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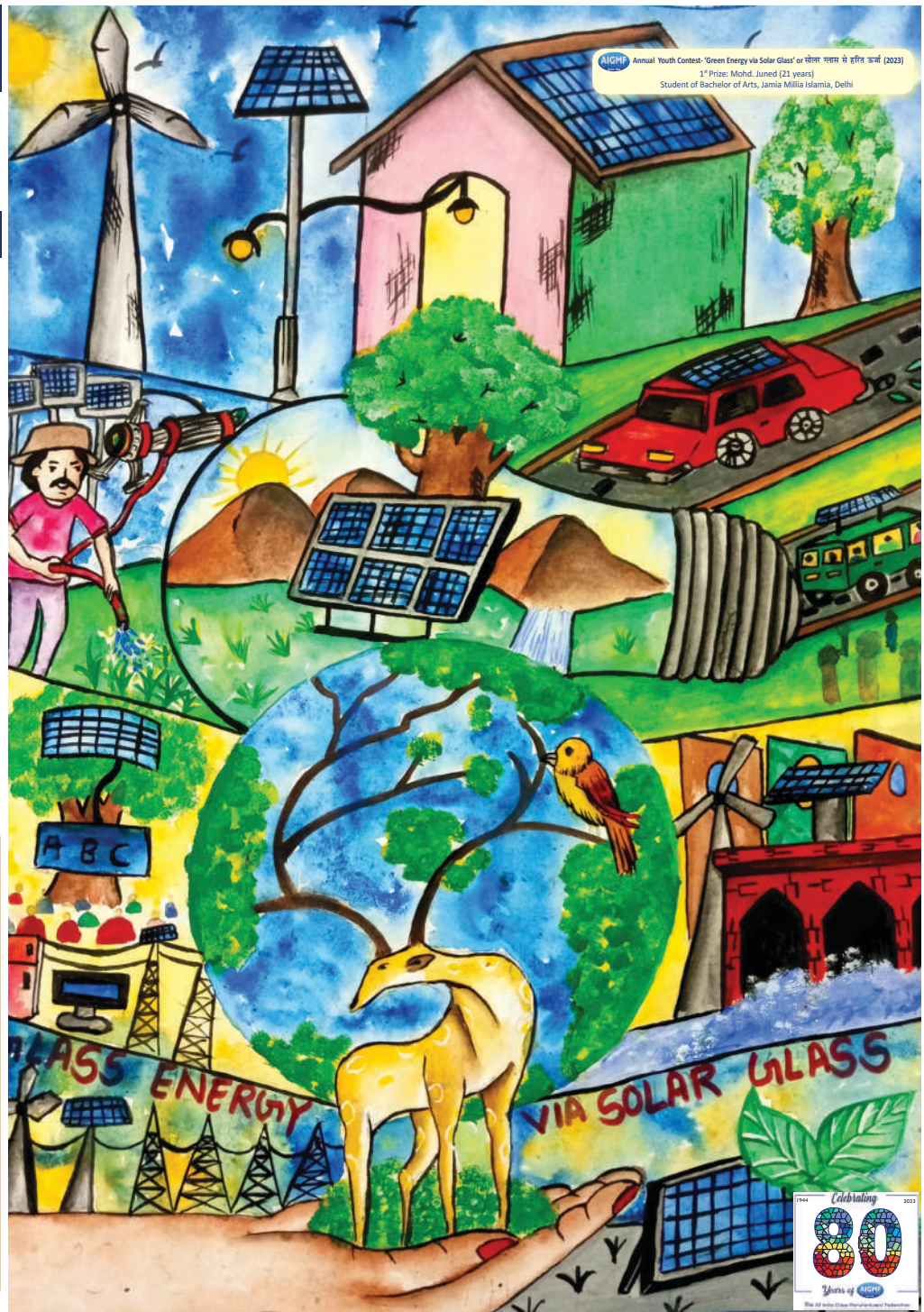
14th AIGMF International Conference

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- Synopsis of Select Papers (page # 9)

Special Feature

- Monitoring Methods for New Melting Technologies
- Decarbonisation in Glass Machinery Manufacturing
- Glass Industry celebrates success with Youth and Manufacturers'
- National Workshop on Ascertaining a Skill Centre for Glass and Glazing
- On the Spot... Pawan Kumar Shukla
- Seeing the Light
- Glass News
- Students upbeat on Tapping Green Energy via Solar Glass

