glass stairwell and glass railings.

Thanks to excellent post breakage strength most of the fragments remain stuck to the interlayer even when broken, ensuring safety and security for people and property. Şişecam Extra Strong Laminated Glass can also be combined with coloured glasses for aesthetic solutions. Şişecam Extra Strong Laminated Glass is also available with Low-E heat insulation coated and Solar Low-E solar control coated. It also provides extremely high protection against UV radiation and helps to reduce fading.

MOBILE FRIENDLY AIGMF WEBSITE

An updated and mobile friendly website was launched at Platinum Jubilee celebrations of AIGMF on Sept 27 at The Ashok, New Delhi.

New site offers free online access to Glass Worldwide / AIGMF Library of Indian Articles, Kanch, Glass News and more.

सरकार ने मलेशिया से क्लियर फ्लोट ग्लास के आयात में डंपिंग जांच शुरू की

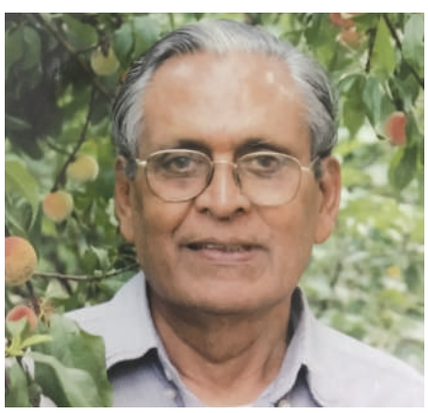
सरकार ने मलेशिया से क्लियर फ्लोट ग्लास के आयात में डंपिंग जांच शुरू की है। इस शीशे का इस्तेमाल वाहन और रेफ्रिजरेशन उद्योग में होता है। घरेलू कंपनियों की शिकायत के बाद सरकार ने यह कदम उठाया। वाणिज्य मंत्रालय के तहत आने वाला व्यापार उपचार महानिदेशालय (डीजीटीआर) यह जांच कर रहा है।

डीजीटीआर की ओर से जारी अधिसूचना

में कहा गया है कि मलेशिया से इस उत्पाद की डंपिंग के पर्याप्त प्रमाण मिले हैं, जिसका घरेलू उद्योग पर असर पड़ रहा है। डीजीटीआर अपनी जांच में कथित डंपिंग के प्रभाव और डंपिंग रोधी शुल्क की सिफारिश करेगा जिससे घरेलू उद्योग को सरंक्षण दिया जा सकेगा। डीजीटीआर डंपिंग रोधी शुल्क की सिफारिश करता है जबकि वित्त मंत्रालय यह शुल्क लगाने पर अंतिम फैसला करता है। जांच की अवधि 2018–19 है। हालांकि, डीजीटीआर 2015 से 2018 के आंकड़ों की भी जांच करेगा।

PASSING AWAY OF C V CHALAM

Mr. C V Chalam passed away on July 16, 2019 just a few months short of his 90th birthday.



Mr. Chalam was actively involved with the glass industry in India. He founded M/s. C V Chalam Consultants Pvt. Ltd., in 1984 and was an Affiliate Member of AIGMF.

WELCOMING MLA FIROZABAD AT AIGMF SECRETARIAT

Mr. Manish Asija, Member Legislative Assembly from Firozabad (Uttar Pradesh) was welcomed by President Mr. Raj Kumar Mittal in the month of August at AIGMF Secretariat by gifting a glass memento.

Mr. Asija is a real enthusiast for promoting glass packaging as according to him future lies with glass, which supplements Swachh Bharat Abhiyaan, vision set by the Hon. Prime Minister and the present Government.

AIGMF AT INDIAN GREEN BUILDING CONGRESS 2019

AIGMF participated as Supporting Association in CII's-IGBC Green Building Congress 2019 which was held from September 25 – 28, 2019 at Hyderabad.

The event was attended by over 2000 delegates. The annual Green Building Congress is a platform where National and International stakeholders converge to share, learn and explore new growth opportunities in the areas of green buildings and sustainability,

Today, India, with over 7 billion sq.ft, is one of the top five countries in the world in terms of largest registered green building footprint, with over 5400 projects adopting CII- IGBC green building rating systems.

Coinciding with the Congress, an International exhibition on green building products and technologies were also held, wherein some of the new, innovative and futuristic green building products, materials and technologies were displayed.

Telangana, State government is making a determined effort in transforming the state into a holistically sustainable state, said Minister for Roads and Buildings, Legislative Affairs and Housing Mr. Vemula Prashanth Reddy at the event ■

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

Do you have news to share?

Send your news and press releases to info@aigmf.com

The All India Glass Manufacturers' Federation

Glass Industry 4.0

13th International Conference

Powered by:

Supporters:

(October 10-11, 2019)

at Hall 2A, Bombay Convention & Exhibition Centre, Goregaon (E), Mumbai, INDIA

DAY 1 **October 10, 2019** (Thursday)			
TIME (hrs)	**TOPIC/s**	**COMPANY**	**SPEAKER(s)**
1000-1100	**Registration**		
1130	**Opening Remarks** **By** Mr. Raj Kumar Mittal, President, AIGMF & U.P. Glass Manufacturers' Syndicate (UPGMS) and Managing Director– Mittal Group of Glass Industries, Firozabad **and** Mr. Thomas Schlitt, Managing Director, Messe Dusseldorf India **Welcoming International Speakers** **By** Ms. Birgit Horn, Director, Global Head, glasstec; Messe Dusseldorf Germany **Release of KANCH and Glass News- special issues** *(AIGMF Office Bearers/ Former Presidents/Director CGCRI/Mr. Thomas Schlitt/Ms. Birgit Horn/Mr. Günther Mlynar, VDMA to join)* **Touring Exhibition- "Adopt a Glass Bottle for Healthy Environment"** *(President AIGMF/Director CGCRI/Former Presidents/Mr. Dave Fordham to do the honours)* Short Speech by Dr. K Muraleedharan, Director, Central Glass and Ceramic Research Institute (CGCRI) *(Display of select drawings by school children on Glass Packaging aiding Swachh Bharat Abhiyaan (Clean India Campaign), vision set by Hon. Prime Minister on the path laid by Mahatma Gandhi. As a voluntary service to the society, AIGMF took this as one of its main CSR activity by involving school children who painted their thoughts on how Glass is vital being only 100% recyclable packaging material. Drawing Competitions were held in 2018 and 2019 wherein more 4000 students participated from all-over India)*		
1200	**Welcome Session Orientation** - Glass- a vital building material for Smart Cities - Glass aiding Swachh Bharat Abhiyaan (clean India campaign)	Central Glass and Ceramic Research Institute and Member Editorial Board, KANCH Confederation of Construction Products and Services AND Xebec Property Management Pvt. Ltd. AIGMF and HNGIL Dept. of Ceramic Engg., IIT (BHU); Convener- Flat and Coated Glass Subcommittee of BIS and Member Editorial Board, KANCH	Dr. K Annapurna Sr. Principal Scientist, Glass Division Ar. Deepak Gahlowt Hon. Adviser and Director Mr. Sanjay Somany Former President and Chairman Dr. Devendra Kumar HOD

		Glass Worldwide	Mr. Dave Fordham Publisher and Coordinator-AIGMF Conference
1230	Modern Automation Systems in Batch Plants and Cullet Recycling Plants	Zippe Industrieanlagen GmbH	Mr. Thorsten Zimpel Head of Process Control Systems
1255	Glass Marking - When Traceability Becomes an Obligation	HEGLA GmbH & Co. KG	Mr. Jörg Zimmermann Area Manager for UK & Ireland, MENA, Turkey and India
1320	SORG Forehearth Systems: The SORG 340S+® Forehearth and the SORG® Coloring Forehearth System	Nikolaus Sorg GmbH & Co. KG	Mr. Joerg Kraus Sales Manager Asia
1345	**Question Answer session** Moderated by Mr. Dave Fordham		
1400	**Lunch**		
1500	"Adopt a Glass Bottle" - Container Glass scenario in India - Recent events by AIGMF on glass packaging - What is required at global level?	AIGMF and HNGIL	Mr. Sanjay Somany Former President and Chairman
1525	Glass Recycling – Potentials for Indian Glass Manufacturers	EME GmbH	Mr. Bernd Baunach Area Sales Manager
1550	Fully Automatic Lines for Chemical Strengthening of Glass	GLAMACO GmbH	Mr. Andreas Gruhle Managing Director
1615	Sophisticated Glass Handling and Processing in the Era of Industry 4.0	Grenzebach Maschinenbau GmbH	Mr. Jan Lukassek Sales Manager Glass Technology
1640	**Question Answer session** Moderated by Mr. Dave Fordham and Dr. Devendra Kumar		
1650	**Tea** **Wrap-up of Day 1**		

DAY 2 **October 11, 2019** (Friday)			
1000	**Registration**		
1015	National Building Code: Glass and Glazing Aspects AND Emerging Regulations	Confederation of Construction Products and Services AND Xebec Property Management Pvt. Ltd.	Ar. Deepak Gahlowt Hon. Adviser and Director
1040	Refractory Materials Challenges in Sodalime Glass Feeders	Saint-Gobain SEFPRO	Mr. Frederic Pomar Marketing Director
1105	Energy Savings in Glass Making: The Importance of Correct Vacuum Setting	Pneumofore	Mr. Rolf Hilfiker CEO
1130	**Question Answer session** Moderated by Mr. Dave Fordham and Dr. K Annapurna		
1140	**Tea**		

1155	Aesthetics and Functionality through Glass	Central Public Works Department, Ministry of Housing & Urban Affairs Govt. of India	Dr. K M Soni Additional Director General (Tech), Delhi Ms. Usha Batra Special Director General, Mumbai
1220	Industry 4.0: A Pragmatic Approach	Eurotherm by Schneider	Mr. René Meuleman Electric Business Leader Global Glass
1245	Furnace optimisation and NOx reduction	Land Ametek	Mr. Neil Simpson Glass Consultant
1310	Panel Discussion - Excerpts of 2019 conference - Question and Answer - What next? - Wrap of the conference	AIGMF and HNGIL Şişecam Flat Glass India Ltd. Confederation of Construction Products and Services AND Xebec Property Management Pvt. Ltd. Central Public Works Department, Ministry of Housing & Urban Affairs Govt. of India Dept. of Ceramic Engg., IIT (BHU); Convener- Flat and Coated Glass Subcommittee of BIS and Member Editorial Board, KANCH Glass Worldwide	Mr. Bharat Somany Sr. Vice President and Vice President Mr. Srinivas Sapher Vice President- Sales & Marketing Ar. Deepak Gahlowt Hon. Adviser and Director Dr. K M Soni Additional Director General Mrs. Usha Batra Special Director General Dr. Devendra Kumar HOD Mr. Dave Fordham Publisher and Coordinator- AIGMF Conference
1345	**Lunch**		
1430-1800	**Glasspex and Glasspro India exhibitions** *(meetings, visiting stalls, etc.)*		
1800-2100	**Delegate and Exhibitors Get-together** *(with prior invitation)*		

PARTICIPATION:

Delegation Fee	Indian Companies (Rs.)	Foreign Companies (US$)
Main Delegate	4000	150
Other Delegates	2000	100
Corporate (Main delegate + 4 delegates)	10000	500

Cheque/demand draft payable to "The All India Glass Manufacturers' Federation", at New Delhi may be sent to Secretary- AIGMF, 812, New Delhi House, 27, Barakhamba Road, New Delhi – 110 001

Payment can also be remitted through wire transfer. Our bank details are as under:

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BARBUS33, FEDWIRE/ROUTING NUMBER:
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Name : The All India Glass Manufacturers' Federation
Bank : Bank of Baroda
Branch : Parliament Street
City : New Delhi, India

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Account No. : 0411156983
Name : The All India Glass Manufacturers' Federation
Bank : Kotak Mahindra Bank
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(to be sent to info@aigmf.com)

S. No.	Company / Organisation	Participant/s (Name, Designation, Address, Tel, E-mail)
1.		
2.		

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Annual Subscription US$ 80

Synopsis of Select Papers to be Presented in 13th AIGMF International Conference on Glass Industry 4.0 (Oct 10-11, 2019)

Modern Automation Systems in Batch Plants and Cullet Recycling Plants

Thorsten Zimpel
Head of Process Control Systems
Zippe Industrieanlagen GmbH
t.zimpel@zippe.de

Mr. Thorsten Zimpel, started with ZIPPE Industrieanlagen in year 1994 and has been working as a Process Automation professional for more than 25 years.

He is deployed in many countries for commissioning Automation Systems for Batch Plants.

Mr. Zimpel takes care of software developments for modern process control systems for Batch Plants and Cullet Recycling Systems. In addition, he has more than 20 years' experience in automation, data transfer to MES systems, PLC programming and weighing systems.

He masters several SCADA and DCS Systems from different vendors like Rockwell, Siemens, Schneider, Wonderware, GE, and is very experienced in SCADA systems and communication between different automation systems.

The presentation focuses on these control systems and covers the following:

- An overview of the different kinds of weighing systems and process control systems will be given.
- Here, system redundancy and safe network structures as well as remote service are of ever-increasing importance.
- Mobile apps are used around such a control system.
- Production data are stored and displayed in different charts. Dashboards and reports help you to improve productivity of your plant.
- You can display the important data on a computer screen or on a mobile device.
- By means of customized apps you can navigate to the different data you are interested in.
- In batch plants for the glass production there are different types of building and devices to store and feed different raw materials and cullet. Nowadays, this equipment and the material transport is controlled automatically.
- The information can be located locally or cloud based.
- You can access them from everywhere or just compare the performance of each plant.
- Control systems are constantly changing and new technologies are being introduced into the future plant automation. Automation and IT- structures are increasingly growing together.

SORG Forehearth Systems: The SORG 340S+® Forehearth and the SORG® Coloring Forehearth System

Joerg Kraus
Nikolaus Sorg GmbH & Co. KG
kraus@sorg.de

2008–today Nikolaus Sorg GmbH & Co. KG
2016–today Nikolaus Sorg GmbH & Co. KG / Sales Manager Asia

For more than 40 years, SORG has a global reputation as a reliable partner for forehearth systems. Over the past decades we have consistently improved the technology and set milestones in forehearth engineering.

SORG has been developing forehearth technology continuously for decades. This enables us to provide the solutions our customers need for successful production. Technological advances, reliability, lower service costs and lower total cost of ownership. These are key factors of SORG forehearth technology.

In order to keep pace with the higher requirements customers have regarding glass conditioning, SORG has now improved on the 340S® forehearth. Its successor is the new **340S+®**.

The modified steel bracing shortens construction time as well. Each **340S+®** refractory superstructure cover plate is individually fixed. The insulation is partially protected with sheet metal covering.

Practical experience led to easier forehearth height adjustment. Instead of many single height adjustments, it is now possible to adjust the forehearth height at only two points in the front.

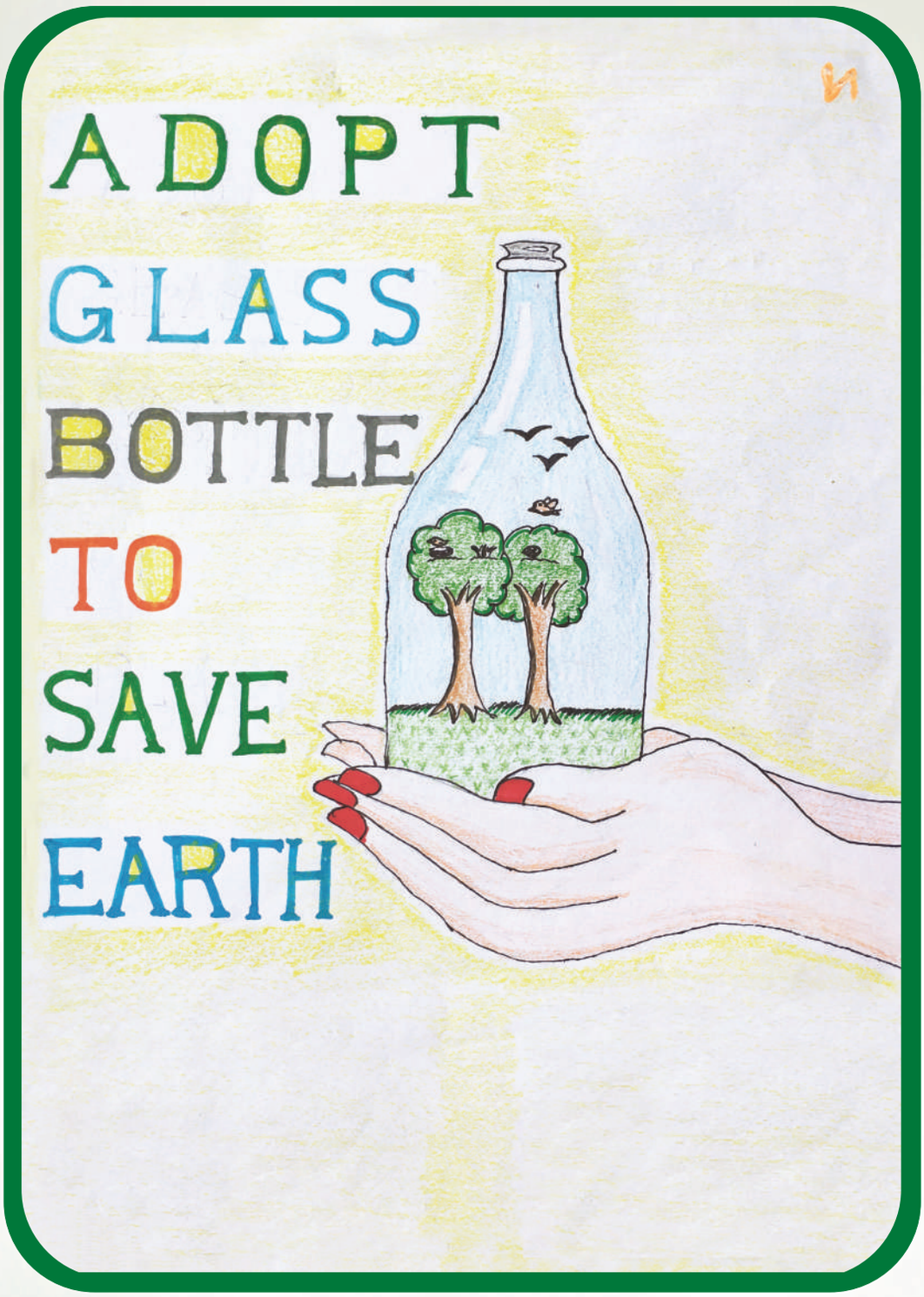
Principally the **340S+®** was designed that indirect air cooling alone will be sufficient. Direct cooling is foreseen in the refractory material and can be retrofitted on demand. This is enabled by combining it with the effective STW working end cooling which provides optimum forehearth entry conditions.

The largest modification from the 340S® to **340S+®** regards the cooling air supply. In new **340S+®** forehearths, the complete cooling air for all forehearth and working end zones, including possible bottom cooling will be served by only one fan – and not by two or even more fans as previously was the case. This fan is frequency controlled to ensure stable cooling air supply at different loads. Cooling air is supplied by a second redundancy fan.

SORG has delivered numerous factories worldwide – among them more than 1750 conditioning systems. By combining the know-how of our employees, the longtime experience of service staff and ongoing dialogues with customers, SORG has an exceptional position in the glass industry. Based on this, we successfully developed many products in the glass conditioning field which were established in the market during the past decades. Now we have improved the established 340S® forehearth to create the new **340S+®** generation. Of course, every SORG forehearth will be custom-tailored to the customer's specific requirements. The forehearth and all available options are available from one source, including excellent service and individual attention.

glass WORLDWIDE
PREFERRED INTERNATIONAL JOURNAL OF AIGMF IN ASSOCIATION WITH KANCH

Celebrating 75 Years of AIGMF



AIGMF - Catering to the needs of Glass Industry

Glass is **Inert** and wholly **Recyclable**

Glass bottle is **Environment Friendly** and **Hygienic**

Contents in glass bottle **Cools Faster** and is **Refreshing**

THE ALL INDIA GLASS MANUFACTURERS' FEDERATION
812 NEW DELHI HOUSE, 27 BARAKHAMBHA ROAD, NEW DELHI-110001, INDIA
Telephone: + 91 11 23316507 Fax: + 91 11 23350357 E-Mail: info@aigmf.com Website: www.aigmf.com

Glass Recycling – Potentials for Indian Glass Manufacturers

Bernd Baunach
Area Sales Manager
EME GmbH
baunach@eme.de

1982 – 1986: University of Applied Science Nuernberg
1986 – 1988: Hertel AG, Fuerth, Design of standard and tailored end mill cutters
1988 – 1992: Nikolaus Sorg GmbH & Co. KG, Design Department glass furnaces
1992 – 1994: Wolf Montage Automatisation, Project Manager
1995 – 2009: Nikolaus Sorg GmmbH & Co. KG, Deputy Design Manager
2009 – today: EME GmbH, Area Sales Manager

With almost 100 years of experience, EME provides tailor-made solutions for batch and cullet handling in accordance with customer's needs and transfers unique process and technology know-how into state of the art plants for the glass industry. As a result of increasing demands and requests from our key customers to be involved as a strategic partner in glass recycling and sorting projects in the Asian market, EME is currently very active in this market. EME incorporates its expert knowledge and experience of batch and cullet processes and conditions into the cullet recycling concepts with special attention on reliable quality management as well as minimizing the environmental impact of spillage and dust emissions.