इस पोस्टर के अंतर्गत सोलर ग्लास से प्राप्त होने वाले लाभों को दर्शाया गया है। सोलर पैनलों का इस्तेमाल करके सूर्य की ऊर्जा के माध्यम से बिजली (ऊर्जा) का निर्माण किया जा सकता है। इस ऊर्जा से पर्यावरण स्वच्छ व हरा-भरा रहता है। कारों, बसों को भी सौर पैनल के द्वारा रिचार्ज कर सकते हैं। खेतों में मोटर चलाने, घर और सड़कों पर बिजली के लिए भी सोलर ग्लास का प्रयोग किया जा सकता है। बाँध से पानी छोड़ने, कंपनियों की ऊर्जा सुधार व जीव-जंतु संरक्षण हेतु भी सोलर ग्लास आवश्यक है। गांवों में टी.वी., फ्रिज, पंखा, कूलर आदि चलाने में सहायक है।





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T: +91 11 2331 6507 E: info@aigmf.com

Editor MOHAN LALVANI

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

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From President's Desk

Dear friends,

Glasspex and Glasspro exhibitions are being staged from Sept 14-16, 2023 at Bombay Exhibition Centre, Mumbai once again after 4-long years. There is a great enthusiasm amongst Industry Members to get together and learn about the latest technologies and develop new partnerships.

I am happy to inform you that AIGMF and Glass Worldwide would once again be sharing joint stalls at the Glasspex exhibition. Mr. Dave Fordham, his team from Glass Worldwide London and AIGMF Secretariat would be available throughout; and from their joint booth # A41.



As a parallel event; in partnership with Glass Worldwide (*official international magazine and Honorary Member of the AIGMF*), Messe Dusseldorf and powered by glasstec 2024, experts from world over would be re-uniting at Mumbai at AIGMF's 14th International conference on "Decarbonization for the Sustainable Glass Industry" on Sept 15 at Dress Circle (above The Grande), Bombay Exhibition Center, Goregaon (E), Mumbai. The conference will start at 1045 hrs and is likely to be over by 1400 hrs over the networking lunch. At the conclusion of the conference, a special presentation has been kept on glasstec 2024. An updated copy of the program is available at www.aigmf.com

A one-day national workshop on ascertaining a skill centre for glass and glazing was organized by the Department of Applied Physics, Delhi Technological University at their campus on August 11, 2023. The whole idea was to bring Industry and Academia together which was initially discussed at the Glass & Glazing Knowledge Forum (GGKF) in early July, where members were of the view to ascertain and establish a training center for Glass and Glazing at DELHI NCR. GGKF represents following industry associations: FOSG (Federation of Safety Glass), GSI (Glazing Society of India), CCPS (Confederation of Construction Products and Services), UWDMA (uPVC Window & Door Manufacturers Association), Glass Academy and AIGMF (The All India Glass Manufacturers' Federation).

Under the banner of the International Youth Day an Industry meet was organised at AIGMF's Annual General Meeting at Hotel Lemon Tree, Aerocity, DELHI on August 26. The program provided an excellent platform to honour Youth of the country who participated in AIGMF's annual contest on 'Green Energy via Solar Glass' or सोलर ग्लास से हरित ऊर्जा। The contest was made open to Youth between 7-24 years who were asked to submit online entries by means of drawings, photos, poems, essays, technical articles etc. Hundreds of entries were received from schools and colleges across India. Winning entries may be viewed at www.aigmf.com

1st Prize (Rs. 25,000) was given to Mohd. Juned aged 21 years, a student of Bachelor of Arts, Jamia Millia Islamia, DELHI. 2nd Prize (Rs. 15,000) was given to Sarthak Kumar aged 15 years, 10th class student of Sant Nandlal Smriti Vidya Mandir, Ghatshila, JHARKHAND. 3rd Prize (Rs. 10,000) was given to Sparsh Tejwani aged 21 years, a student of MSc. Economics with BTECH EEE, BITS Pilani, RAJASTHAN.

The prestigious annual CK Somany Award for Innovation and Technology was given to Er. Pulkit Gaur, Chief Technology Officer, Gridbots Technologies.