Potentials and challenges for Indian glass producers

The use of additional cullet from internal or internal and foreign sources has various benefits for glass manufacturers. For example, 10 % cullet addition results in approx. 2,5 % energy savings in the furnace, 10 % cullet addition reduces approx. 4 % NOx, Six tons of recycled glass reduces approx. one ton of CO_2 emission, Lower amount of raw material consumption results in less spillage/less cost, and even more advantages. Due to these factors many European producers already use up to 80 % cullet in their furnaces. The specification of the input quality of the available cullet is of upmost importance to design and configure a tailor-made glass recycling plant. Potential contaminations can be bulk waste, organics, plastics, ferrous and non-ferrous metals, CSP (ceramic-stone-porcelain), lead crystal glass, heat resistant glass, opal glass and off-colours. The contamination levels have to be specified in g/to or ppm, as well as the grain size distribution. One of the main challenges for the Indian market is to configure the recycling plant to allow for varying input qualities. EME is additionally capable to evaluate cullet impurity levels at its test facility in Germany.

Glass recycling concepts and technologies

EME offers equipment for all steps of the cullet treatment process, including cullet preparation (handpicking, crushing, screening, drying), contamination removal (organic separators, ferrous separators, non-ferrous separators, CSP-sorters, heat-resistant and lead glass sorters), color sorting (flint-amber-green-other), fines processing through cullet pulverization technology.

All projects are designed and engineered in accordance with individual customer needs. The following machinery and equipment may be included in a glass recycling plant:

Manual sorters for bulk waste removal

- Screens (e.g. bar screens, linear screens, flip-flow screens
- Crushers
- Organic separators

- Dryers
- De-labelers
- Magnetic separators for ferrous metals (e.g. overbelt magnets, magnetic drum separators)
- Eddy current separators for non-magnetic metals
- Optical sorters (e.g. 2-way or 3-way sorters; horizontal version with belt conveyor or vertical version with chute) - for CSP and off colors - for color sorting (flint-green-amber)
- Suction and filter system for dust, dryers and organics

In addition to standard offsite solutions, EME has specialized concepts for inline glass recycling plants that are integrated into the batch house process. These inline solutions have various advantages, primarily a higher quality can be achieved due to the elimination of additional contamination from external sources as well as reduced fines generation due to reduced cullet handling. Additionally, with direct integration and connection into the batch house and its control system, savings can be generated through shared operators, combined maintenance and cleaning routines and common spare parts.

EME capabilities for Indian customers to implement a tailor made cullet recycling system

EME incorporates its expert knowledge and experience of batch and cullet processes and conditions into the cullet recycling concepts which will lead to a successful project concept development according to customer needs, engineering for general layout and project management, design and manufacturing drawings for supporting steel structure for local manufacturing, delivery of key equipment, selection of sub-suppliers for special equipment like sensor based sorting equipment, electrical control, project management for local sub-suppliers, installation etc. EME is your perfect partner for tailor-made solutions for your glass recycling and sorting project.

Fully Automatic Lines for Chemical Strengthening of Glass

Andreas Gruhle
Managing Director
GLAMACO GmbH
a.gruhle@glamaco.com

1995–1999, GLAMACO Maschinenbau GmbH, Project Engineer
1999–2012, GLAMACO Maschinenbau GmbH, Sales Manager
2012–2014, GLAMACO Maschinenbau GmbH, Managing Director
2014–Heute, GLAMACO Engineering GmbH, Managing Director

Everyone is using chemical strengthened glass products in his daily life – almost all cover glasses for mobile phones are made by this type of processing.

JSJ and Glamaco are offering the technology and machinery for fully automatic lines for chemical strengthening of glass. The chemical strengthening technology is highly recommended for automotive and architectural industry with respect to both reduced glass thickness and increased glass strength.

We are suppling complete solutions for fully automatic lines with a broad range of production steps such as:

- glass unloading from L-frame into machine rack (robot handling)
- chemical treatment of glass (fully automatic process)
- reloading of treated glass from machine rack into L-frame (robot handling)
- traceability of single products

There are several projects worldwide which demonstrate the high reliability and effectiveness of our lines in many years of use. By cooperating with JSJ and Glamaco, Indian companies will have huge benefits such as:

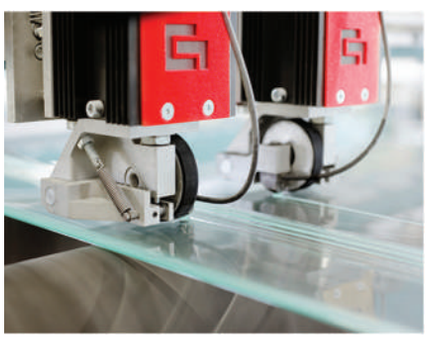
- our German high-class technology
- our continuous innovations of production processes for high quality products
- long experience with successfully running production plants in India

Sophisticated Glass Handling and Processing in the Era of Industry 4.0

Jan Lukassek
Sales Manager Glass Technology
Grenzebach Maschinenbau GmbH
Jan.Lukassek@Grenzebach.com

Mr. Jan Lukassek is a Mechanical Engineer.
Since 2004 Mr. Lukassek has been working at GrenzebachMaschinenbau GmbH in Hamlar as a Sales Manager Glass Technology.
His responsibilities in BU Glass cover the sales area of Middle East and India.
He also has experience in sales of end-of-line packaging machines for the pharmaceutical and cosmetics industries.

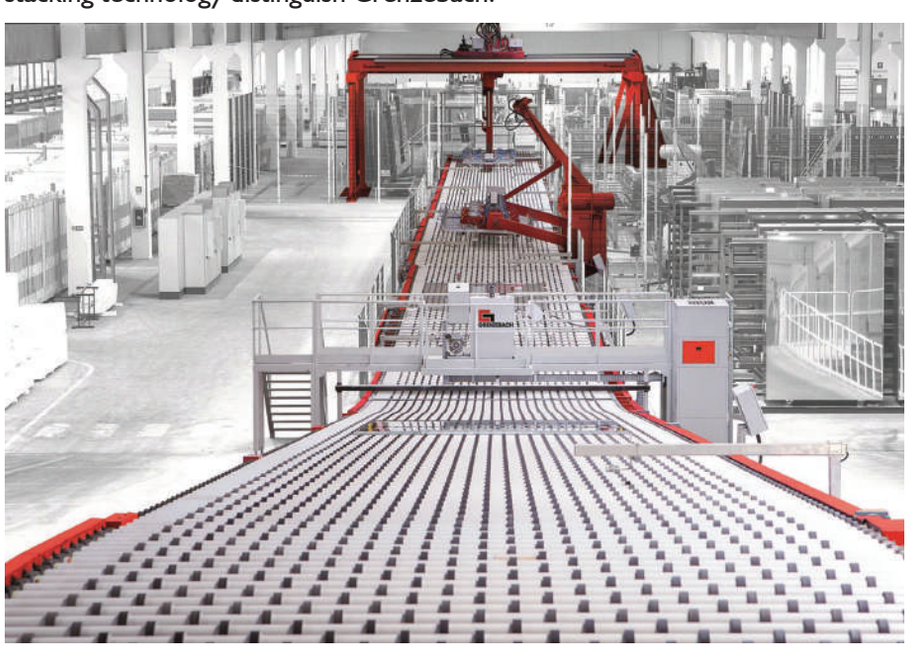
The presentation showcases the Grenzebach Group as a leading specialist for the automatization of industrial processes. The company develops customized automation solutions from planning to manufacturing and commissioning for the global markets of the glass, building materials and intralogistics industry.



Cutting

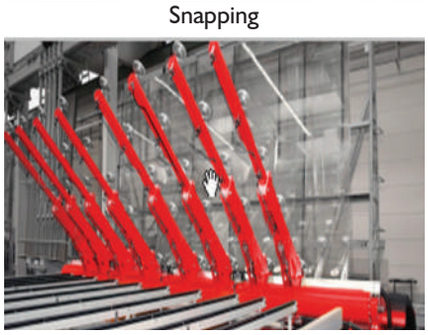
Flat Glass Production Technology

From lehr to warehouse the float cutting line is separated in several sections which need to be precisely connected to one another. Smoothly and safely glass transport, superior cutting and snapping accuracy and high speed and precise stacking technology distinguish Grenzebach.



Cold End Equipment / Transportation

Snapping

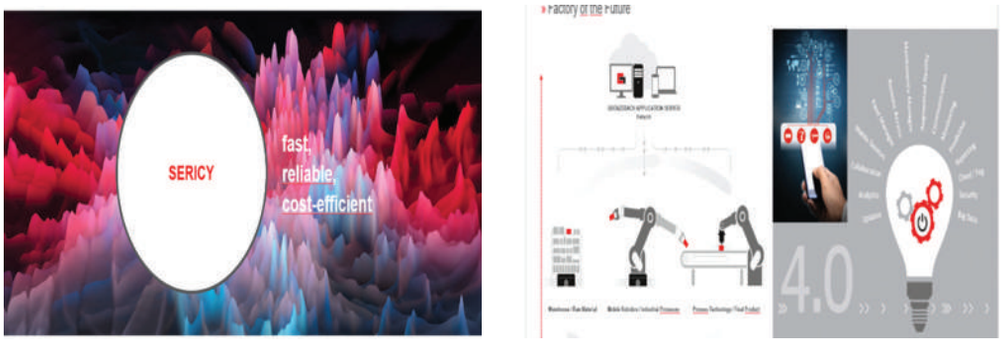


Stacking

More than 300 Grenzebach Float Lines are installed worldwide.

Digitalization / Industry 4.0

Further content is Sericy the newly developed IIoT platform for digitalization. Sericy is the enabler for any future production efficiency enhancement through digital information. A development of an Industrial IIoT platform by GrenzebachSericy is the further content of this presentation. The IIoT platform is the basis for the development of own apps and allows users to shorten their development times significantly. In summary: the presentation will also show practical examples of how a leading solution provider tackles digitalization.



Digitalization / Industry 4.0

National Building Code: Glass and Glazing Aspects AND Emerging Regulations

Ar. Deepak Gahlowt
Hon. Adviser and Director, Confederation of Construction Products and Services AND Xebec Property Management Pvt. Ltd.
deepak@xebecdesign.com

Mr. Gahlowt is currently with Xebec, an integrated design-build-manage company that has delivered projects over more than 240 cities across India under three verticals - consulting, design and build, and facility management.

Other than starting Xebec, he has led and worked on developing and writing standards on safe use of glass in buildings for India; standardization of doors and window sizes; and has contributed to the Energy Conservation Building Code for India (ECBC). He was also the Convener of Confederation of Construction Products and Services (CCPS) for over 9 years.

An Architect and Member RICS, interest and experience in design, project management, historical conservation, sustainability, standards writing and building bye-laws drafting, advocacy, training, research and writing.

The objective of this presentation is to educate the entire construction value chain on the codes and provisions given in National Building Code 2016 on the use of glass and glazing systems in Indian Buildings and thereby enabling the implementation of the same.

Refractory Materials Challenges in Sodalime Glass Feeders

Frederic Pomar
Saint-Gobain SEFPRO
frederic.pomar@saint-gobain.com

Ceramic Engineer, currently Marketing Director for Saint-Gobain SEFPRO.

Joined Sefpro in 1996, since then occupied several positions in Sales and Marketing.

"Corrosion process and potential glass defect formation happening in glass furnace feeder are critical issues since they are taking place in the last conditioning area before the final forming steps. Thermo-mechanical stresses play also a key roles in the life time of the complete forehearth.

We will discuss stresses and corrosion mechanism that refractory materials face in this particular part of the glass furnace and detail the specific environment for both glass contact and superstructure area.

We will discover how SEFPRO, supported by a wide range of fused cast and bonded refractory products can propose the optimized solution adapted to every glass maker constrain in term of glass quality, feeder lifetime and investment cost".

Energy Savings in Glass Making: The Importance of Correct Vacuum Setting

Rolf Hilfiker
CEO, Pneumofore
info@pneumofore.com

Graduated in Economics at the University of Basel (Switzerland) and former President of the Young Entrepreneurs Group of the Industrial Employers' Association in Turin (Italy), Mr. Hilfiker has been serving Pneumofore since 2015 as Chief Financial Officer, at first, and Chief Executive Officer at present. He is the grandson of Jakob Hilfiker, who founded the company in 1923.

The glass manufacturing industry consumes a large quantity of compressed air and vacuum which are essential to drive the forming machines, improve the production speed and produce high quality containers. But when it comes to selecting the most appropriate pneumatic technology, "the more - the better" approach is not always the right choice, although very popular in many sales strategies of suppliers. Rather, high energy savings are possible by choosing the most efficient technology on the long run and a proper system configuration according to the real production needs.

Aesthetics and Functionality through Glass

Usha Batra / Dr. K M Soni
Special Director General, Mumbai / Retd. Additional Director General (Tech), Delhi
Central Public Works Department, Ministry of Housing & Urban Affairs Govt. of India
ubvinod@gmail.com / dr.kmsoni@gmail.com

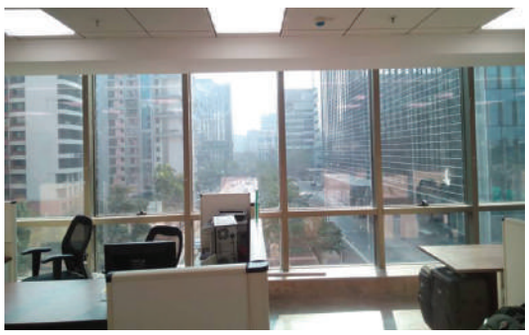
Architects always look for a material which is aesthetically pleasing. At first sight, any person would like an aesthetically pleasing building, but for a person occupying the building with functionality is also important hence architects and engineers look for a material which passes through the test of aesthetics as well as functionality.

Glass has been in use for a long time and probably from the time when glass was invented and people realised the importance of aesthetics. Its use continued and would continue for ever. Initially it had limited applications in windows but now name any part of the building and any shape, glass can fulfill into the requirement.

Glass is a unique material due to various reasons and its properties. e.g., think for the transparency and one would immediately talk about glass. Glass is a material which brings outside view into your room whether panoramic view or otherwise. Due to solar light requirements in a habitat, glass becomes a necessity. In fact, without glass, it is difficult to imagine a human habitat. It may be store of dead materials or animal's natural habitat though the animals also prefer habitats with solar light and store also requires light to see without artificial light.

Another property of glass is transmission of light through it. At night, it provides a stunning effect from outside and inside both. Lighting, many a times also consists of glass.

If one looks for a material compatible to multiple kinds of materials, glass is one of the competitor nowadays. Traditionally timber (wood) and steel have been used with glass in windows and doors. In new and innovative buildings, aluminium, stainless steel, stones, concrete and PVC are finding use along with glass. And then, glass in itself has become a complete material for use in various components of a building. Various polymeric materials are also compatible to glass which are making glass safe whether in laminated or bullet proof glass. Thus safety glass is the product of marriage of glass with polymeric materials.

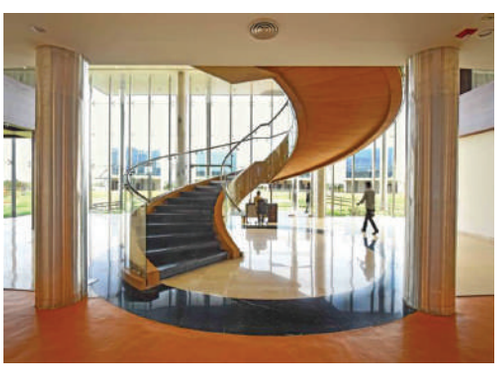


Looking through glass

Stunning lighting effect due to glass

Glass has large functions in a building and in future it will find place even in roads in original construction as well as in rehabilitation. One cannot imagine solar power generation without glass. Structural glazing in facades, use of glass in windows and doors, roofs and walls, and now in interiors like floorings, staircases, railings, murals, partitions, and furniture are going to surpass the projected requirements of glass in future if it qualifies economic considerations.

Today world is looking for a material which can be recycled and glass qualifies this criterion too. Use of fibre glass is also going to take place in many engineering and household applications in future.



Glass with wood and steel

Glass with concrete

All types of glass cannot be used at all the locations and for all the functions. It has to be selected as per the requirements and tested for its properties. Unplanned and use of improper type of glass may create problems during fire, safety requirements and handling and may cause severe accidents during disasters or otherwise hence glass must be used considering aesthetics as well as functionality by way of selecting proper type of glass. This requires awareness generation, training and education of glass properties, types and their uses. As large infrastructure is still needed, books and testing facilities at various cities should also be developed for creating confidence in use of glass in various applications.

Industry 4.0: A Pragmatic Approach

René Meuleman
Electric Business Leader Global Glass, Eurotherm by Schneider
rene.meuleman@se.com

Mr. René Meuleman studied electrical engineering. In 1968 he started his career in the paper industry as a technical assistant, before switching to the glass industry in 1969 as an employee of VereenigdeGlasfabrieken. During his early

years, he built his broad knowledge and experience in design and development of electronic quality equipment for container glass manufacturing and was involved in the implementation of their first-generation PLC and DCS systems, as well as electronic timing systems for IS-machines.

Mr. Meuleman worked on several model based predictive control (MPC) projects, as well as being involved in object oriented engineering method developments. He became responsible for process control inside the BSN group and finally was responsible for the European plant process control and forming electronics inside the Owens-Illinois group.

10 Years ago, he left O-I and joined the Eurotherm by Schneider Electric group where he is responsible for the technical and commercial glass business development. Based on the Eurotherm and Schneider-Electric portfolio and together with his global glass business team he works on the development of innovative, pragmatic and competitive glass manufacturing process and power control systems.

Industry 4.0 is a name for the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of things, cloud computing and cognitive computing.

It is no secret that the Glass Industry is very traditional, conservative and risk averse, but perhaps this is due to the fact that glass manufacturing is one of the most complex physical and chemical industrial processes around. It could profit greatly from data analytics because of this, but in most branches of the industry where margins are low, and products are considered to be commodity and investments rather than directly manufactured equipment, the related costs are hard to justify. To be fair, process control suppliers haven't introduced big innovations either and if we look at systems supplied 30 years ago, the difference is not that great. We all recognize that this has to change soon, simply because the industry faces huge challenges, for example, competition against plastics, introduction of new glass materials and remaining attractive to a young workforce, as well as energy related challenges such as reducing carbon emissions, the ability to cope with the energy market, finding the skill required to manage fossil fuel composition fluctuations and eventually converting to all-electric 'emission free' manufacturing. A change of attitude is required but 'change' needs to be justified, and data is what is needed to provide that justification. Some high-end glass manufactures are already investing a huge amount of money and resources into data analytics because the complexity of their process can no longer do without it. Others will need to follow, and we, the suppliers of this technology, have an obligation to keep it pragmatic and at an acceptable price level to enable glass manufacturing to remain competitive

Furnace Optimisation and NOx Reduction

Neil Simpson
Glass Consultant for AMETEK Land
neilsimpsonfsgt@btinternet.com

Mr. Neil G Simpson holds BEng (Hons) CEng MEI FSGT MIRefEng.

He is an Independent Consultant for Simpson Combustion and Energy Ltd and has worked with AMETEK Land for over 3 years on furnance and combustion optimisation projects.

"Before trying to reduce NOx it makes sense to optimise the furnace first! The AMETEK Land Cyclops portable pyrometer has, at least in my life, been one of the most reliable tools to use to optimise the thermal profile in the furnace. When AMETEK Land developed its in-furnace thermal imaging camera, NIR-B Glass, everyone was impressed by the visual image. What impressed me was that it is over 300,000 continuous cyclops temperature measurements. In this paper I will cover how the thermal data can be used to optimise the furnace and minimise NOx" ■

Platinum Jubilee celebrated by Honouring School Children and Industry Legends

(Sept 27, 2019)

The All India Glass Manufacturers Federation (AIGMF) celebrated its platinum jubilee on Sept 27 at The Ashok, New Delhi. Hon. Minister of State for Jal Shakti as well as for Social Justice and Empowerment, Mr. Rattan Lal Kataria, was the Chief Guest. Mr. Manish Asija, Member of the Legislative Assembly from Firozabad (Uttar Pradesh) accompanied the Hon. Minister showcasing full zeal and commitment for the Glass Industry.

A roadshow on 'Adopt a Glass Bottle' was kicked-off, displaying select drawings by school children on Glass Packaging aiding the Swachh Bharat Abhiyan (Clean India Campaign), a vision set by the Hon. Prime Minister on the path laid by Mahatma Gandhi. Along with the paintings, an exhibition of glass water bottles and other packaging solutions were also put on display. The roadshow will travel to other cities showcasing the vital role of Glass, being the only 100% recyclable packaging material.

Winning students were given cash prizes by the Hon. Minister:

- 1st Prize (Rs. 10,000) to Archisha Shyam aged 13 years, Class 8 student of Orchids International School, (Jalahalli) Bangalore.
- 2nd Prize (Rs.7,000) to Pranav Singh aged 11 years, Class 6 student of Bal Bharti School, Bahadurgarh (Haryana)
- 3rd Prize (Rs. 5,000) to Swastik Saha aged 10 years, Class 5 student of Bal Bharti School, Bahadurgarh (Haryana)

The Hon. Minister also gave the AIGMF Glass Awards- 'C K Somany Award for Innovation and Technology' to Mr. B.L. Kheruka of Gujarat Borosil Ltd., and 'Balkrishna Gupta Award for Exports' to M/s Firozabad Glass Shell Industries.

Mr. B.L. Kheruka, born in 1930 is a pioneer in the glass industry. The Chairman of India's leading specialty glass manufacturing group, Borosil Glass Works Ltd., he presides over multiple verticals, including laboratory-ware pharma packaging (comprising of vials and ampoules), consumer goods and solar glass.

Mr. Raj Kumar Mittal, President AIGMF said, "*Firozabad Glass Shell Industries has been engaged in the manufacture of Doubled Walled Glass Refills (Glass Liners) for Vacuum Flasks since its inception in 1980. FGSI is today the largest Manufacturer - Exporter of Glass Refills from India with a share of about*

Winning Students with Hon. Minister of State for Jal Shakti as well as Social Justice and Empowerment, Mr. Rattan Lal Kataria.

Mr. Nitin Dhand of Gujarat Borosil Ltd. receiving **'C K Somany Award for Innovation and Technology'** on behalf of Mr. B.L. Kheruka.

65% of India's export of this product. The company is owned by Mr. Ram Kishore Gupta, Mr. Dharmendra Mohan Gupta and Mr. Sunil Mohan Gupta, who have long experience of over 3 decades in different spheres of glass production".

Jury for these awards comprised of:

- Dr. K. Annapurna, Senior Principal Scientist, Glass Division, Central Glass & Ceramic Research Institute (CSIR-CGCRI), Kolkata
- Mr. Dave Fordham, Publisher, Glass Worldwide, London (UK)
- Mr. Bharat Somany, Senior Vice President - AIGMF and Vice President – HNG & Industries Ltd.
- Mr. M.K. Bansal, Executive Committee Member AIGMF and Partner, Shri Sitaram Glass Works, Firozabad (UP)
- Mr. Vinit Kapur, Secretary AIGMF, Delhi

"The contribution of Mr. B.L. Kheruka to the Indian glass industry for more than fifty years cannot be overstated, right through from founding Window Glass Ltd. in the 1960s to building

Mr. Dharmendra Mohan Gupta of Firozabad Glass Shell Industries receiving **'Balkrishna Gupta Award for Exports'.**

the Borosil brand and overseeing the company's evolution to become the leading specialty glassware enterprise in India. He is a most worthy recipient of the 2019 CK Somany Award for Innovation and Technology, and Glass Worldwide is pleased to support the AIGMF in recognizing Mr. Kheruka's achievements and those of his family. We also offer sincere congratulations to Firozabad Glass Shell Industries upon being recognized for their export contributions with the 2019 Balakrishna Gupta Award" said Mr. Dave Fordham, Publisher of Glass Worldwide, the preferred journal of AIGMF in association with Kanch (quarterly journal of the AIGMF).

As a CSR initiative, The AIGMF gifted 100 Glass Water Bottles with the Swachh Bharat Abhiyan Logo to The Ashok. Also, as a token of appreciation, the first 100 drawing competition entrants were gifted a glass water bottle with the Swachh Bharat Abhiyaan (Clean India Campaign) Logo, *(manufactured by Hindustan National Glass & Ind. Ltd.)* ■

AIGMF marks 75th anniversary

To mark The All India Glass Manufacturers' Federation's 75th anniversary, Vinit Kapur, Secretary explained to *Glass Worldwide* (preferred international AIGMF journal) the organisation's principal activities, its aims and objectives, as well as profiling the AIGMF's current office holders.

GW: Who does the AIGMF represent and what are its overriding aims and objectives?
Founded in 1944, the AIGMF is the umbrella organisation for all categories of large, medium and small-scale glass manufacturers in different parts of India.

The federation's main aims and objectives are to encourage, promote and develop the manufacture of glass articles of all kinds. A series of committees meet regularly to ensure the promotion of glass, to study and research advances in glass technology, to secure the necessary supply of raw materials required for the manufacture of glass articles and to make representations whenever necessary to the Union Government or any unit of the Union of India for the removal of difficulties that might hamper the trade of glass articles or for special facilities to be granted to assist the local glass industry. In addition, the Government or public's attention is drawn to difficulties faced by the glass industry, soliciting their help and support through concerted action.

All those engaged in the manufacture of glass and glass articles are enrolled as 'ordinary' members of the AIGMF and those associated with the glass industry are enrolled as 'affiliate' members of the federation.

GW: Who are the organisation's office bearers?
President - Raj Kumar Mittal, Managing Director, Mittal Group of Glass Industries, Firozabad.
A commerce graduate, Raj Kumar was elected as Chairman of the Indian Industries Association (IIA), Firozabad Chapter and President of UP Glass Manufacturers' Syndicate (UPGMS). He has been associated with the glass industry for almost 30 years and heads five glass companies in Firozabad.

Senior Vice President - Bharat Somany, Vice President - Hindusthan National Glass & Industries Ltd, Bahadurgarh (Haryana)
A Bachelor of Commerce (Honours) graduate from the University of Delhi with a professional course in management from the Indian Institute of Management in Ahmedabad, Bharat Somany has benefited from multifarious hands-on training in the glass industry from various leading companies around the world, notably in Germany, Italy, the USA and Japan.

Vice President - Sanjay Agarwal, Managing Director, Kwality Glass Works, Firozabad.
A BSc graduate, Sanjay Agarwal was elected Vice Chairman of the Indian Industries Association (IIA) Firozabad chapter and Vice President of UP Glass Manufacturers' Syndicate. He heads GT Group of Industries, a business that specialises in the manufacture of glassware, scientific ware/glass bangles and glass handicraft items.

Former AIGMF President, Sanjay Somany at an interactive AIGMF session staged last July in co-operation with the Central Glass & Ceramic Research Institute and the Indian Ceramic Society.

Honorary General Secretary – Kailash Chandra Jain, President Sisecam Flat Glass India Ltd, Mumbai.
Kailash Jain is a mechanical engineer by profession and has worked in the glass industry since 2005. He is currently President of Sisecam Flat Glass India Ltd, with responsibility for flat glass operations in India. Mr Jain has 46 years of industrial experience in various industries ranging from steel to paper. He has also chaired the functioning of CCPS - Confederation of Construction Products and Services for over two years.


The AIGMF is the umbrella organisation for all categories of glass manufacturers in India.

Originally published in Glass Worldwide, preferred international journal of AIGMF

glass WORLDWIDE

The Executive Committee of the AIGMF meets regularly with the active support of regional associations.

AIGMF Secretary, Vinit Kapur.

Honorary Treasurer – Hargun C Bhambani, Managing Director, Sunrise Glass Ind Pvt Ltd, Gujarat.
Located near Hazira port in western India, Sunrise Glass is a diversification of the Astron Group into the glass container business, a company originally created in 2011 by the late visionary Hasmukh Bhai Thakkar. Hargun Bhambhani, a family associate, has taken forward the vision of Hasmukh Bhai Thakkar and provided dynamic leadership to Sunrise Glass. It is his strong commitment for customer satisfaction and hard work to exceed customer expectations that has resulted in 100% growth in just eight years.

GW: Who else is involved in the AIGMF's Executive Committee?
Based on the recommendations of Zonal Associations, the following were nominated as members of the Executive Committee for the year 2018-19:

Eastern India Glass Manufacturers' Association (EIGMA)
Vinay Saran, Hindusthan National Glass & Industries Ltd, Kolkata.

Northern India Glass Manufacturers' Association (NIGMA)
Saurabh Kankar, Gujarat Guardian Ltd, New Delhi.
Shailendra Kumar Misra, Hindusthan National Glass & Industries Ltd, Bahadurgarh.

South India Glass Manufacturers' Association (SIGMA)
Rajesh Khosla, AGI glasspac, Hyderabad.

UP Glass Manufacturers' Syndicate (UPGMS)
Manish Bansal, GM Glass Works No 2, Firozabad.
Sanjay Mittal, Farukhi Glass Industries, Firozabad.
Krishan Mohan Gupta, Firozabad Glass Shell Industries, Firozabad.
Anurag Gupta, Om Glass Works (P) Ltd, Firozabad.
Mukesh Kumar Bansal, Sri Sitaram Glass Works, Firozabad.
Uma Shankar Agarwal, Pooja Glass Works (P) Ltd, Firozabad.

Western India Glass Manufacturers' Association (WIGMA)
G K Sarda, Empire Industries Ltd, Vitrum Glass, Mumbai.
Sanjay Tiwari, Piramal Glass Ltd, Mumbai.
Naresh Gupta, Hindusthan National Glass & Industries Ltd, Mumbai.
H R Bhandari, Pragati Glass Works (P) Ltd, Mumbai.

GW: Please identify the activities and primary focus of each of the zonal associations that make up the AIGMF.
The Executive Committee of the AIGMF meets regularly with the active support of regional associations and organises healthy debate on industry issues, with the sole aim of the industry's development.

The federation is made up of five regional associations, namely the Eastern India Glass Manufacturers' Association, the Northern India Glass Manufacturers' Association, the South India Glass Manufacturers' Association, the UP Glass Manufacturers' Syndicate and the Western India Glass Manufacturers' Association.

Individuals, companies and corporate bodies that wish to become ordinary or affiliate members of the federation submit an application to the AIGMF Secretary via their relevant regional association, in a format prescribed by the committee. The application is then placed before the committee at the next meeting or it is circulated for consideration, provided the regional association has already recommended it.

GW: What are the key benefits of AIGMF membership and what type of organisations do you represent?
The AIGMF provides a stable platform for all manufacturers to participate at the annual forum. Its Executive Committee meets every three months to discuss challenges and opportunities that may exist for the glass industry and ways and means to move forward.

A united front is provided on behalf of all glass manufacturers to gain those advantages that may not be possible via individual initiatives. The AIGMF helps to draw Government or public attention to the difficulties faced by the glass industry, while also solving other problems confronting it and soliciting their help and support through concerted action.

Members are involved in the container, float, solar and speciality glass sectors, while affiliate members include suppliers of raw materials, machinery, consultants etc.

The AIGMF publishes its own quarterly journals *Kanch* and *Glass News,* carrying news from around the globe. An exclusive tie-up with *Glass Worldwide* adds quality and information relevant for an industry with a readership of over 12,000. Complimentary copies are provided to AIGMF members.

Raj Kumar Mittal.

Bharat Somany.

Sanjay Agarwal.

Kailash Chandra Jain.

Hargun Chhataram Bhambhani.

The secretariat works closely with various ministries, Departments at the Government of India and State Governments, public undertakings, trade associations, institutions etc, seeking their continued support for the furtherance of the federation's aims and objectives, as well as for the local glass industry's development and growth.

GW: Are there any key industry initiatives in which the AIGMF participates, both domestically and internationally?

Members are informed about important exhibitions, conferences, trade fairs and workshops etc held in India and abroad and to seek their possible participation. Among the regular AIGMF events are:

- Events held parallel to Ex Com meetings aiding Make in India and Clean India campaigns by promoting glass packaging and the Government of India's Smart Cities mission by promoting the use of glass in buildings from human safety and aesthetics.
- CII's Indian Green Building Congress as one of the supporting associations.
- glasstec exhibition in Germany and China Glass in China.
- glasspex and glasspro exhibitions as a supporting association and organising the AIGMF's bi-annual international conference in parallel to glasspex exhibition.

GW: Please summarise economic conditions in India and the challenges/opportunities faced by India's glassmakers.

Glass in various forms is used in road vehicles for sidelites and backlites, windscreens, windows, rear view mirrors etc. An increase from this sector is leading to increased demand for glass.

The construction industry, both in India and globally, has

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 glass industry viz., suppliers of machinery, raw materials, consultants and others connected with glass industry are enrolled as **Affiliate Members**.

Foreign Companies supplying machinery etc., to 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 ₹ 5000/-
- Annual subscription: Single Unit: ₹ 27,500 + GST as applicable
- More than one Unit: ₹ 1,10,000 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 1,25,000 for a single Unit and ₹ 5,00,000 for more than one Unit + GST as applicable

Affiliate Members:

- Admission fee ₹ 5000/-
- Annual subscription: ₹ 11,000 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 49,500 (including admission fee) + GST as applicable

Affiliate Members from countries other than India:

- Admission fee US $ 200
- Annual subscription: US $ 440 + GST as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of US $ 1,650 (including admission fee) + GST as applicable ■

Originally published in Glass Worldwide, preferred international journal of AIGMF

glass WORLDWIDE

Delegates at the 12th AIGMF International Conference in 2017.

been experiencing rapid growth over the past few years, driven primarily by real estate construction. In recent years, there has been increasing demand for improving the aesthetics of commercial complexes, which has further fuelled growth in the use of glass in various forms. Government schemes and initiatives like 'Housing for all by 2022', smart cities, RERA etc are driving the level of development, construction, infrastructure, employment opportunities etc in these cities, which will in turn lead to additional demand for glass.

Demand for glass used in solar energy applications is expanding. As a result, demand for glass processing equipment serving this sector is also expected to offer significant sales potential.

The growing use of glass packaging is driving the glass container industry globally. With glass possessing the properties of reusability and being 100% recyclable, customers are increasingly conscious about safety and hygiene and increasingly making use of glass containers.

The AIGMF invites suggestions from its members, including those relating to a recently introduced GST by the Indian Government and submits representations to various Government departments and related trade organisations seeking relief on raw materials availability, mainly in the form of natural gas, soda ash and cullet etc.

GW: How does the AIGMF's co-operation with *Glass Worldwide* enrich proceedings?

The AIGMF's association with *Glass Worldwide* has always been a special one, with *Glass Worldwide* named as the organisation's preferred international journal in association with *Kanch*.

AIGMF dignitaries at the 12th AIGMF International Conference in 2017, each holding their latest copies of the Indian Glass Directory.

In order to benefit the glass industry and its members, the AIGMF approached *Glass Worldwide* in 2012 to tie up for an exchange of information and articles that may be beneficial to all parties. The AIGMF website is updated with an online library of Indian articles in association with *Glass Worldwide*. And all Indian articles published in *Glass Worldwide* since 2009 are uploaded for ready reference.

In addition to being the leading bi-monthly journal for all sectors and regions of the global glass industry, *Glass Worldwide*'s co-operation with the AIGMF and *Kanch* provides the Indian sub-continent with the best possible forum for the exchange of news and views between glass manufacturers and their suppliers. *Glass Worldwide* shares the AIGMF's goals of promoting the Indian glass sector to a domestic and global audience, as well as informing Indian glass professionals about developments from other regions.

Recently, co-operation with *Glass Worldwide* has grown in the form of participation at international events, eg glasstec exhibition, where a joint stand is taken to facilitate greater publications and information exchange.

Along with the Central Glass & Ceramic Research Institute and the Indian Ceramic Society, the AIGMF organised an interactive session on 'The Role of Publications in Brand Promotion' in July 2018 at CGCRI, Kolkata, where Dave Fordham, Publisher of *Glass Worldwide* was the guest speaker. Mr Fordham gave an overview of *Glass Worldwide*, its reach and sectors covered, emphasising the publication's association with the Indian glass industry/AIGMF, as well as the exchange of technical articles.

In 2018, the first AIGMF Glass Awards were presented. This ceremony featured the C K Somany Award for Innovation and Technology and the Balkrishna Gupta Award for Exports. Dave Fordham was invited to participate on the selection panel. Later this year, the second AIGMF Glass Awards will again be supported by *Glass Worldwide.* ●

Further information:
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web: www.aigmf.com

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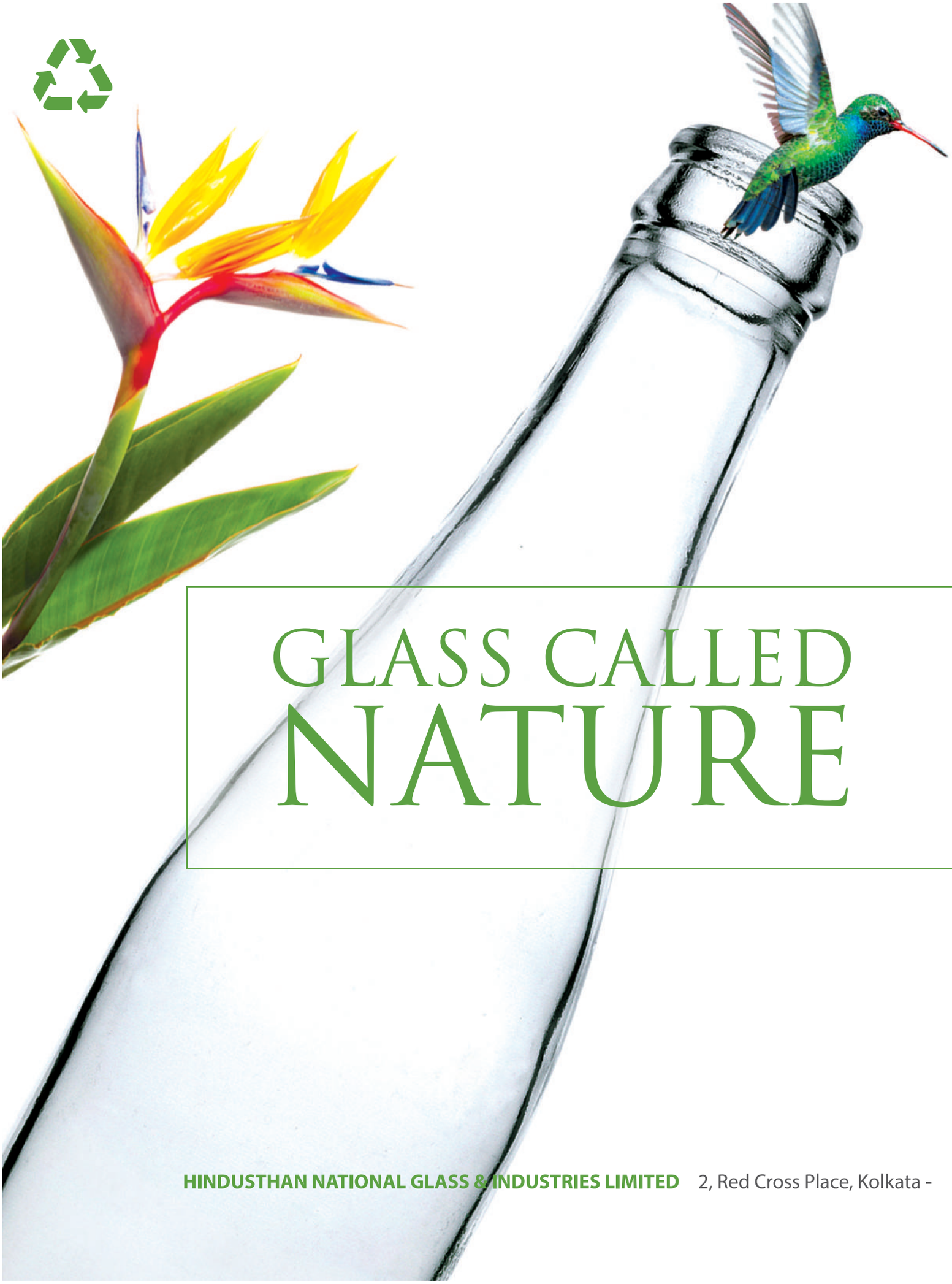
Originally published in Glass Worldwide, preferred international journal of AIGMF