The Balkrishna Gupta Award for Exports was bestowed to Schott Glass India Ltd. Both awards are supported by Glass Worldwide, preferred international journal of the AIGMF in association with Kanch■

Sanjay Agarwal

President AIGMF and
Director, Kwalty Glass Works, Firozabad



The All India Glass Manufacturers' Federation

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presents

14th International Conference on:

“Decarbonization for the Sustainable Glass Industry”

15 September 2023

at Dress Circle (above The Grande), Bombay Exhibition Center, Goregaon (E), Mumbai, INDIA

TIME (hrs.)	TOPIC/s	COMPANY	SPEAKER
1000	Registration / Tea / Coffee		
1045	Opening Address By Mr. Sanjay Agarwal , President AIGMF Introduction of Speakers and Need for Decarbonization By Mr. Dave Fordham , Publisher, Glass Worldwide magazine and Honorary Member AIGMF		
1100	Accelerating International Capability for a Circular Economy	GLASS FUTURES Ltd.	Mr. Neil Butler Global Innovation Lead
1120	The Future of Glass Furnaces in a Decarbonized World	FIC (UK) Ltd.	Mr. Steve Burns Technical Manager
1140	New Melting Technologies require updated Refractory Monitoring Methods	PANERATECH	Mr. Fred Aker Vice President
1200	Renewable Energy is only a small piece of the Puzzle when Designing all-Electric Forehearth for a Carbon Neutral Future	ELECTROGLASS	Mr. Grahame Stuart Project Engineer
1220	In-Furnace Thermal Imaging for Process Optimization for Energy Reduction and Asset Protection	AMETEK Land	Mr. Philippe Kerbois Global Industry Manager - Glass
1240	Your Vision for Sustainable Glass Melting - Our Tools	EMISSION by SORG Group	Mr. Matthias Haas Associate Director
1300	QUESTION ANSWER SESSION Moderators: Mr. Dave Fordham & Prof. A S Rao , Head, Department of Applied Physics, Delhi Technological University and Member Editorial Board of KANCH (quarterly journal of AIGMF)		
1310	Wrap-up By Mr. Shreevar Kheruka , Vice President AIGMF and Vice Chairman & Managing Director, Borosil Ltd.		
1315	Presentation on glasstec 2024 By Mr. Lars Wismer , Director Occupational Safety & Health / Glass Technologies, Messe Düsseldorf GmbH		
1340	Vote of Thanks By Mr. Rajesh Khosla , Sr. Vice President AIGMF and CEO / President AGI Greenpac		
1345	Networking Lunch*		

*Participation is free, however, eco-kit bags, glass mementoes and lunch have a registration fee payable, with details given at www.aigmf.com

Program as on Sept 5



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PARTICIPATION: Free of charge

However, those requiring an official kit bag, glass mementoes and lunch may register under the following:

Delegation Fee	Indian Companies (Rs.)	Foreign Companies (US\$)
Main Delegate	4000	150
Other Delegates	2000	100
Corporate (Main delegate + 4 delegates)	10000	350

Cheque 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.

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THE ALL INDIA GLASS MANUFACTURERS' FEDERATION

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Focus India

On the Spot... Shreevar Kheruka

Managing Director Shreevar Kheruka outlines Borosil's expansion plans to cater for increased demand across its diverse solar glass, consumer productions and life sciences divisions in an exclusive interview with Glass Worldwide, preferred international journal of the All India Glass Manufacturers' Federation (AIGMF).

Q: Following the last passing last December of Borosil Executive Chairman M. B. Kheruka, what legacy do he leave behind within the company and the wider glass industry?

Q: What is the progress of the new brownfield solar glass plant being constructed at Borosil's Pune facility in Gujarat?

Q: What are the high-light investments?

Q: Following the doubling of Borosil Renewable's capacity in 2019 and a further successful upgrade and expansion project in 2021, what is the motivation for the latest significant increase?

Focus India

Indian glass industry bounces back

Ahead of glassplex India and the concurrent AIGMF 14th International Conference, Sunder Singh reports on recent activity in the Indian glass industry and considers the rising demand for its flat glass and container products in this feature for Glass Worldwide, preferred international journal of the AIGMF.

Macro factors indicate that Indian glass industry is expected to do well in short and medium term. With a GDP growth rate of 6.7%, India was the fastest growing major economy in 2022. According to IMF projections, the Indian economy is expected to grow by 6.7% in the current year and by 6.8% in 2024. Steady economic growth, increased foreign investment and the rapid pace of urbanisation, are leading optimistic forecasts for further strong growth in consumption (having a direct impact on container and automotive glass) and construction (which drives architectural and float glass demand).