GLASS CALLED NATURE

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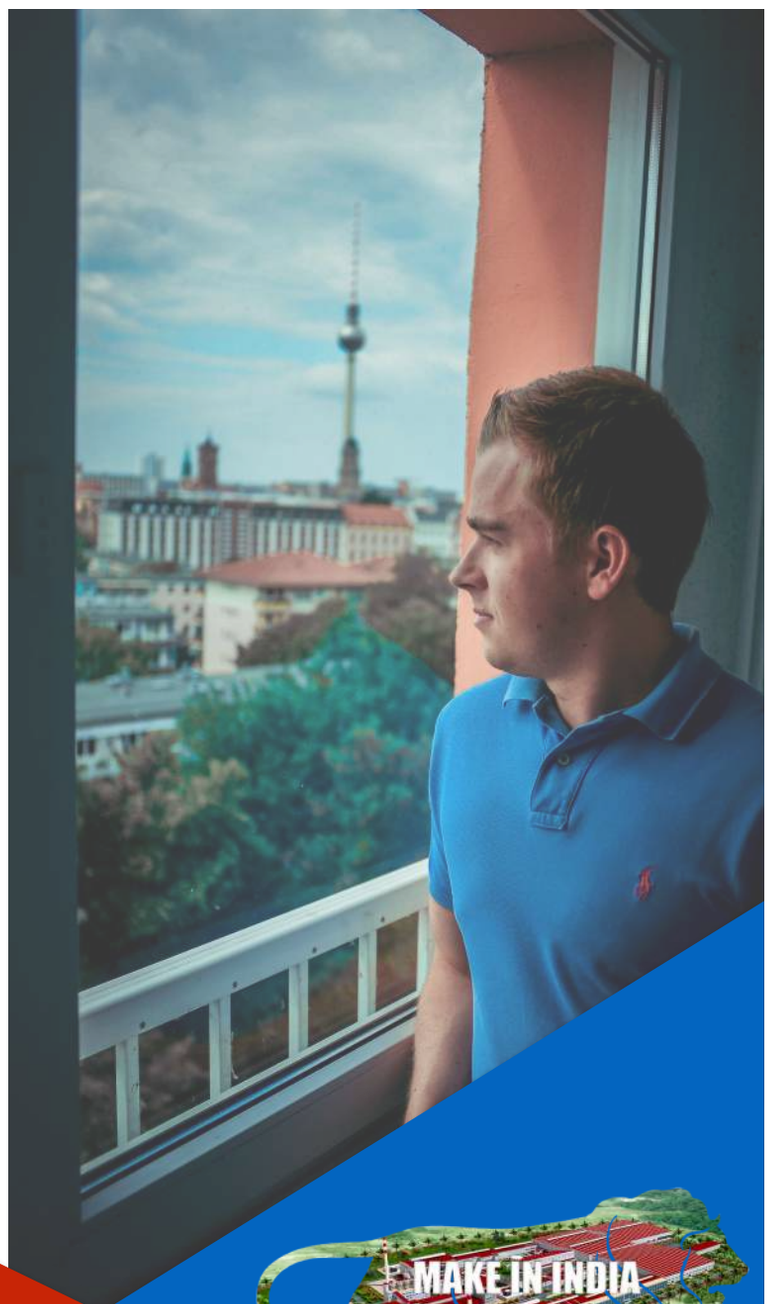

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The 'World Glass Complex' at Sriperumbudur, near Chennai is spread over a campus of 177 acres.

A trail-glazer in the Indian glass industry

Mr B Santhanam, Managing Director at Saint-Gobain India Pvt Ltd, described to *Glass Worldwide* (preferred international AIGMF journal) the origins, present-day activities and prospects for Saint-Gobain's glass business in the dynamic Indian market.

Saint-Gobain entered the Indian market in 1996. Subsequently, with a cumulative investment of over INR7500 crores, with 2018 sales in excess of INR 7000 crores, 6000 employees (2000 in the glass business alone) and 23 manufacturing sites, India has become a key market for the group, so much so that it is identified as a standalone region in its global operations.

What has stood the company in good stead is a friendly industrial climate, growing impetus by the national government to 'Make-in-India', skilled labour and a persistent demand for its innovative products. In fact, 90% of the group's sales in India are manufactured locally. Furthermore, with a pan-India dealer network and smart advertising strategies that ensure a strong connect with the final consumer, the brand recall of Saint-Gobain in India has been known to be as good as that in France. ▸

Mr B Santhanam, Managing Director, Saint-Gobain India Pvt Ltd.

A third float line has recently been commissioned at the 'World Glass Complex' near Chennai.

Originally published in Glass Worldwide, preferred international journal of AIGMF

glass WORLDWIDE

Located in Kerala, the Yahir Auditorium uses SGG Midas Gold glass.

In Mumbai, SGG Planilaque – Ultra White glass was used for the SRKay Consulting project.

Extensive manufacturing expertise

The Saint-Gobain India – Glass Business started operations in 2000 with the commissioning of its first float glass plant at Sriperumbudur, Tamil Nadu. Today, Saint-Gobain is considered a strong technology and market leader, shaping the industry with a country-wide manufacturing footprint and plants in Sriperumbudur, Tamil Nadu, Jhagadia, Gujarat (acquired in May 2011) and Bhiwadi, Rajasthan (a greenfield investment in March 2014).

In south India, the 'World Glass Complex' of Saint-Gobain at Sriperumbudur, near Chennai is spread over a campus of 177 acres. It houses three float lines and two state-of-the-art advanced magnetron coater lines, scalable to 140 million ft^2 and delivering high performance, high selective, energy efficient glass to the building industry. The site also features automotive processing lines for 1.3 million car sets annually, a solar control reflective glass manufacturing facility to produce on-line coated glass for residential markets, a 50 million ft^2 state-of-the-art mirror processing line that is capable of making eco-friendly (copper-free and lead-free) mirrors and lacquered glass for interior applications and a state-of-the-art glass solutions facility for fire safety, bullet proof, blast proof, advanced marine applications and insulated and laminated glazing.

The World Glass Complex includes two rain water harvesting reservoirs with a combined capacity of 130 million litres, whereby 100% of the water requirement of the third and latest float glass facility will be met from this mammoth capacity. There is also an innovative 'Urban Forest' initiative that will house 100,000 native trees by the end of 2019, with 74,000 trees already planted.

In north India, the 'World Glass Complex' of Saint-Gobain at Bhiwadi represents an investment of over INR 1000 crores and is spread over a campus of 136 acres with a built-up area of 1.14 lac m^2. It houses a float glass manufacturing line and a laminated glass line for automotive requirements. The plant is a fully automated, futuristic (with state-of-the-art robotics), integrated glass facility featuring several innovative features that were deployed for the first time in the Indian glass industry. The strategic location makes the facility easily accessible to the entire glass market of north India.

And in west India, a brownfield manufacturing complex at Jhagadia houses a separate float line. It serves the entire western region of India and will soon expand into manufacturing high value-added products.

Product range

From its basic clear glass that is synonymous with being invisible, Saint-Gobain's glazing products include tinted glass, eco-friendly mirrors, Sun Ban solar control glass for residential window glazing, the Infinity range of high performance exterior glass solutions for commercial applications, the Inspire range of interior glass solutions that span a wide offering of lacquered glass and Plug n Play LED mirrors etc.

The Vetrotech range of safety and security solutions is offered for fire safety, bullet and blast resistant applications and interactive glass applications like Priva-LITE (a glass that transforms from transparent to translucent with the flick of a switch), along with dynamic glass like SageGlass (an electrochromic glass that tints automatically) and the entire portfolio of automotive glass (Sekurit). ▸

Arihant, The Verge in Chennai uses Saint-Gobain's Planitherm Clear (Planitherm – Pristine White), KT440 (Nano – Tropical Green) and ST436 (Cool Lite Turquoise) glass materials.

In Mumbai, the Tata Sky project features Saint-Gobain's Contraflam glass.

Originally published in Glass Worldwide, preferred international journal of AIGMF

The Maesrk project in Belgaluru employs SGG Planilaque – Titanium Grey glass.

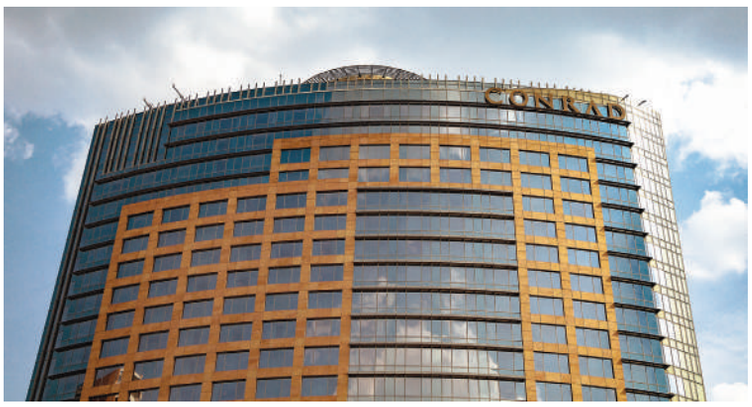
Diverse presence

Saint-Gobain's presence permeates everyday life with a suite of offerings, designed to ensure wellbeing at home, at work, in educational institutions and on the move, in the form of automotive glazing. The group's flat glass products and solutions cater to domains that include but are not restricted to hospitality, healthcare, institutions, residential, commercial, retail, recreational, public spaces and transportation/mobility hubs etc.

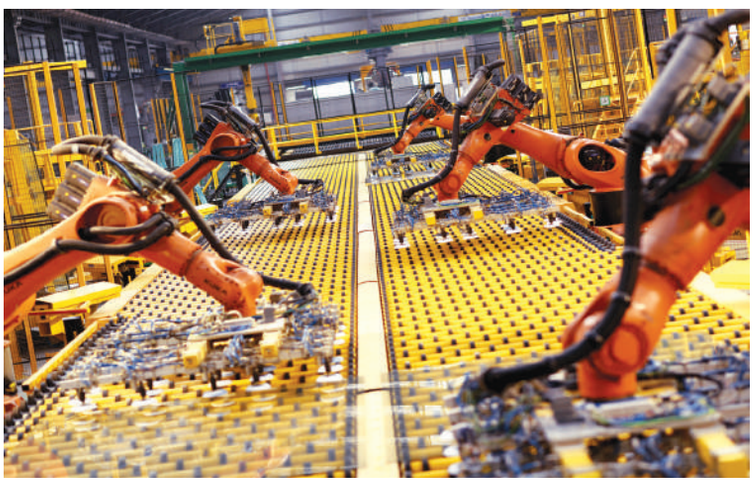
Research

Research is recognised as the key to driving innovation. Saint-Gobain Research India (SGRI), located at the IIT-M Research Park in Chennai, is the group's seventh Transversal Global Research and Development Centre. With more than 100 scientists, SGRI is working towards creating products and developing frugal customised solutions for hot and humid climates, while addressing the challenges of sustainability.

In a very short span of time, the group's global R&D network in collaboration with local academic and ecosystem partners, has generated over 65 patents and 36 design registrations.



Saint-Gobain's KS138 (Nano Silver – Shine) and ST120 (Cool Lite Sterline Silver) glass has been used for the Conrad project in Bengaluru.



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

Sustainability

As a world leader in sustainable habitat solutions, Saint-Gobain offers a large range of building materials that help save more energy than it takes to produce them. Saint-Gobain has strategically focused on transforming all its products to contribute to sustainability and energy conservation. The result is the largest range of EPD-certified products for buildings being made locally available in India.

Today, every eight out of 10 green buildings in India is by Saint-Gobain. Saint-Gobain believes that being sustainable is being smart and walks its sustainability talk. The corporate office of Saint-Gobain Glass in Chennai, for example, is LEED-Gold certified and recertified. This is an honour that only a handful of workplaces across the world have achieved.

The 'World Glass Complex' also features automotive processing lines for 1.3 million car sets annually, a solar control reflective glass manufacturing facility and a 50 million ft² mirror processing line.

The last word

For more than 350 years, Saint-Gobain has been an integral part of living and working spaces across the globe. As the world leader in habitat, it has brought significant value to built environments everywhere. As a top employer in 31 countries (and the first time in India), the group is constantly working to make a difference to the world. Drawing from its passion to be the best in all that it does, Saint-Gobain India – Glass Business has taken a leaf from the group's book to not just continue on the same path to progress but lead from the front and be a trail-glazer! ●

About the author:
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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.

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The AGI facility in Bhongir was commissioned in 2009 and a new furnace was constructed in 2013.

Developing opportunities for glass packaging from a position of strength

Rajesh Khosla took over as President and Chief Executive Officer at AGI glaspac in May 2018, having previously worked extensively in the international steel and associated industries. Just over a year after his appointment, Mr Khosla spoke exclusively to *Glass Worldwide (preferred international AIGMF journal)* about AGI glaspac and the business growth opportunities that exist for one of the region's leading glass packaging manufacturers.

With two state-of-the-art manufacturing facilities, the AGI glaspac division of HSIL Ltd is one of India's leading glass container manufacturers and the largest in the south of the country, with a 17% market share nationally. The business employs approximately 3000 people and manufactures high quality glass containers to meet the stringent and demanding quality needs of food, pharmaceuticals, soft drinks, spirits, beer, wine and other industries.

The company's first plant in Hyderabad was commissioned in 1972 and following several phases of significant investment since 2000, is now a modern plant with a capacity of about 600 tonnes/day. A second plant some 45km away in Bhongir was opened in 2009 with a capacity of 500 tonnes/day. Subsequently, a second 500 tonnes/day furnace was commissioned in 2013.

According to Rajesh Khosla, AGI has a different perspective from other local glass manufacturers with respect to its working environment, manufacturing tools, its vision for the future, its plans for expansion and passion for value addition. "An environment has been created, for example, where innovation, research and development and best practises are an integral part of the working culture" he explains. "Furthermore, manufacturing tools like business excellence and total

Rajesh Khosla was named President and Chief Executive Officer at AGI glaspac in May 2018 .

Originally published in Glass Worldwide, preferred international journal of AIGMF

productive maintenance have been introduced, showing that AGI glaspac does not stick to traditional methods, taking full advantage of workplace cultures that are implemented globally. AGI has a medium-term, five year plan for horizontal and vertical movement."

Since joining the company, Mr Khoska has identified business growth opportunities both locally and outside India. In addition, however, he believes strongly that value-added services need to be introduced to revolutionise the glass market and to grow vertically.

"AGI glaspac provides an excellent platform for professionals" he suggests. "The whole organisation is running with the vibrant energy to experiment, innovate and grow. And since glass is the 'sunrise industry' in India, opportunities are many."

Rajesh Khosla's management approach is to dream for potential, create an execution plan and implement it with full energy and discipline. "Besides that, I fully believe that best practises employed in other industries can also be applied and integrated in the glass business. We must explore all areas, including sales, raw materials and operations, as well as integrating with a changing world."

Product development focus

Rapid product development is a core strength of AGI, a company renowned for producing innovative products in four-six weeks and sometimes, within two weeks! The glassmaker also boasts ISO quality management certification and complies with all social requirements. "We are really customer-focused, with a company motto 'To take care of the customer'."

It is now planned to enter the retail sector, where AGI plans to reach out to end consumers via e-commerce platforms.

A series of important short, medium and long-term goals are in place. In the short-term, this includes the introduction of best practises in manufacture, the introduction of operational management tools and collaborations with leading international glassmakers in the area of technology transfer. Until recently, for example, a technology transfer agreement was in place with Germany's Wiegand-Glas and the company is currently exploring other opportunities for a similar partnership.

Digitalisation and automation are recognised as an important part of daily work routines and elsewhere, AGI is introducing a series of non-manufacturing-related tools to the business that are expected to deliver accuracy, speed and authenticity to the decision-making process.

In the medium-term, the company wants to introduce a series of value added services, so that existing and future customers are served effectively, while in the long-term, the goal is to be recognised as a world class manufacturer, with a presence in India and abroad.

Investment priorities

As well as investing in a new crushing plant and the latest inspection technology, the company is planning to upgrade existing packaging, warehousing and logistics systems to permit increased production volumes.

Close relationships are maintained with such leading international suppliers as Agr, Antonini, Emhart, Heye International, IRIS, Pennekamp, Sheppee, SORG, Zecchetti and ZIPPE. "We need suppliers to help us to perform better by concentrating on two broad areas" Rajesh Khosla suggests. "How can solutions be customised for the Indian market?; and because most equipment and parts come from Europe, is it feasible for items to be made locally? As a result, they will be more economical, enabling us to be more competitive globally."

According to Mr Khosla, deeper engagement between AGI and technology suppliers would go a long way to achieving a win-win in the market for all parties. "My belief is that our technology suppliers too should capitalise on the 'Made in India' initiative, conceived by the Industry Ministry, thereby bringing in a win-win for both. Surely, India is a competitive place when it comes to manufacturing today."

Market opportunities

The introduction of value added glass products is expected to represent a major opportunity for AGI's business growth in India's expanding glass packaging market. On the flip side, significant challenges also exist, based largely on the uncertainty of potential government policies that could adversely affect the market and the glassmaker's customers.

Rajesh Khosla reports that the local glass container industry is performing reasonably well, driven by the needs of a huge middle class and their preference for glass packaging. "While Indian glass container demand has grown, the time has come for the supply side to push for products that will transform the packaging industry generally" the AGI President contends. "Glass is well placed as the preferred packaging material."

AGI glaspac is an active member of the South India Glass Manufacturers' Association (SIGMA), with Sandip Somany having served as President for more than a decade. Furthermore, Rajesh Khosla is an Executive Committee member for the All India Glass Manufacturers' Federation (AIGMF) and heads the organisation's Raw Materials Committee, which represents the glass industry at national government level.

"In my opinion, trade associations such as SIGMA and AIGMF are very important, as they are the structured voice for the industry and they are the best channels for communication between industry and other stake holders" Mr Khosla concludes. "AIGMF has been successfully creating a platform where the industry can benefit from its collective efforts." ●

Rajesh Khosla's management approach is to dream for potential, create an execution plan and implement it with full energy and discipline.

Further information:
AGI glaspac, Hyderabad, India
web: www.agi-glaspac.com

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On the Spot... Sanjay Ganjoo

Celebrating its 25th anniversary, Asahi India Glass (AIS) is a leading integrated manufacturer of all types of flat glass and a dominant player in the automotive and architectural glass value chains. Sanjay Ganjoo, COO Architectural Glass at AIS and former AIGMF President, spoke exclusively to *Glass Worldwide (preferred international AIGMF journal)* about the company's recent investments and the current status of the different flat glass sectors in India.

GW: Since we last spoke in 2014, AIS has commissioned a float glass plant in Taloja and a fifth automotive glass plant in Gujarat. What are the highlights of the investment in Taloja and the plant's performance?

Being one of the leading glass manufacturing companies in the country, AIS enjoys 72% market share in the passenger car segment and caters to all major automotive brands, while we have approximately 20% of the total market share of the Indian float glass industry. We recently refurbished our existing Taloja facility in 2018 and it is now fully functional. This expansion gives additional capacities to produce 550 tons of float glass per day and we have seen an increase in our top client base by 60% in FY18-19, in the architectural segment because of this.

Due to the Taloja plant, we are able to serve customers more efficiently, with a better product mix. As AIS has deep penetration in the rural and suburban area, this plant will further help us grow in the architectural segment in the coming years.

GW: And the plans for the new automotive glass plant in Gujarat?

We have started work on our fifth automotive glass plant - a greenfield project in Gujarat - mainly to service the requirements of the Maruti Suzuki plant in Gujarat. It will be operational in this financial year. Our Gujarat project is a state-of-the-art automotive glass plant with the latest global technologies and the ability to manufacture all value added glass products for automotive requirements. AIS will make an investment of up to 600 Crores in this project in two phases. The plant will have capacities to produce 2.4 million car sets per annum. Our Gujarat plant will further strengthen our scale, flexibility and ability to seamlessly service customers across India.

AIS's fifth automotive glass plant is a greenfield project in Gujarat.

This investment is in line with the Make in India initiative, launched by the Government of India. As a result, AIS will further expand its footprint across India with manufacturing plants and advanced sub-assembly units across multiple locations in the country.

GW: Now boasting 13 plants/sub-assembly units, what are AIS's current manufacturing capacities?

We currently have four auto glass plants in India in Bawal, Chennai, Roorkee and Taloja. We are coming with a new automotive glass manufacturing plant in Gujarat that will add up to 2.5 million car sets to our present capacity.

We now have a total capacity of 5.9 million laminated windscreens and 4.3 million tempered car sets. Post Gujarat plant operation, our capacity will be 8.3 million windscreens and 6 million tempered car sets. The growth will be sustained by further automating the process and initiating high value improvements.

GW: Following this significant investment, what is AIS's position in the market and how well-positioned is the company to be competitive going forward?

As India's leading integrated glass manufacturing company, AIS delivers top-of-the-line products and solutions through its three strategic business units for automotive glass, architectural glass and consumer glass. AIS is a pioneer in the automotive glass industry in India, with over three decades of proven leadership in technology, scale and QCDDM (Quality, Cost, Delivery, Development, Management). AIS is the only automotive glass company in the country to have received the prestigious Deming Application Prize in 2007.

Over the years, AIS Auto Glass has expanded from a single location manufacturing company into one with multiple production and assembling facilities across different regions of India. Today, we have four state-of-the-art production facilities at Bawal (Haryana), Roorkee (Uttarakhand), Chennai (Tamil Nadu) and Taloja (Maharashtra).

AIS offers unmatched location flexibility to its customers, with multiple plants spread across the country, which run at optimum capacity and have the capability to make products in line with customer requirements. This will be further bolstered with the addition of the aforementioned greenfield facility in Gujarat, with the capability to produce the entire auto glass range.

With warehouse-cum-sub-assembly units in Gujarat, ▸

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glass WORLDWIDE

Pune and Bangalore, supported by a stocking facility in Gurgaon, AIS mitigates any disruption in the supply chain by being close to customers, with each warehouse maintaining adequate inventory to manage for any contingency.

The widest range of glass products available in the automotive sector in India today is from AIS and includes not just laminated windscreens and tempered glass for sidelites and backlites but also a host of sub-assembly and value added products like de-fogger glass, acoustic glass, encapsulated glass, head-up displays etc and innovative products like plug-in windows, water-repellent glass and rain sensor windscreens etc.

AIS is a dominant brand covering the entire spectrum of the automotive industry, which includes leading OEMs like Maruti Suzuki, Hyundai Motors, Tata Motors, Mahindra & Mahindra, Toyota Kirloskar, Honda Cars India, Volkswagen India, Ford India, Skoda Auto and Fiat India.

GW: Does AIS plan the construction of any further facilities or major upgrades?

The ongoing major investment in Gujarat will be completed in two phases and we are focussing towards the completion of this project… hence there may not be any other further major investments in the near future. However, we are always exploring possibilities for growth and may consider investing, if any good opportunity comes at an appropriate time.

GW: What are the main criteria for selecting suppliers of technology to support your investments?

Selection of technology depends on various parameters like the requirement of a particular material for a specific time in the future, productivity, flexibility to produce different products, cost of production etc. We have an in-house engineering function that designs and manufactures highly customised machines, suitable for our processes.

GW: What are good examples of significant recent product developments?

For architectural glass, highlights include products like gold, DLE, switchable glass, fire-resistant glass and other products with broad features based on the market requirement. Our focus is on value-added products that offer thermal comfort, noise reduction, reduction in fuel consumption and design/visibility enhancement, along with functional displays.

Across all OEMs, reduction in car weight is also of prime importance and hence ultra-thin windscreen glasses with tougher quality specs are expected to be used in future car models.

We have also introduced value-added products like solar glass, acoustic windscreens, IR Cut PVB windscreens, IR Cut acoustic PVB windscreens and UV Cut glasses for entry level Indian passenger car models. Currently, these high end technology products are available only in niche segments.

Given below are some details about our value added products in automotive glass:

IR Cut windscreens and solar control glass for sidelites and backlites: IR Cut laminated glass is built with a special PVB interlayer. This interlayer has a special additive that blocks the sun's heat and prevents it from entering the car. Solar control glass used for sidelites and backlites has a metal oxide ingredient that blocks the sun's heat. So, even if the car is parked under the sun, it ensures faster cooling of the cabin to a comfortable temperature. It improves the air conditioner's performance due to less heat transfer from outside and also ensures longer life of seat covers due to reduced heat.

Acoustic windscreens for cars: A high performance car glass that is made by sandwiching two panels of glass with a special PVB interlayer, having a high dampening material. This blocks high frequency sound waves and dampens acoustic and mechanical vibrations. It significantly reduces noise and vibrations inside the car cabin, thereby reducing driver fatigue.

Head-up display glass: Dashboard information is projected right on the windscreen through an in-built projector in the car's console. The glass is built with a wedge-shaped PVB film that is thin towards the bottom and thick on the top. This provides better clarity and avoids a blurred image that usually occurs in a standard windscreen.

Water-repellent glass for side windows: This glass is built with a special hydrophobic coating that increases the angle of contact to prevent water from spreading onto the surface. It enables a safer driving experience during rain due to better visibility through the side door glass.

AIS refurbished its existing Taloja float glass facility in 2018.

Heated windscreens: This product uses very fine, almost invisible, heatable tungsten wires that are embedded on the PVB interlayer film and are heated by the car battery. It helps in defogging and the removal of snow deposits.

GW: What can you tell us about the company's consumer facing brands, AIS Windows and AIS Glasxperts?

Windows have come a long way from being mere holes-in-walls that let light and air into a house. Today, they are a very important element in the overall architecture of the house and play a key role when it comes to the interiors. Advances in glass technology, frames and manufacturing techniques mean that a window offers almost limitless permutations and combination solutions to create ideal interiors.

AIS Windows offers end-to-end professional window solutions, bringing together the material of your choice – be it upvc, wood or aluminium – with the best in glass products and hardware fittings. We offer 360º solutions, including design consultation, glass and frame selection to installation and most importantly, post-installation support.

With the right choice of design and functionality, modern windows can truly make any house a contemporary landmark, ensuring comfort and peace for the people who live within.

AIS Glasxperts is a full service offering from Asahi India Glass Ltd (AIS), bringing together an integrated approach and specialised knowledge in glass and allied products and services. They help meet customer needs for modern, eco-sensitive aesthetics with a full spectrum of world class, high quality, branded glass products, fittings and systems with assured safety and hassle-free services. They provide complete glass, window and door solutions for aesthetic, safety and security, energy efficiency, acoustic and privacy needs.

GW: In general, how is the automotive glass sector performing in India?

Demand for automotive glass across the segments – passenger vehicles, commercial vehicles and three wheelers - increased during the 2017-2018 financial year, although sluggish performance was recorded in 2018/19 due to the introduction of a goods and service tax. Demand has subsequently improved again, in particular for value-added products.

AIS maintains a >72% share of business in terms of ▸

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glass WORLDWIDE

the passenger car sector and is the market's dominant player for commercial vehicle glass.

GW: And the architectural glass sector?
The overall architectural glass industry in India manufactures 180,000 tonnes of glass per month and is estimated to be at Rs6200 Crores. The processed glass industry can be estimated at Rs1100 Crores.

AIS is the second largest company in the float glass sector and the largest in terms of processing. The sector has been badly affected in recent years because of a slowdown in the real estate and construction sectors.

However, the real estate industry is already showing signs of revival on the back of Government initiatives and is projected to reach $180 billion by 2020, offering huge potential for growth. The latest Government proposals, such as the development of 100 smart cities, as well as its focus on roads, railways, manufacturing hubs etc, are also expected to boost opportunities for growth in this segment. The ongoing shift towards 'green' buildings will only further push demand for high performance glass, opening up a huge opportunity for expansion in the architectural sector.

With signs of lower interest rates, the construction sector is expected to pick up shortly. The best part in this cycle could be the increasing awareness and shifting preferences of consumers towards high performance, value-added glass products and services. This is a welcome shift and AIS is well poised, with its product portfolio and deeper penetration, to make the most of this shift in market preferences.

GW: Has knowledge increased in recent times in terms of architectural specifiers in India and the use of glass as a facade? If so, will this trend continue?
Due to its fragile nature, the use of glass to bring natural light into buildings was previously restricted only to windows and other small installations. The development of new construction techniques, value additions and processing conducted on glass have made this material strong and durable. As a result, it is now considered a viable choice for more complex structural requirements.

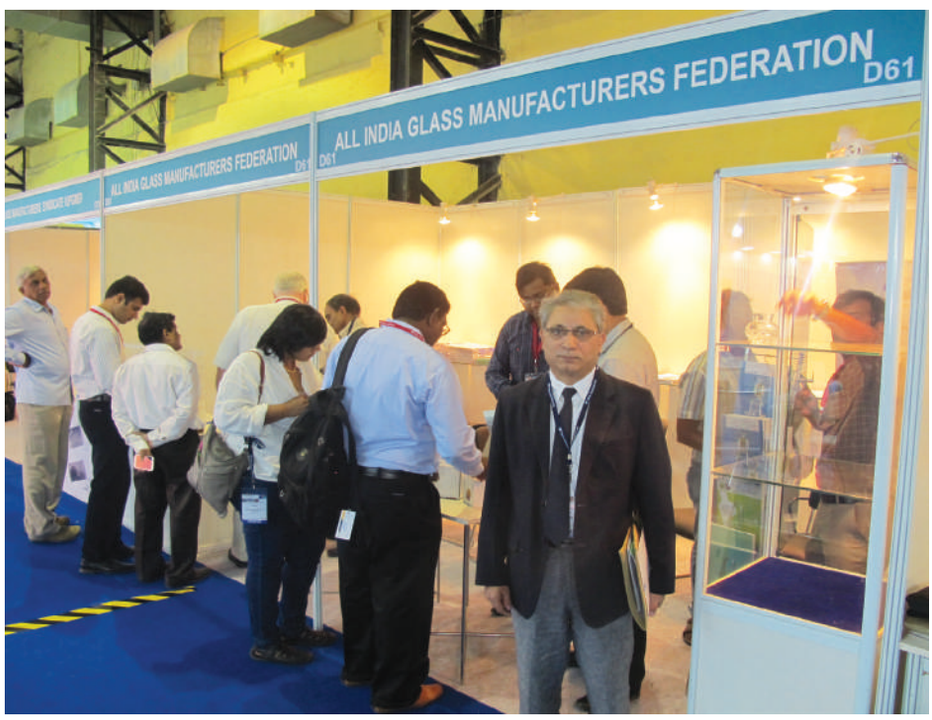
Glass is now being used for facades on an unprecedented scale to create remarkable designs and yield eco-savings. The use of glass in facades gives a dramatic effect to the building. Glass panel facade systems offer versatile, high performance coverage, with a wide range of stylish design possibilities.

It is one material that is aesthetically sound, eco-friendly and economically viable. It is a smart, adaptable and versatile material, lending itself to endless possibilities, both in terms of design and functionality, across exterior and interior applications. All in all, glass stands in a league of its own. The reason for this is simple to understand… glass enhances the visual appeal of buildings, adds a touch of modernity and elegance and helps the building gain recognition for its stylish and luxurious environment-friendly 'green' architecture.

GW: Considering challenges to control both manufacturing costs and levels of cheap imports from China and the Middle East, does India represent a cost-effective manufacturing hub for flat glass producers in the long-term?
Cheap imports are always a concern for the glass industry in India, due to a huge variation in cost structures. For example, the cost of energy in India is almost double that of some countries exporting glass to India. In the Middle East, the cost of energy is one tenth of that in India. So it will always be a challenge to compete with some of these countries, which have a huge advantage in their input costs. To offset these advantages, Indian glass manufacturers provide a lot of value addition in terms of packing, sizes, flexibility to produce customised products, new product development, shorter lead times, better quality and service and much more to offset the cost factor and attract consumer attention towards other important benefits that the products offer.

GW: What did it mean to you to serve as President of the All India Glass Manufacturers' Federation (AIGMF) between 2014 and 2016?
It was indeed a pleasure and I feel proud to be associated with such a respected body in the industry. I hope I have been able to do justice to the position and helped the body grow positively and bring it closer to achieving its vision. I have been honoured to serve the AIGMF in the past and will be ready to take up the mantle of any responsibility that comes my way to bring about a positive change in the future as well.

GW: Did your presidency succeed in further emphasising the importance of flat glass activities beneath the overall AIGMF umbrella? If so, has this trend continued since 2016?
Flat glass participation under the AIGMF umbrella has improved significantly and is now much more active compared to the period before 2014. Wider issues related to the glass industry are discussed to represent the industry at various forums to improve overall industry efficiency. We are working closely with organisations like GRIHA, NBC, QCO and BIS etc in order to be a part on their endeavour to create an ideal, sustainable environment. ●



Sanjay Ganjoo was proud to be AIGMF President between 2014 and 2016.

Further information:
Asahi Glass India Ltd, Tajola, India
web: www.aisglass.com

Originally published in Glass Worldwide, preferred international journal of AIGMF

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S. No.	Company	Products/Services
1.	**M/s Durgesh Block & Chinaglass Works** (Mr. Ghanshyam Das Lalwani) NH -2, Agra Road, Firozabad – 283 203 (U.P.) M: + 91 9917468461 Email: aisan-glassware@yahoo.com	Manufacturer of Glass Tumbler and Glass Bottles
2.	**M/s G.K. Glass Industries** (Mr. Rajendra Gupta) Dholpura Road, Khasra No.367, Opp. Tiger Glass Works Firozabad – 283 203 (U.P.) M: + 91 9837064277 Email: rajendra@glasscraft.in	Manufacturer of Mouth Blown, Hand crafted Glassware and Mouth Blown articles
3.	**M/s Ankit Silicate** (Mr. Pratik Dudhrejiya) 303, Jimmy Tower, Gondal Road, Opp Swaminarayan Gurukul Near Reliance Petrol Pump, Bhaktinagar, Lohanagar Rajkot 360002 (Gujarat) M: +91 98252 18329 Email: sales@ankitsilicate.com, export@ankitsilicate.com	Manufacturer of Sodium Silicate
4.	**M/s Om Laxmi Industries** (Mr. Chandra Prakash Kesarwani) 242/91, Muir Road Ashok Nagar Allahabad, U.P.-211 001 Tel: + 91 8303627773 M: + 91 9838095005 Email: omluxmisilica@yahoo.com	Manufacturers of Raw Material, Silica Sand. Mine owner and supplier of Raw Material
5.	**M/s Magna India** (Mr. Srinivas Bhagavatula) A-203, Mantri Paradise, Next to HSBC Arakeregate, BG Road, Bangalore – 560076 T: + 91 9341232491 E: magnaindia@yahoo.com	Consultant and agent of Refractory

SGD Pharma quality, made in India

More than 9000 tonnes of moulded Type I pharmaceutical glass containers and 4000 tonnes of tubular vials and ampoules (corresponding to more than 700 million pieces) are produced annually at the Vemula (India) glassworks of SGD Pharma. Sardar Akshay Singh, Managing Director of SGD Pharma India, spoke to *Glass Worldwide* (preferred international AIGMF journal) about the fully integrated facility's extensive capabilities, prospects and opportunities.

Sardar Akshay Singh, Managing Director of SGD Pharma India.

The Indian pharmaceutical sector has been the subject of impressive growth rates in recent years, a trend that continues to benefit specialist Type I moulded and tubular glassmakers like SGD Pharma India Ltd. Collectively, the sector was valued at US$33 billion in 2017 and is expected to reach US$55 billion by 2020. India's pharmaceutical exports stood at US$17.27 billion in 2018 and have reached US$10.80 billion in the current financial year (up to October 2018).

Indian pharmaceutical companies and their subsidiaries have established a strong presence in the USA during the past couple of years, with higher ANDA approvals. The loss of patent exclusivity and cost cutting measures adopted by several nations has pushed demand for generic products. Indian pharmaceutical companies have enhanced their investments in research and development and successfully received higher approvals from the USA's FDA within the last decade. Out of a total of 5350 ANDA approvals between 2009 and 2018, Indian companies have secured 34.4% of these approvals and received a total of 1842 ANDA final approvals. Furthermore, of the 1310 tentative approvals, Indian companies are responsible for 500 from the USA FDA, which works out to over 38.2%.

In 2018, Indian pharmaceutical companies received 290 ANDA approvals from the USA FDA. In total, the FDA approved 813 ANDAs in 2018, slightly lower than the previous year's figure of 846. Thus, Indian pharmaceutical companies captured 35.7% of total approvals in 2018. Similarly, the USA FDA approved 194 tentative products during 2018, against 174 products a year earlier and Indian companies secured 77 tentative approvals in 2018, compared to 61 in 2017. Furthermore, the country accounts for approximately 30% (by volume) and about 10% (value) of the $70-80 billion USA generics market. The local biotechnology industry is also expected to expand at average annual growth rates of about 30% and reach US$100 billion by 2025.

The high quality tubular market for India and neighbouring countries in Asia Pacific corresponds to approximately 70,000 tons of tubing. With high growth rates in the pharmaceutical sector and a change of regulations for China, there has been a significant increase in demand for glass primary packaging, for which the raw material suppliers, especially glass tubing, are investing in capacity expansions in China and India.

As a result, Akshay Singh anticipates positive local market opportunities for his borosilicate glass business. The SGD Pharma India Ltd Managing Director has been associated with the Hyderabad-based pharmaceutical glassware specialist since its creation as Cogent Glass Ltd a decade ago. He has led a major investment at the Vemula glass production site and overseen its growing importance within the international SGD Pharma organisation. With five plants in France, in Germany, China and India, the company manufactures more than eight million vials every day. Its mission is to improve and protect patient health by supplying high quality, reliable and innovative glass primary packaging. Through continuous improvement and innovation, SGD Pharma is committed to reinforcing patient safety by improving the physical, chemical and cosmetic properties of its products.

Tubular vials from SGD Pharma India.

A wide range of tubular ampoules are available.

Integrated infrastructure

SGD Pharma is a world leader in glass pharmaceutical packaging for healthcare. To improve market share, its offering to customers and to increase the company's geographical advantage, SGD Pharma acquired Cogent Glass, a moulded and tubular Type I glass manufacturing facility in 2013.

The SGD Pharma India glass plant is strategically ▸

Originally published in Glass Worldwide, preferred international journal of AIGMF

glass WORLDWIDE

The addition of amber glass to the portfolio and the introduction of technology to produce larger bottles should help the company to gain further market share of moulded Type I borosilicate pharmaceutical glass packaging in India and internationally.

located on the Hyderabad-Bangalore highway, approximately 120km away from Hyderabad and spread across 36 acres. The new corporate office is located in Hyderabad, which is an important pharmaceutical hub in the country.

All manufacturing equipment is sourced from the world's leading manufacturers of glass forming machinery. For example, the batch plant is from ZIPPE (Germany), the melting furnace from SORG (Germany), lehrs from Antonini (Italy) and inspection equipment from Tiama (France). The glassmaker's tubular vial and ampoule manufacturing equipment comes from Spami, KYP, OCMI and Moderne Mecanique.

According to Akshay Singh, SGD India is the only composite manufacturer in the world, with an integrated infrastructure for moulded and tubular vials and ampoules. Moulded and tubular vials are manufactured in accordance with GMP standards and conform to the requirements of Drug Master Files for product registration, ensuring the use of quality raw materials and glass containers, matching global benchmarks and pharmacopoeia like USA, European, Indian and Japanese standards.