India's construction sector has registered very healthy growth rates during the last two calendar years. Following increases of 18% in 2021 and 10.8% in 2022, total investments in construction are expected to reach US \$600 billion in 2023. Civil engineering leads the form ahead, but the major driver of architectural glass demand - the residential segment - accounts for almost one fifth of the total and continues to register double-digit growth rates. During January to March 2023, housing sales reached their highest level at any time in the past decade, driven by increased demand not only in Tier 1 cities but also in Tier 2 and smaller towns due to the rise of the middle classes and the Indian government's efforts to develop industry and infrastructure links within and between the major cities.

In early 2023, India has become the world's most populated country. It has surpassed China and is now the most populous country in the world, according to a United Nations Population Fund (UNFPA) report filed 'The State of World Population Report, 2023'. The report indicates that India's population is 1,426.9 billion while China stands at 1,427.1 billion, making a difference of 2.9 million.

The report shows that 26% of India's population falls within the age group of 0-14 years, 18% of people are aged 15-64 years, 20% are aged 15-24, 68% are aged 15-64 and 7% of the population are older than 65. Conversely, 17% of China's population falls within the 0-14 year age bracket, 12% are aged 15-19 years, 18% are aged 15-24, 69% are aged 15-64, and 14% are over the age of 65.

India's demographic advantage - its young population - is a consumer driven economy will be a significant factor in driving development and will present an enormous opportunity for the country's flat, container, and laboratory glass industry.

Container glass
The Indian container glass industry saw a marginal increase in total capacity over the last 18 months, both AGI Glasspac and BGCCT India augmenting their resources.

Furnace
AGI Glasspac's Bhongir facility operates alongside the company's 6000t glass plant in Hyderabad. The company has

Focus India

New furnace brings speciality glass opportunities

Investment in a 154tpd clear glass furnace and five production lines at AGI glasspac's Bhongir manufacturing facility will enable the company to export Glass Worldwide, preferred international journal of the All India Manufacturers' Federation (AIGMF), spoke exclusively to Rajesh Khosla, AGI's President & CEO about the company's entry into the speciality glass sector.

AGI Glasspac's recent INR 400 crore (US\$2.2 billion) investment at its Bhongir facility will provide substantial opportunities for the Indian glass manufacturer. Not only will it expand the company's capacity to produce glass for export, according to the company's President and CEO Rajesh Khosla:

"AGI glasspac's entry into the new segment of manufacturing specialty glass is a strategic decision. It will allow us to cater to the much-requested premium automotive, premium optics, food and beverage as well as water bottles and other niche products. The facility has been set up in line with the company's 'Make in India' and 'Atmanirbhar Bharat' (self-reliant India) vision. It will help to reduce dependency on imports, as well as various industries to get the glass products from local sources. The company is looking to the government for incentives to the tune of 15-18% by 2023-25."

Phenolics
Like the rest of the world, AGI glasspac had to grapple with the problems caused by Covid-19, production of the chemical products with the production of the chemical products to support the automotive and to grasp what a world meant for their customers. A lot of capital investment programmes due to their heavy company.

"Their heavy investment in infrastructure and their investment in the plant of Covid-19 and related regulatory measures, and there was this to be prudent to help companies understand what the industrial future looked like and how they can be better prepared for the future. The Bhongir facility has a capacity of 154tpd, or the equivalent of 2 million 200 lakh containers and bottles per day. From its five manufacturing lines, it will access 15 containers to cater to the requirements of sectors such as food and beverage as well as water bottles and other niche products. The facility has been set up in line with the company's 'Make in India' and 'Atmanirbhar Bharat' (self-reliant India) vision. It will help to reduce dependency on imports, as well as various industries to get the glass products from local sources. The company is looking to the government for incentives to the tune of 15-18% by 2023-25."

The report of the local 'Taj Group' is the most recent in the industry of Covid-19. It is not only the industry of Covid-19, but also the industry of the last stage to allow the industry to continue their production from May 2020 onwards, when many reactions occurred. AGI has received approximately INR 16 billion (US\$20.8 million) in its facilities in Hyderabad and is keen to invest further, where the investment is made by the company. One interesting company has been put in place for a 710 crore (US\$1.3 billion) expansion in the field of India.

Pick up free copies of Glass Worldwide and Kanch from our stand and visit www.glassworldwide.co.uk for the latest Hot Topics news, Virtual Marketplace showcase and much more!

Synopsis of Select Papers to be presented in 14th International Conference on: "Decarbonization for the Sustainable Glass Industry"

(Sept 15, 2023)

Accelerating International Capability for a Circular Economy

Mr. Neil Butler has worked in the global glass industry for over 35 years, holding various technical and commercial roles with Pilkington / NSG, Schott, Vesuvius, Glaston and Fives.