SGD Pharma India has acquired a substantial market share since 2013. The addition of amber glass to the portfolio and the introduction of technology to produce larger bottles should help the company to gain further market share of Type I in India and internationally. The result of 35% CAGR growth reflects the trust in quality levels SGD Pharma India has maintained over the years and will continue to do so to establish the organisation as the market leader for Type I glass in India. Exports represent 15% of global sales, with a special focus on Asia, European markets and in the USA. This is primarily due to the geographical advantage and position of the company's production site. Most products destined for domestic markets are also sold to USA FDA-approved facilities, wherein the end product is exported to the USA and Europe.

Experienced team

SGD Pharma India employs approximately 800 people. This includes the best available talent in their respective fields. Depending on skill matrix analytics, sufficient training is provided to all employees to maintain the company's position as a world leader for glass primary packaging. Most employees come from highly specialised backgrounds. The focus at SGD Pharma India is to benefit from those skill sets and extensive knowledge in order to meet global standards in training and safety.

Training is an important focus, via a specialist department and team. For 2018, the company's average training man hours exceeded 3000 per month. An important training focus relates to GMPs, 5S, safety, quality, process and HR. Inter-company departmental exchanges, monthly calls and senior management quarterly meetings have enhanced Vemula to respect global standardisation of processes and practices followed within the group and vice versa.

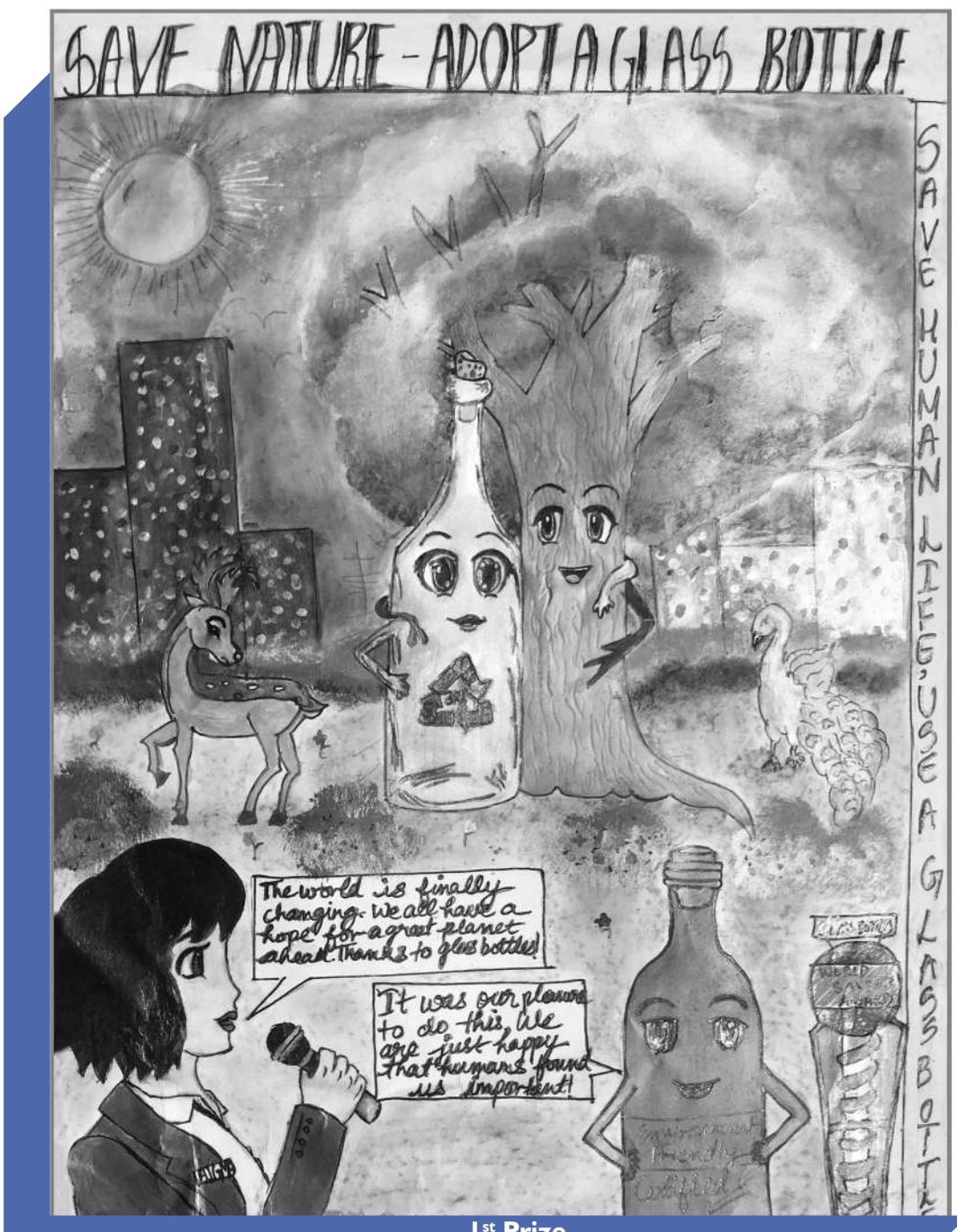
SGD Pharma India complies with all environmental compliance norms, prescribed by the pollution control board. Periodic checks are performed and the results are shared with governmental authorities and within the group to ensure full compliance on environmental topics. Based on the company's growth over the last three years, a significant investment in both moulded and tubular glass containers is anticipated in the next four years. ●

Further information:
SGD Pharma India Ltd,
Hyderabad, India
web: www.sgd-pharma.com

School Children optimistic on 'Adopt a Glass Bottle' for Healthy Environment

(August 12, 2019)

To commemorate International Youth Day, The All India Glass Manufacturers' Federation (AIGMF) invited online entries from children between 7-16 years to participate in "Drawing Competition 2.0" on the theme "Adopt a Glass Bottle".



I st Prize

Former Presidents, Mr. Sanjay Somany and Mr. S C Bansal were jury members who adjudged top 3 drawings out of approx. 2000 entries received from all over India.

Mr. Sanjay Somany said, *"A good attempt by youngsters who are now focusing their point of view. This will have repercussion on community and lifestyle, we see a bold initiative".*

Mr. S C Bansal said, *"School children painted excellent drawings, which portrays their good understanding on eco-friendliness of glass".*

Secretary AIGMF, Mr. Vinit Kapur commented *like last year, almost 70% drawings received from school students were based on comparison i.e. benefits of glass packaging vis-à-vis menace of plastic, however, AIGMF being a responsible association kept aside all those entries; and drawings without comparisons were considered for shortlisting. Mr. Kapur highlighted that Glass is the only packaging medium which is 100% recyclable and contributes significantly for a clean environment.*

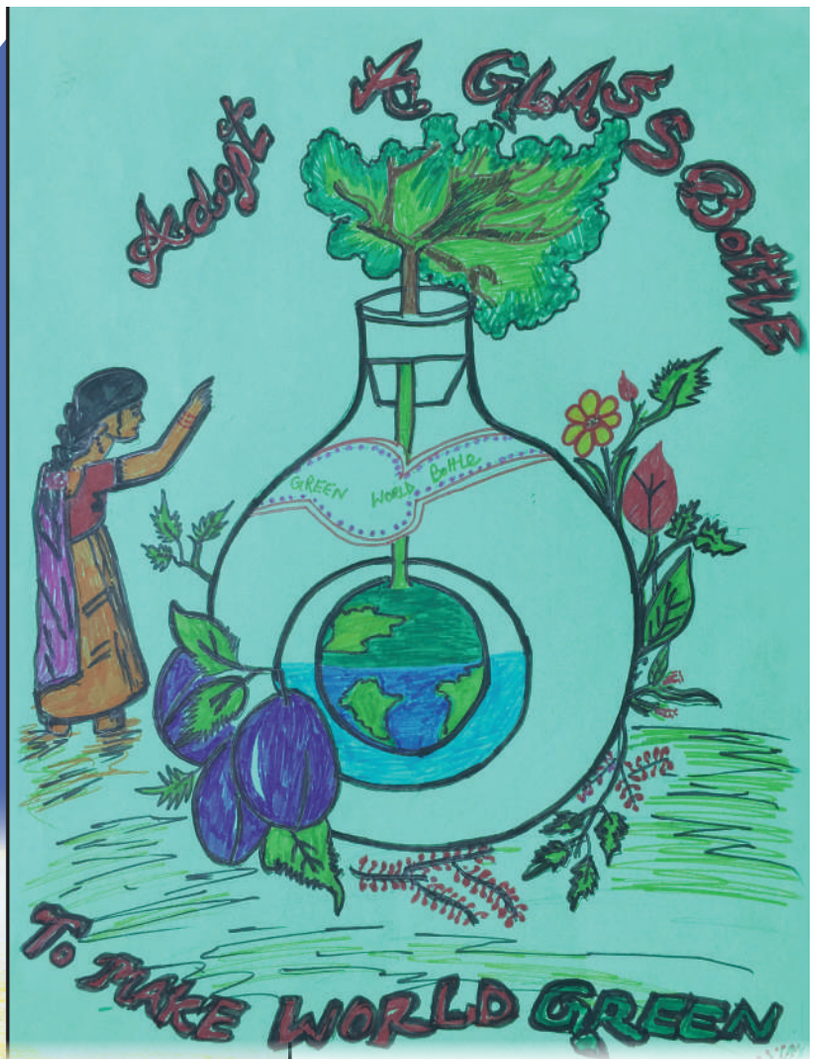
As part of Appreciation, first 100 entries were gifted a glass water bottle *(specially*

1st Prize (Rs. 10,000) was given to Archisha Shyam aged 13 years, 8th class student of Orchids International School, (Jalahalli) Bangalore

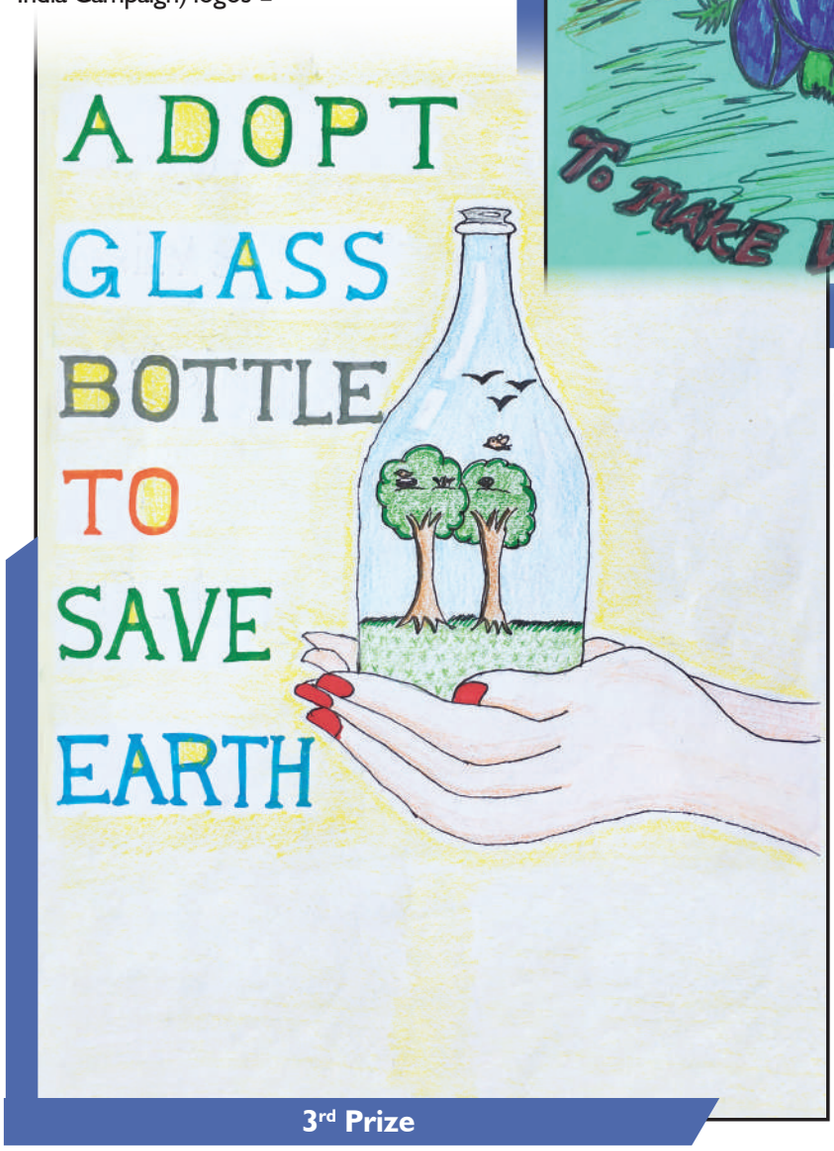
2nd Prize (Rs. 7,000) was given to Pranav Singh aged 11 years, 6th class student of Bal Bharti School, Bahadurgarh (Haryana)

3rd Prize (Rs. 5,000) was given to Swastik Saha aged 10 years, 5th class student of Bal Bharti School Bahadurgarh (Haryana)

manufactured by Hindustan National Glass & Ind. Ltd.), with World Environment Day and Swachh Bharat Abhiyaan (Clean India Campaign) logos ■



2nd Prize



3rd Prize

Winning entries can also be viewed at https://aigmf.com/past-events.php

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- Syrup Bottles from 60ml - 550ml
- Dry Syrup with mark bottles
- Flat Amber Glass Bottles
- Designer Glass Bottles
- Wide Mouth Glass Bottles

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Website: www.vitrum-glass.com

Indian glass industry raw materials review

From rising energy costs to unexpected fluctuations in raw materials price levels, unforeseen obstacles are making it difficult for glass producers to remain competitive. Writing for *Glass Worldwide* (preferred international AIGMF journal), Sunder Singh assessed the raw materials situation in India.

With a daily installed capacity of nearly 18,000 tonnes of flat, container and table glassware, the Indian glass industry has experienced mixed fortunes in the past four years. Average industry growth between 2014 and 2018 was significantly below performance levels achieved earlier in the decade. However, considering that the construction sector has started to show signs of revival, the local flat glass industry is expected to register healthier growth in the future. Three leading float glass producers, Saint-Gobain, Asahi India and Gold Plus Glass have added about 1900 tonnes/day of float glass capacity in the last 18 months in anticipation of this demand.

In comparison to flat glass, Indian glass container producers have witnessed slightly lower growth rates in the past four years. A number of policy decisions by central and state governments such as demonetisation, implementation of Goods and Service Tax (GST), Apex court's ban on sales of alcoholic beverages on the highways and prohibition on alcohol sales in some of the largest states has had an adverse impact on the industry. Competition from other forms of packaging, especially from PET has made matters worse. As a result, the Indian glass container industry has not seen any major capacity expansion in this timeframe. Instead, there have been examples of capacity streamlining and capacity realignment.

Raw material costs

Different glass sectors and individual plants use a wide range of raw materials. The main raw materials include silica sand, soda ash, limestone, feldspar and dolomite, along with colouring/decolouring agents such as chromites, iron oxide, cobalt oxide, selenium and zinc selenite. For the manufacture of special and technical glasses, lead oxide, potash, zinc oxide and other metal oxides are employed. Refining agents include arsenic and antimony oxide, nitrates and sulphates. However, four raw materials represent more than 95% of those used by the industry. This article focuses on these four raw materials, their availability and cost in the context of the Indian glass industry.

India is endowed with significant silica sand resources.

Silica sand, soda ash and dolomite account for about 72%-74% of total raw materials costs for float and glass container production. Profitability is dependent on availability, proximity and fluctuations in prices of these raw materials.

Table 1 tabulates raw material costs from the last four financial years for India's largest glass container producer Hindustan National Glass Ltd (HNGL). Raw material costs as a percentage of sales revenue have increased by 1.23% during the periods 2014-15 and 2017-18.

For float glass producer Asahi Glass India, raw material costs as a percentage of sales revenue was at 33.15% in 2017-18, an increase of 1.07% from 32.08% registered the previous year. For another major float glass producer, Gold Plus Group, raw materials cost stood at 32% of sales revenue in the 2018 financial year, while it increased to 37% of operating income in the latest half year period (April 2018-September 2018).

Glass producers are adopting a number of strategies to minimise raw material costs, ranging from entering long-term contracts with suppliers to investing in state-of-the-art technologies that optimise raw materials consumption. For example, Piramal Glass has invested in a new IT platform to digitally transform its manufacturing operations. Piramal Glass has implemented the Real-Time Manufacturing Insights (RTMI) solution on 46 production lines across four plants at Kosamba and Jambusar in Gujarat, India, Sri Lanka and the USA. These plants have an overall capacity of

	2014-15	2015-16	2016-17	2017-18
Total sales (in $ million*)	310.37	308.86	293.32	279.30
Raw material cost** (in $ million)	89.62	91.37	85.11	84.07
Raw material cost as a percentage of sales revenue	28.87%	29.58%	29.01%	30.10%
Soda ash cost (in $ million)	46.37	48.49	44.45	41.68
Soda ash cost as a percentage of sales revenue	14.94%	15.70%	15.15%	14.92%
Soda ash cost as a percentage of total raw material costs	51.74%	53.06%	52.22%	49.57%
Silica sand cost (in $ million)	15.31	14.64	13.83	14.98
Silica sand cost as a percentage of sales	4.93%	4.74%	4.71%	5.36%
Silica sand cost as a percentage of total raw material costs	17.08%	16.02%	16.24%	17.81%
Soda ash + silica sand cost as a percentage of total raw material costs	68.82%	69.08%	68.46%	67.38%

Table 1: Sales revenue, soda ash and silica sand cost for India's HNGL.
**Conversion of INR to US$ is based on the INR/US$ conversion rate in early May 2019 ($1 = INR 70).*
***Raw material costs also include the cost of cullet.*

Nearly 95% of local soda ash production capacity is concentrated on India's western coast in the state of Gujarat.

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1375 tons/day, with 12 furnaces and 60 production lines.

Using this technology, the company acquires data from sensors on production lines to identify quality parameters at each stage and gains insights on line efficiencies in real-time. This has resulted in improved production efficiency and cost reductions up to 70%, compared to a glass industry manufacturing execution system (MES).

Silica sand

India is endowed with significant silica sand resources. A number of states such as Rajasthan, Gujarat, Tamil Nadu, Kerala and Andhra Pradesh have ample resources, although the quality is of medium grades. Most leading glass producers have adopted a strategy of backward integration, wherein these producers operate their silica sand quarries and beneficiation plants to improve quality.

Freight costs represent one of the most critical factors and it is not unusual for glass producers to pay more for transportation than the actual cost of materials. To minimise these costs, glass producers are securing larger supply bases of silica sand. In 2018, Gujarat Guardian increased silica sand processing capacity near its float glass plant from 33,120 tonnes/month to 86,500 tonnes/month. The company has also applied for a license to acquire new silica sand capacity in Gujarat.

In January 2019, the country's largest float glass producer Saint-Gobain initiated dialogue with state-controlled Neyveli Lignite Corp (NLC) India and the Tamil Nadu government to use the silica grade sand that NLC quarries. NLC India is an integrated lignite mining cum power generation company. Its lignite mines are open cast and the sand mined is dumped outside.

"We have found that the sand layer above the lignite can be used to manufacture glass" comments Mr B Santhanam, Managing Director of Saint-Gobain India. "We have developed a beneficiation process whereby the sand could be used after removing impurities. They can be a raw material for us and several glassmaking units. We want the Tamil Nadu government and NLC India to agree on logistics and royalty for the sand. Our annual requirement of silica sand at the Chennai plant is nearly 400,000 tonnes/year, which can be met completely from Neyveli."

Currently, Saint-Gobain transports silica grade sand for its south Indian operation from the coastal states of Andhra Pradesh and Gujarat. In addition, some material is imported from Egypt.

Asahi Glass India has set up a dedicated company to source and process raw materials for the company's requirements. Integrated Glass Materials Ltd supplies silica sand to Asahi Glass's float glass plants. The company operates a silica sand quarry at Karauli in the state of Rajasthan under the name Khirkhira Silica Sand Mining. It has recently applied for environmental clearance for silica sand mining at an extended area near the existing silica sand operation.

Soda ash

The cost of soda ash is so critical for the glass industry that even a small price variation is sufficient to give producers the jitters. The proximitiy of soda ash suppliers to glass production sites helps to reduce total material costs due to the fact that soda ash absorbs moisture quickly and glass producers cannot retain high inventories for long periods.

In India, the glass sector accounts for about 32% (globally glass accounts for 53%) of total soda ash consumption. Local demand currently stands at about four million tonnes/year, while production stands at 3.2 million tonnes of total domestic capacity of 3.5 million tonnes and is expected to grow at about 10% CAGR for the next two years.

In 2017-2018, India imported about 900,000 tonnes of soda ash to meet domestic requirements. Soda ash is imported from China, the European Union, Kenya, Pakistan, Iran, Ukraine and the USA. Among these countries, China accounts for a significant proproportion. Given the environmental issues in China (as there are still some soda ash plants in east, south and central China that need to be relocated or upgraded), the Indian soda ash industry expects production to decline in China and tightness to prevail in the industry.

Anti-dumping duties on soda ash imports in the last five years have increased costs for Indian glassmakers. Latterly, Indian authorities have sought to remove these duties but domestic producers have challenged this order in the high court. If anti-dumping duties are removed, however, Indian glassmakers will benefit from lower costs.

The domestic industry is dominated by three producers. The largest, Nirma, has a 27% market share, while GHCL and Tata Chemicals control 25% and 20% respectively. In 2017-2018, about 23% of the country's requirement was imported.

Nirma has an installed capacity of 1.43 million tonnes per annum. During the financial year 2017-2018, the company sold 1.08 million tons and 0.24 million tons were utilised for captive consumption.

Nearly 95% of soda ash production capacity is concentrated on India's western coast in the state of Gujarat. This means that glass producers based in the states of Gujarat, Rajasthan and Maharashtra have an advantage of low freight costs compared to companies in other parts of the country.

Gujarat Heavy Chemical Ltd (GHCL) completed a brownfield expansion at its Sutrapada production facility in Gujarat, taking the overall installed capacity to 1.1 million tonnes of soda ash per annum. In the financial year 2018-2019, the company produced a total of 970,000 tonnes of soda ash.

Another brownfield expansion with the similar capacity of 125,000 tonnes per annum is now in process. This expansion is expected to be completed in the current financial year (2019-2020). GHC is also looking to set up 500,000 tonnes per annum capacity at a greenfield plant, whereby the company will become the single largest producer of soda ash, with an installed capacity of 1.73 million tonnes per annum by 2022.

Speaking during the company's conference call at the time of release of its latest financial results, Mr R Mukundan, CEO of Tata Chemicals commented: "India is a net importer of soda ash, irrespective of significant new capacities coming in. At a growth rate of 5% or 6%, India will need close to 250,000 tonnes to 300,000 tonnes of additional soda ash every year. The global and Indian soda ash market is fairly balanced to tight. I think the full Turkish capacity has come on stream. Some new capacities will also come on stream in China. I do not see massive shifts in this balance happening for quite some time."

Dolomite

Indian dolomite reserves have been placed at 8415 million tonnes, of which 677.8 million tonnes are placed under reserves category and the balance of 7737 million tonnes under the remaining resources category. However, only 3% of these reserves are suitable for glassmaking.

A major share of about 88% resources are distributed in eight states, namely Madhya Pradesh (27%), Andhra Pradesh (15%), Chhattisgarh (11%), Odisha (10%), Karnataka and Rajasthan (7% each), Gujarat (6%) and Maharashtra (5%). The remaining 12% of resources are distributed in Arunachal Pradesh, Jharkhand, Haryana, Sikkim, Tamil Nadu, Telangana, Uttarakhand, Uttar Pradesh and West Bengal.

In 2017-2018, the glass industry consumed 156,718 tonnes of dolomite from domestic producers. Nearly 20% of demand was met via imports from Thailand and the UAE. The low iron content of dolomite from these countries has prompted domestic glass producers to source dolomite from these sources. ●

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Selling the Organization – Not Selling the Float Glass –

A new Sales Approach in the Glass Industry

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Abstract

Glass industry depends on many other industries for selling their products apart from direct selling of some of the consumer products to customers via various small or big retail outlets. While the retail sales both in the malls and e-commerce outfits may not have gone down very much, higher sales are expected with the progress of our economy. Among the industries that consume float glass are mainly the auto sector and building construction segment. With the economic progress, both are supposed to go up, but the opposite has happened very recently due to a variety of reasons. While these reasons are not too difficult to understand, actions in the field are causing a delay in recovery in these sectors. This has compounded the problem of glass industry that is already saddled with some other problems including the common problem with the liquidity in the market. In this difficult situation, one has to be extra careful than the 'times of euphoria'. In this short article, some selling techniques will be elaborated that might help the industry to some extent in a relative sense. .

INTRODUCTION

Glass is a wonderful material with a variety of usages that attract a vast range of people and industry. In Kanch and in various seminars organized by AIGMF, this point has been highlighted and they exist in many reports **[1-6]**. In India and elsewhere, two industries get a huge prominence when it comes to the contribution to the economy – i.e. auto and building construction sectors – both are great consumers of glass products, particularly float glass. While in auto sector, float glass has to be heat treated and bent to give desired shape for car front screen and the back along with the windows, the building construction sector needs float glass mostly in 'as it is basis' with different sizes to suit the need **[5,6]**.

Sometimes, the latter are cut into desired sizes and fixed in aluminium frames for 'ready to fit' into the buildings. This particular sizing and framing encompass a huge business in EU and USA in the range of billions of dollars. However, in India, it is mostly done by small-scale or unorganized sectors, and hence it is difficult to assess their actual need. As a selling strategy, organizing this type of activity locally could mean better sales management and also keep a tab on 'skill level' and 'employment' so that AIGMF could ask the Govt of India for certain concessions, if and when needed. This is a new dimension to the float glass business that has to be seriously noted.

An unusual thing has recently happened in India. After a lacklustre budget that has neither favoured a large-scale investment in different sectors that are badly needed at present for better employment situation in the country – nor has it encouraged foreign investment in both portfolio and industrial sectors. Naturally, stock market took a heavy beating for some days. Several sectors have also been hit by reduced sales volume and lack of liquidity causing an investment glut, e,g. in auto and building construction sectors. Although both are important for glass manufacturers, the latter is particularly significant both in terms of volume of sales per 100 sq ft of construction (and even by total sales value), and the number of skilled, semi-skilled and unskilled workforce.

Auto sector is often highlighted with an aggregated sales turnover of about rupees 13 lac crores for car makers,

ancillaries and auto-dealers combined, i.e. over $185 billion, i.e. about 7% of GDP with employment for more than several millions of people (mostly skilled workers), and that also a majority is in the auto-dealer sector, where of course there is a good number of unskilled workers.

As per a previous projection, auto sector is slated to grow at more than 3% in 2016-26, but in 2019 itself, the sales has dropped over 12% with some companies logging a decline of about 30% year-on-year basis. The situation is bad, but as proposed, a reduction of GST to boost sales of passenger cars and commercial vehicles for transporting goods might not take off too much - considering the overall economy of the country. For glass makers, it is a kind of saturation of sales in the sense that the growth would not be significant, even if there is a boost in overall sales in the country. However, newer avenues for export markets with newer models could be an option in this situation, but the weakening global demand may be a dampening factor.

Compared to the above description on auto sector, the construction sector does not appear to be so robust, but very similar. As per a previous projection, the building sector is slated to grow its contribution to GDP from 6.3% in 2016 to its double at 12.9% in 2025. In value terms, the sales figure shows a higher average growth of 4.3% from $126 billion in 2015 to about $180 billion in 2020 that is almost equivalent to the level of performance in the auto sector.

Employment scenario is supposed to grow from 9.2 million to 17.3 million of all types of workers, but here the trend is to avoid including the huge number of unskilled workers under various contractors. This excess number when added with that of workers in many unorganized segments could easily trigger the total employment to over 30 million. This is quite tenable considering 2 to 4 storey buildings are coming up in huge numbers in tier 2 and tier 3 cities due to rapid urbanization and the advent of affordable housing that are the main drivers of growth in this sector, particularly in the reasonable range of prices due to some economic prosperity and expansion of activity. *This segment is also our customers*.

However, during the last few years, there has been a sluggish growth due to high inventory built-up. Expensive flats are remaining unsold in the main metro cities in huge numbers to the tune of 6.5-7 lacs units causing a lot of liquidity crisis in the system. Again, the glass manufacturers are affected. About 2 years ago, I personally wrote quite a few times in Quora.com and also in Twitter.com that the unsold stocks should be put into parcels that could be sold in block to Private Equity funds from USA and Europe at a slight discount. This may sound like loosing money – but, financially speaking, it is much better than counting the "interest cost" instead. This has actually happened, but not to the extent desired by the realty sector **[7]**.

After writing about a page on the state of affaires in both auto and construction sectors, let us now look at the manner of selling glasses as they both are really our "heavy customers".

Industrial Selling →

To many mangers in the glass industry, industrial selling is a kind of mystery. A sales campaign that is to be successful can be made: (a) if there is a good thought process, (b) significant amount of effort, (c) a mix of inter-personal strength, and (d) stable management. This starts with an approach to one purchasing agent and ends with a whole company's commitment to buy. This is a complex process and hence it is difficult to describe. But there exists creative technique that could move buyers to buy. One has to believe in it – even before starting to do it.

In any business, we often talk about some 'industrial prospects', but to turn them into a 'customers' is a real challenge. However, it does not of course exclude the usual customers, i.e. maintenance selling. For maintaining some level of profits, it is important to keep these usual 'accounts'. The marketing is defined as: *Identifying customer needs and then to satisfy those needs*. Sometimes, there is not any apparent need, but one has to "create the need" and then "satisfy it" - that's called "creative selling", which costs money due to various new efforts including a visit to some installations or testing facilities, etc.

It has to be remembered that useful business comes slowly which requires a proper comprehension by the top managers, and hence selling effectively takes time, and sometimes that can be intolerable. But it is more or less guaranteed that if any company is working on enough potential customers, they enhance the chances of obtaining new 'sales accounts' when one badly needs them.

It has to be noted that here we are talking about professional buyers who make their choices after considering a variety of factors, such as product quality, service, and prices. Of course, it excludes those customers who are only price-sensitive, i.e. looking for the lowest price, without bothering about the delivery, the mode of payment, and other relevant issue concerning the quality, stability of the system, etc. The reason of insisting on Professional buyers is that they want

value for the long term, as a short-term price often may result in costly production problems, inefficiencies, may be some sort of 'surprises on quality'.

Inexperienced salespeople invariably start by thinking and talking about 'prices' when money is the last thing they should discuss. They probably reason: "If a buyer's decisions is based on quality, service, and price, how can I prove good quality and service when I am not shipping anything? The only thing left is price." This is not the case in general.

The 'sales force' needs to be told: Never talk about 'prices' with anyone before the actual sales take place, particularly selling your company or what it stands for product quality etc. The purchaser will generally guide the salesperson who really wants to do business with - to the lower price. This is a 'psychological" reason why people buy from whom they want, and make price and other factors comply with the particular sales situation, i.e. they fit the various situations in order to accommodate the new seller.

From my personal sales experience with difficult and expensive products both in India and abroad, I have clearly noticed this aspect of identifying the "seller" himself as well as the "company profile" that I represented. I honestly used to crowd them out with a lot of interesting stories about myself and about the company within the actual context, i.e. in the field of glass or ceramics – rather than talking about 'general' things like price and delivery. Even small stories like some incremental investment on the process itself, such as using 'automatic control' of a given 'process parameter', improvement of the 'service desk', installation of one 'exotic software', etc. would be quite attractive at times. I could talk about myriad of 'successful sales stories' based on these 'human interactions'. This is always appreciated by the customers **[7,8]**.

Selling the Organization →

This is the most appropriate slogan – it is not "selling the product", but "selling the organization". So, it is better to make it clear at the beginning. In any sales event, there should be extensive planning and this is particularly true for creating new "accounts". In a planned sales approach, the seller must appeal first to a buyer's rational side or rather what the buyers want to hear. The question is: How to go about it or rather how we plan about it? It is quite important that buyers need to be sold on the proposition that the 'seller company is the type of organization' that the buyer might like to do business with. They have to be convinced that the seller company can and will supply them efficiently without any type of default.

On a production system, the last thing the buyer wants is some kind of "disruption" in its operation, and hence a solid reasoning has to be put up by the sales manager or the seller in this regard – of course with some solid real-life examples that is definitely a "must". This is of utmost importance for new accounts to be created – as developing that level of 'trust' for efficient delivery is quite challenging – but one has to do it with 'tenacity and care', and of course with sincerity. This is also important in the initial stage of convincing. Once the "trust" is created, the limit is quite high in sales volume or acquisition of new customer segment in the overall sales scenario. It should be clearly noted that initial efforts sometimes appear difficult, but tenacity ultimately wins the day.

Very often, the senior sales managers are in some kind of a dilemma: whether "new acquisition" is important or the addition of "new sales volume" is important. This is a difficult problem, but it depends on many issues: such as (a) Geographical area where one likes to put its footprint – drawn with the "strategic" insights, (b) Some inside information that the present seller is defaulting on right quality of product at the right time or a just-in-time (J-I-T) delivery – authenticity of the information needs to be checked, (c) the buyer wants to expand its production base with new investment - very unlikely in the present situation of market glut, but some kind of a similar situation, etc. A chart analysis has to be produced to chalk out the merits and demerits of such an important decision. Good data management with good analysis sometimes help in this kind of challenging decisions in challenging times.

At this sensitive stage: Is it very important to say all what you want to convince the buyer? The answer is a big "No". It is also important for the salespersons to see and watch the reaction of the buyer – where the buyer already seems to be sold on such ideas. The indicators are mainly: (a) Body language, and (b) Buyer asking easier questions on the entire gamut of discussion. Here, a confusing signal might be created in that the buyer may also ask some difficult questions – but the salesperson must not loose sight or rather remain 'focussed' and they should very boldly try to answer those typical questions or arrange to get them answered within a shortest possible time limit. Ultimately, the buyers need to feel confident that all details will be handled as trouble-free as possible.

One key point to remember that existing customers are important to be sustained in a difficult economic

scenario, but getting 'new customer accounts' in these times are more challenging. A salesperson for his company's good as well for his own good future prospect must do new things in an excellent manner without any fault. This is a motivational approach, many senior 'sales managers' somehow fail to implement, when needed **[8]**.

Last but not the least important, another point needs to be highlighted here. Sometimes, a customer needs to divide the total purchase into two parts. The bigger part generally goes to the existing supplier and the smaller part has to be grabbed as a new account. Here also the efforts have to directed, as enumerated above, by doing good homework and then do all that is needed in an excellent manner **[7,8]**.

Finally, many things could be said on sincerity, tenacity, crisp documents preparation for better absorption by clients, etc. But all is well, that ends well – that's the age-old dictum that we should not forget along with a massive dose of motivational approach.

CONCLUSIONS

In a difficult and challenging times of economic activity, the business of float glass or even container glass for institutional sales needs to gear up its selling approach. Out of many proven approaches, one technique stands apart, i.e. highlighting one's company profile as well as the profile of the salesperson need extra polishing. This has to be supplemented with a lot of motivational approach along with little more expenses (if needed) to make the acquisition strategy of newer customers more effective and result-oriented.

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Toughened or Tempered Glass (Part I) General

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Abstract

By keeping the surface of a glass plate or glass sheet under compressive stress and the interior of the glass just below the surface under the tensile stress, glasses are toughened or tempered so that they do not break into smaller uneven sharp pieces to cause damage to our body. The high compressive stress on the surface with the tensile stress in the interior of the glass generates strength in the glass piece and also the manner of breakage under external impact or force. In this short 'general' article, basic ideas on toughening will be presented with some applications to highlight the importance of this particular part of the manufacturing process of tempered glass. In the part II of the paper, the theory of tempering or toughening will be discussed.

INTRODUCTION

First of all, it should be clarified that there are different ways of generating or increasing strength of a glass that is required in many applications in our day-to-day life and some of these usages are of great importance. One well-know and well-proven method is by toughening the glass so that it has higher strength and other characteristics when broken into pieces. Moreover, there can be two types of toughening: namely, (a) Thermal Toughening or tempering that will be discussed here, and (b) Chemical Toughening coupled with Ion Exchange that will be separately discussed in a future article.

Generally, tempered or toughened glass is a type of safety glass processed by controlled thermal or chemical treatments to increase its strength compared with that of a normal as-annealed glass. When the glass piece is subjected under thermal treatment, called tempering, it puts the outer surfaces of the glass plate under compressive stress and the glass interior under tensile stress. The interplay of these two types of forces, i.e. compression and tension, causes a kind of resistance to the surface towards external forces, which means the "overall strength" of the glass is increased. Such stresses cause the glass, when broken, to crumble into smaller granular chunks - instead of splintering into sharp nails-like pieces as the plate glass under normally as-annealed condition does. The granular chunks are less likely to cause injury, i.e. less harmful to the human body, when present near to such a situation.

As a result of its safety and strength, tempered glass is used in a variety of demanding applications: including vehicle windows – both in passenger and commercial vehicles – and it is also the most well-known application. But it has many other applications, such as:

a) Shower doors,
b) Architectural glass doors and tables,
c) Refrigerator trays,
d) Mobile screen protectors – the most recent important application,
e) Bulletproof glass (as a component),
f) Diving masks used 'under the water' exploration, and
g) Various types of plates and cookware.

Generally speaking, in the automobile sector, it is unthinkable to use a normally annealed glass panel in the front and rear of the car. If there is an accident, the glasses will break into small sharp pieces that could be fatal both for drivers and others in the car. It is true for many other situations, when broken or shattered glass by some external impact or force could cause unforeseen damage to the humans. So, the concept of tempered glass was invoked many years ago to help mitigate this situation. Typical glass panel for the rear of a car is shown in the figure.

Figure 1: Tempered glass of a car rear window. Variations in glass stress are clearly seen when photographed through a polarizing filter (lower picture)

The History →

First of all let us briefly talk about the history of toughened glass. In 1874 at the age of 44 years, a French man - called F. B. A. Royer de la Bastie - in Paris first developed a method of tempering glass by quenching almost molten glass in a heated bath of oil or grease, and this method was patented in England in the same year **[1]**. Tempered glass is sometimes known as '*Bastie glass'* after 'de la Bastie'. Three years later, in 1877, F. Siemens in Germany developed a different process, sometimes called compressed glass or Siemens glass, producing a tempered glass stronger than that produced by the 'de la Bastie process' by pressing the glass in cool moulds. The first patent on the whole process to make tempered glass was held by a chemist known as R. A. Seiden who was born in 1900 in Austria and emigrated to the USA in 1935 **[2,3]**.

Although the underlying mechanism was not known at the time, the effects of 'tempering' glass have been known for centuries. In about 1660, Prince Rupert of the Rhine brought the discovery of what are now known as «Prince Rupert›s Drops» to the attention of King Charles II. These are teardrop-shaped bits of glass which are produced by allowing a molten drop of glass to fall into a bucket of water, thereby rapidly cooling it. They can withstand a blow from a hammer on the bulbous end without breaking, but the drops will disintegrate explosively into powder if the tail end is even slightly damaged.

Strength of Tempered Glass →

First of all, it should be made clear that glasses are brittle materials and hence they easily break. For practical applications of container glasses for the packaging industry, however, the mechanical strength is very important. It is also important for their marketability. It appears from a vast amount literature data that there is a considerable amount of work done on fracture, the effect of micro-flaws on fracture, the effect of fracture strength on the overall mechanical behaviour of glasses, etc. The sheer number of papers on this subject justifies its importance. Thus, the study of fracture on glasses assumes special significance for the mechanical properties **[4]**.

In a previous article on "Theoretical Strength of Glasses" in Kanch **[5]**, the problem of theoretical strength in glassy materials was discussed in the context of Griffith formalism by taking fluctuation in spatial elongation near the maximum value of applied stress. In this manner, the theoretical strength could be predicted by a multiplication factor, when micro-flaws are present in glasses. The mechanical properties in terms of fracture of such glasses are also of great importance, as they are mostly used in the building industry and façade decoration purposes, wherein fracture in any form can cause damage to the installation that will result in a loss of the investment made.

Although the present article deals with the problem of increasing the strength of glasses by tempering process, the importance has to be given to the "float glasses", as these glasses have aesthetic appeal with the highest quality requirements so far the glass industry is concerned **[6]**. This short discussion is needed to understand the behaviour of flaws in glasses whose strength increases on thermal toughening **[7, 8]**.

It is known that "tempered" glass is physically and thermally stronger than normal as-annealed glass. The greater contraction of the inner layer during manufacturing induces compressive

stresses on the surface of a glass that is balanced by tensile stresses inside the body of the glass. In order to consider a glass piece as 'tempered', this compressive stress on the surface of the glass should be a minimum of 69 Mega-pascals (i.e. 10,000 psi). For this glass to be considered a "safety glass", the surface compressive stress should be considerably higher and exceed 100 Mega-pascals (i.e. 15,000 psi). As a result of the increased surface stress, if the glass is ever broken it only breaks into small 'circular' pieces as opposed to sharp nails-like pieces that is harmful for the human body. This characteristic makes tempered glass safe for high-pressure and explosion proof applications.

It is this compressive stress that gives the tempered glass increased strength. This is because the annealed glass, which has almost no internal stress, usually forms microscopic surface cracks that cannot be seen through naked eyes. In the absence of surface compression, any applied tension to the glass causes tension at the surface, which can drive crack propagation. Once a crack starts propagating, tension is further concentrated at the tip of the crack that causes it to propagate at the speed of sound in the material. Consequently, the as-annealed glass is fragile and breaks into irregular and sharp pieces **[9, 10]**.

If any cutting or grinding needs to be done on the glass piece, it has to be done prior to tempering. Cutting, grinding, and sharp impacts after tempering will cause the glass to fracture. This kind of operation accelerates the small cracks to open up and propagate on the surface. The strain pattern resulting from tempering can be observed by viewing through an optical polarizer, such as a pair of polarizing sunglasses.

For a given application, whenever we need to consider the strength, thermal resistance, and safety to be important, we definitely tend to use tempered glass. For example, for passenger vehicles, we have all these three requirements. Since they are stored outdoors, they are subject to constant heating and cooling as well as drastic temperature changes throughout the year. Moreover, they must withstand small impacts from road debris such as stones as well as automobile accidents.

As large and sharp nails-like glass pieces would present additional and unacceptable danger to passengers, tempered glass is used so that if broken, the pieces are blunt and mostly harmless. It is the common practice that the windscreen or windshield is instead made of laminated glass, which will not shatter into pieces when broken -- while 'side windows' and the 'rear windshield' are typically tempered glass, as shown in the above figure. For curved glass shapes that are typically needed at Airports, the figure shows a beautiful portion of an Airport, designed by NorthGlass Co. in Shanghai.

There are different investigations to understand how flaws affect the stress at which a material will fracture. All materials contain defects, and in brittle materials such as glasses, these defects act as tiny pre-existing cracks, which could propagate through the material to cause fracture. The propagation of these cracks is dependent on an energy balance, which leads to a critical crack length. The stress at which a glass fractures depends on the size of the largest flaws present, i.e. the larger the flaw, the lower the fracture stress. For commercial soda-lime-silicate glass, the behaviour is dominated by the surface defects, and the condition of the surface of the glass controls its strength. If steps are taken to remove or avoid the presence of defects, then the glass can be very strong. However, without special precautions, the strength of the glass is rather low and can show substantial statistical variations.

The Disadvantages →

After having written about the strength of tempered glass, it is important to talk about some disadvantages. One example is that the 'tempered' glass

Figure 2: NorthGlass Co. has undertaken a processing project on tempered curtain wall glass giving rise to fulfill their aviation dream

must be cut to size or pressed to shape before tempering, and cannot be re-worked after the tempering process is completed. Polishing the edges or drilling holes in the glass is carried out before the tempering process starts. Due to the balanced stresses in the glass, damage to any portion will eventually result in the glass shattering into thumbnail-sized pieces. The glass is most susceptible to breakage due to damage to the edge of the glass, where the tensile stress is the greatest. However, shattering can also occur in the event of a hard impact in the middle of the glass pane or if the impact is concentrated. For example, this could occur when striking the glass piece with a hardened point.

Moreover, 'tempered; glass can also pose a security risk in some situations due to the tendency of the glass to shatter completely upon hard impact rather than leaving some residual broken pieces in the window frame. The surface of tempered glass normally exhibits "surface waves" that are caused by contact with flattening rollers, if it has been formed using this process. This waviness is a significant problem in manufacturing of thin film solar cells. Here, the float glass process is useful in providing low-distortion sheets with very flat and parallel surfaces as an alternative for different glazing applications.

CONCLUSIONS

Some general features of thermally toughened glass has been defined and described in terms of strength with some details on applications. Although the main application on rear car window has been described, other important and evolving applications will be discussed in a separate article. The strength of such toughened glass has been described and more details will be given on the Part II of the article.

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About

The All India Glass Manufacturers' Federation

The All India Glass Manufacturers' Federation was founded in 1944. The Federation is made up of five Regional Associations viz.

Eastern India Glass Manufacturers' Association **(EIGMA)**-Kolkata

Northern India Glass Manufacturers' Association **(NIGMA)**-Haryana

South India Glass Manufacturers' Association **(SIGMA)**-Hyderabad

Uttar Pradesh Glass Manufacturers' Syndicate **(UPGMS)**-Firozabad and

Western India Glass Manufacturers' Association **(WIGMA)**-Mumbai

The Federation was incorporated under the Companies Act, 1956 (No. 1 of 1956) as a Limited Company on 15-6-1970.

The main aims & objectives of the Federation are:-

- To encourage, promote and develop the manufacture of glass articles of all kinds and to safeguard and protect the interests of glass industry and glassware business in India.
- To form a common link amongst Glass Manufacturers' in India and thus develop a spirit of mutual help and cooperation with one another.
- To promote the study and research in Glass Technology.
- To consider all matters relating to the manufacture and marketing of glass articles in India and the question of export and import thereof.
- To devise ways and means for securing necessary supply of raw materials required for the manufacture of glass articles at comparatively lower prices and thus to decrease the cost of production and increase the national wealth.
- To collect necessary information and data and propagate it for the benefit of Glass Industry and trade in India.
- To make representations whenever necessary to the Union Government or any unit of the Union of India for the removal of difficulties that might hamper the trade of glass articles or for grant of special facilities for the Glass Industry.
- To draw Government or public attention to the difficulties in the way of Glass Industry and to solve other problems confronting it and to solicit their help and support through concerted action.
- To organise a united front on behalf of all glass manufacturers and thus strive to gain all those advantages which may not be possible through individual effort.

All those engaged in the manufacture of glass and glass articles are enrolled as **Ordinary Members** of the AIGMF and those associated with the Glass Industry are enrolled as **Affiliate Members** of the Federation.

Almost all glass manufacturers including many in the small scale sector are 'Ordinary' Members of the Federation.

Articles of Association of the AIGMF were amended in September 1992 to enroll foreign companies as Affiliate Members of the Federation ■

Status Lighting Delivers Safety and Life Cycle Benefits

The latest generation of IS machines can be equipped with sophisticated status lighting to provide enhanced safety, while also increasing mould life expectancy. As Wilfried Seidensticker explains, the status lighting is a coloured RGB-section lighting that colour changes depending on the current status of a section.

In addition to providing pure white light illumination for the blank side, Heye International also offers colour status lighting for its latest generation of SpeedLine IS machines. This colour status lighting (coloured RGB status lighting with an option for white lighting) has been supplemented by a further function that, in addition to its security benefits, also significantly increases the usefulness of this option. This enhancement relates to the equipment's lubrication (swabbing) cycle.

Effectively, the lighting is mounted in the blank side control panel and in its simplest form (white light only), illuminates the section for work that needs to be undertaken there, including job changes, equipment exchanges etc. Initially, the coloured RGB status lighting with an option for white lighting took into account the opportunity to increase operator safety. With the coloured lighting, the operator can visually identify the different operating states of the machine/section.

Without illumination, the section is in normal production mode. By a further defined assignment of different colours, the operator is shown further possible operating states. This includes:

- Section stop activated
- Start phase (reset actuated)
  Start up and operation without gobs
- Special 'cold blank mould' programme

- No communication between status lighting and control (failure)
- Special 'lubrication cycle' programme

Which lubrication periods can be selected?

The 'lubrication cycle' function gives the operator additional support when carrying out daily work routines. By blinking in an assigned colour, the function makes it visible that the lubrication of the blank and/or the neckring is necessary after a defined time interval. The time interval can be stored in the HMST (Heye Modular Servo Technology) control, either in the form of minutes or after a certain number of processed gobs.

Can swabbing of neckrings be indicated separately?

The necessary swabbing of both the blank mould and neckring is indicated to the operator by a colour-coded light that flashes in each station. Flashing frequency increases as the specified interval is exceeded.

The flashing is stopped by the operator pressing the 'blank lubricating' button, before lubricating the blank mould and/or the neckring and pressing the button again, returning the station to the operating state. Thereafter, the interval begins to count again, until re-lubrication of the blanks or neckrings is displayed again.

Which IS machines can be equipped with status lighting?

Coloured RGB status lighting with white lighting option is available for all SpeedLine IS machines that are equipped with modern machine control and HMST control.

Via this added safety benefit, the operator has access to another useful tool to support daily work routines in a simple way. Furthermore, by maintaining a regular lubrication interval, optimum mould lifetime is guaranteed ■

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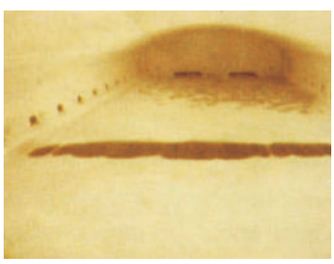







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Firozabad (Suhag Nagari) Glass Manufacturing Cluster

Study Survey with an innovative perspective of Energy Economics, Environment and Human by Vaishali Rajput and Raj Kumar Prince (Students of M.A. in Energy Economics, Department of Economics, BHU, Varanasi)

PREAMBLE

Firozabad is glass manufacturing cluster in India traditionally well known as "Suhag Nagari" with more than 300 medium, small and cottage level glass production units manufacturing a large variety of glass products ranging from Container glass, handicrafts, homeware, tableware to other products. Unlike large manufacturing glass plants with standard monotonous process, one would be fascinated to see large variety of glass manufacturing processes depending on the type of glass products, their operation methodologies and manufacturing capacity. In comparison to large glass manufacturing plants with developed technologies, automation and control, the glass manufacturing units at Firozabad mostly work on indigenously developed engineering skills with minimum automation and control. However, due to use of semi-automatic and manual operation, these industries are employing men and women in very large number and are major source of their livelihood. This Glass Cluster is very near to Taj Mahal (Agra), within Taj Trapezium Zone (TTZ) and thus work under strict environmental norms due to serious environmental concern. On one hand the government puts many restrictions as per the ruling of the Supreme Court since 1996 and on the other hand facilitates by making availability of piped natural gas (PNG) as fuel at a subsidised rate and establishment of Centre for Development of Glass Industries (CDGI) for technological support under Ministry of Small and Medium Enterprises (MSME).

A holistic development entails inclusive growth of all the sections of the society. Along with the Industrial,Technological and Business development it includes the economic growth, sustainability with the environment and balanced livelihood of all the stakeholders. Thus, Economic, Environment and Human perspective is very important for overall inclusive development. Focus on energy has grown in recent times. Saving energy not only saves money, it saves environment and is good for human well-being. In various forms it is a key factor for various activities in life as well as industry. Energy needs of today and tomorrow profoundly shapes the economy. Energy creation requires burning of fuel, liberates heat and emissions, affecting the environment. Thus, a manufacturing and developmental study of glass manufacturing with an innovative perspective of energy economics, environment and human is the need of the hour, particularly for the energy intensive glass manufacturing units in Firozabad (Uttar Pradesh), which employs a large population from within and surrounding areas.

Department of Ceramic Engineering, Indian Institute of Technology (BHU) Varanasi established in 1924 is a pioneering Institution known for glass education and research. Department of Economics, Banaras Hindu University, Varanasi has started a Master's degree course in Energy Economics under umbrella of BRICS Network University (BRICS-NU). It is having a sister course in Moscow School of Higher Economics. BHU is one of the two universities in the BRICS group of countries that are leading the academic activities in the Energy Sector and running this course. Under a collaboration program between the two departments Ms. Vaishali Rajput and Mr. Raj Kumar Prince, students of MA in Energy Economics have taken up a summer project on the aforementioned study under the joint supervision of Prof. Devendra Kumar, Professor and Head, Department of Ceramic Engineering, IIT (BHU) and Prof. Mrutyunjaya Mishra, Department of Economics, BHU, Varanasi. As a part of the internship program the students have done a preliminary survey visit to different Glass Industries and Centre for Development for Glass Industry at Firozabad with a very kind support from The All India Glass Manufacturers Federation (AIGMF), Uttar Pradesh Glass Manufacturers Syndicate (UPGMS) and guidance from Mr. Raj Kumar Mittal, President, AIGMF and UPGMS during June 27-28, 2019. Following is the report from these students:

VISIT REPORT

We (me, Vaishali Rajput and Raj Kumar Prince) were standing at the Bangle making unit (Vardhman Projects), and the site reminded us about the chapter of NCERT class 12th textbook "Lost Spring". There were piles of colourful, bright shining glass bangles around us as we imagined going through that

Manual Inspection of Final Product

Impact test and thermal profile apparatus

school class. Witnessing the complete process of bangle making was a fascinating and delightful experience in itself, from Batch preparation to cutting and bundling of bangles. Fortunately, we got the unique opportunity to visit the city of Glass also known as "Suhagnagri"- Firozabad. Firozabad houses more than 300 medium, small and cottage level glass production units.

The objective of our summer internship project is to map the energy consumption and to look at the energy saving opportunities and potential in any form during the process of manufacturing container glass products. We also focussed on the Environmental measures taken by production units to minimize the pollution in any form. The study also emphasizes at the working condition and ambient atmosphere under which labour work in these units.

We were in the Firozabad for two days, reached in the morning of 27th June after an overnight journey from Varanasi. First day, we visited Bottle Glass manufacturing units. During the visit, we were quite surprised to know that most of the bottle glass manufacturing units were captive power based, using the In-House Electricity generation based on Piped natural gas (PNG). First, we surveyed the container glass units with the common questionnaire having General, Financial, Technical and Energy sections, questions related to them. There we saw the process from feeding the batch material to doghouse through conveyer belt arrangement to melting, refining, and conditioning of glass in Glass melting Tank Furnaces, Distributors. Then Glass gobs were formed into desired product shapes with the help of preheated dye, using both mechanical as well as manual means. After annealing of glass bottles, final packaging takes place after manual inspection of defects. We also saw the in-plant laboratory having gauge to check dimensions of final bottles, apparatus to check impact strength and thermal profile of bottles. The Chief Glass Technologist and other Managers of the plant answered all our queries about the plant operations and made the first day of our visit fruitful.

Second day, we moved to Centre for the Development of Glass Industry (CDGI), an independent institute of MSME Ministry, which is located at Jalesar Road, Firozabad. CDGI is currently playing a role of Technical and Managerial Consultant and Service provider to the Firozabad Glass Industry Cluster. There we had the interactive sessions with Mr. Sanjeev Chinmalli (Principal Director), Mr. Devender Sah (Senior Glass Technologist) and Mr. JP Yadav (Glass Technologist). They appraised us about the improvements in the industry over the decades and how they are working continuously for the improved glass manufacturing process. CDGI is also running a training camp for imparting on-site job skills and Site Safety knowhow to workers and provides hostel facilities for outside participants. While institution has full-fledged laboratories to perform tests and trials, it is expanding its infrastructure to meet future needs.

Firozabad is world famous for its bangles and how could we leave without witnessing the process of making bangles so we visited a bangle making plant of 2-2.5 tonne per day output. This plant had improved pot furnace, with 10 pot sections of 0.5 ton each having glass melt of different colours, similar to the one suggested in 2008 published "Towards Cleaner Technologies" Report of The Energy and Resources Institute (TERI) and Swiss Agency for Development and Cooperation. After taking a gob on the end of a rod it is glazed through "Pakai Bhatti" and homogenised in "Sikai Bhatti" which are natural gas fired furnaces of small capacity. After this process bangles are made using a mechanical roller which draws the glass strings from the softened gob. It was a thrilling experience for us to witness so many different processes taking place in synchronization. Then bangles are sorted, cut from spirals, tied in bundles and then sent further for patching.

Towards the conclusion of our visit, we met Mr. Raj Kumar Mittal, President, AIGMF and UPGMS for an interactive session. After introducing historical evolution of Firozabad Industrial cluster and composition and role of AIGMF, he explained to us current challenges faced by industry

Improved pot furnace in bangle works

in Firozabad. After Supreme Court ruling in 1996 regarding Industries in Taj Trapezium Zone (TTZ), Glass industry at Firozabad has undergone many restrictions. As per SC order to protect 3 world heritage sites in this region – World famous Taj Mahal, Agra Fort and Fatehpur Sikri, it banned use of Coal/Coke in TTZ industries, mandated switch over to Natural Gas and Relocation or shut down of industries. TTZ has also capped the production capacity of all the glass producing units to their pre ruling levels. Environmental norms are refined for TTZ sector.

As per Mr. Mittal, Advantage of subsidised rate of piped natural gas is also disappearing due to new rate formula including rates of both domestic and import gas. Due to capacity capping and other TTZ restrictions, industries of Firozabad cluster are unable to take advantage of Economies of scale, Fuel flexibility and Energy saving Technologies. This has resulted in stagnancy and thwarted investment in the MSME level glass industry of the region. Due to use of Natural gas and production discipline emissions of gases and fugitives are well below environmental norms set by authority. As per him, Industries of the sectors should be incentivised by allowing capacity expansion for following the guidelines, as this will drive the growth of the region and bring prosperity and development. Thriving glass industry is source of abundant direct and indirect employment in Firozabad and surrounding region. He also pointed out poor Government healthcare infrastructure in cluster despite industries paying Employee State Insurance (ESI) properly. He emphasized that workers here, are paid more than minimum wage mandated by state government. While Glass was enlisted in "One District One Product" ODOP Program of state government, there is hardly any benefit accrued to industry yet from it. Firozabad has also exceled in export sector, nearly 2000 crore worth of Handicrafts, Homeware and moulded Glass articles are exported annually from the cluster. There is an Export Association to promote export from the cluster. He mentioned the collaborative effort between CDGI and 63 significant units for monitoring of Environmental emissions.

CONCLUDING OBSERVATIONS

There are certain focus areas like availability of process parameters and record keeping. It would immensly help if all manufacturing firms keep the record of Process Specific Parameters, so that qualitative inferences can be drawn on the basis of them and de-bottlenecking and improvement projects can be taken.

Though the safety gear like helmet, eyeglass, gloves, jackets, etc., have been provided to the labourers they tend to ignore wearing protective gear owing to lackadaisical attitude and hot working conditions. They should be encouraged to wear the safety gear during their shifts as provided to them.

ACKNOWLEDGEMENTS

For such an insightful visit we would like to thank AIGMF, UPGMS, Mr. Raj Kumar Mittal and Mr. K.B. Verma for making our visit fruitful through interactive sessions and giving us opportunity for having this on field experience, providing wonderful hospitality and transportation facility during our visit. This visit gives us a holistic idea about Glass Industry and we also look forward for future associations with AIGMF for more such surveys and studies. It will give us exposure of industry as well as opportunities there in to learn ■

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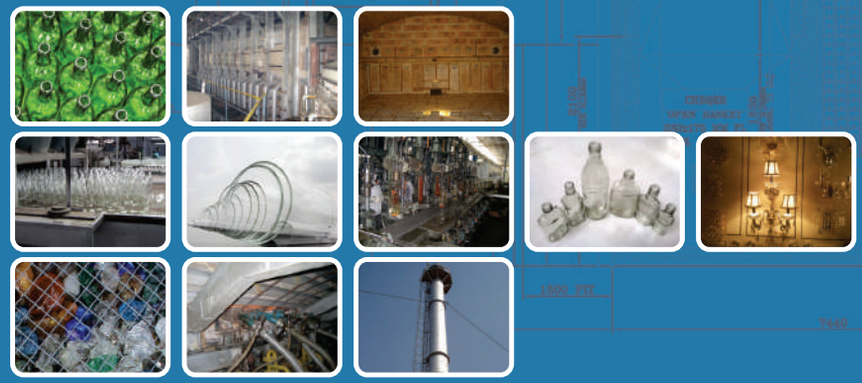

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