Having worked across all sectors including float, container, fibre and optical glass he is excited to bring his experience and knowledge to the greatest challenge facing our vital industry, sustainability and decarbonisation.

Glass Futures is ideally positioned as a research and technology organisation to help the global glass industry collaborate to solve the problem not only of an energy intensive manufacturing process but also to address issues around logistics, recycling and the entire circular economy model.

Neil Butler

Global Innovation Lead
Glass Futures

neil.butler@glass-futures.org



Introducing the structures, capabilities and ambitions of Glass Futures to bring together its members, partners and stakeholders from across the global industry to accelerate R&D and innovation to make glass a truly circular product.

This will involve not only manufacturers and end users but also brand owners in food/beverage, automotive and construction as well as waste collection/management and government organisations working collaboratively to close that glass loop.

The Future of Glass Furnaces in a Decarbonized World

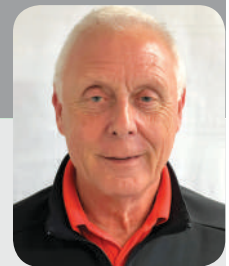
Mr. Steve Burns joined F.I.C. (UK) Limited in November 2008 as Technical Manager following a long career with controls suppliers such as Eurotherm and Honeywell.

Since joining F.I.C. Mr. Burns has led the in-house team in the development and advanced control systems utilising the latest technology available to increase FIC's visibility as an advanced technical supplier of heating solutions for the de-carbonisation of the glass industry at large.

Steve Burns

Technical Manager
F.I.C. (UK) Ltd.

s.burns@fic-uk.com



WHAT WILL GLASS FURNACES LOOK LIKE IN THE FUTURE?

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Electric-melting is already well established for smaller furnaces as vertical melters up to a maximum of around 300 tpd. The paper will examine how furnaces larger than this can use electricity as the main fuel, up to a maximum of approximately 80%, and how the industry can transit from conventional horizontal melters to hybrid which are electrical horizontal melters in an economic transition.

New Melting Technologies require updated Monitoring Methods

Mr. Fred Aker has been active in the glass industry; his entire career was with his father and grandfather. Mr. Aker joined SORG in 1985 to implement their first CAD system. Later roles included managing SORG's interest in a joint venture with HFT.

Fred Aker

Vice President
PaneraTech

fred.aker@paneratech.com



In 2011, Mr. Aker took over marketing activities for the SORG Group. Later, Mr. Aker led one of two sales teams at SORG primarily active in North and South America as well as numerous key accounts globally.

In 2019, Mr. Aker joined the growing PaneraTech team as Vice President of Sales and Marketing.

Mr. Aker has had several articles published in the international glass press on a wide range of topics including glass conditioning, predictive modelling in forehearths and on refractory monitoring.

In striving for sustainable solutions, the tools the glass industry has to reduce greenhouse gasses include highly boosted furnaces, all electric melters and the introduction of hydrogen. The use of more boosting will lead to different and higher corrosion patterns below the glass surface. Hydrogen use will lead to new and still unknown superstructure wear patterns.

High boost will induce initial wear in other areas of the furnace. It may no longer be the metal line that needs overcoating first. With no historical reference, how will manufacturers decide the optimal time to overcoat? Overcoating too early sacrifices the expensive original block prematurely. Waiting too long leads to leaks lower down on the sidewall blocks.

SmartMelter® is already a recognized method to optimize maintenance and safely extend furnace life. What will we contribute to the next generation of glass furnaces?

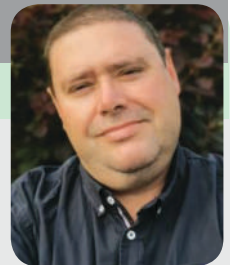
1. Portable sensors to help manufacturers understand new corrosion patterns.
2. PaneraTech is developing a digital endoscopy solution to document superstructure wear.
3. More electrification leads to areas of the furnace that can't be safely accessed with the power on. To avoid boost outages, our new permanent online Polaris sensors can monitor these areas with no human intervention. These will generate alerts when predefined refractory corrosion thresholds are exceeded.

New melting technologies will require updated maintenance and monitoring strategies. Our Digital Furnace Monitoring tools will help glass manufacturers adapt to a low carbon future.

Renewable Energy is only a small piece of the Puzzle when Designing all-Electric Forehearths for a Carbon Neutral Future

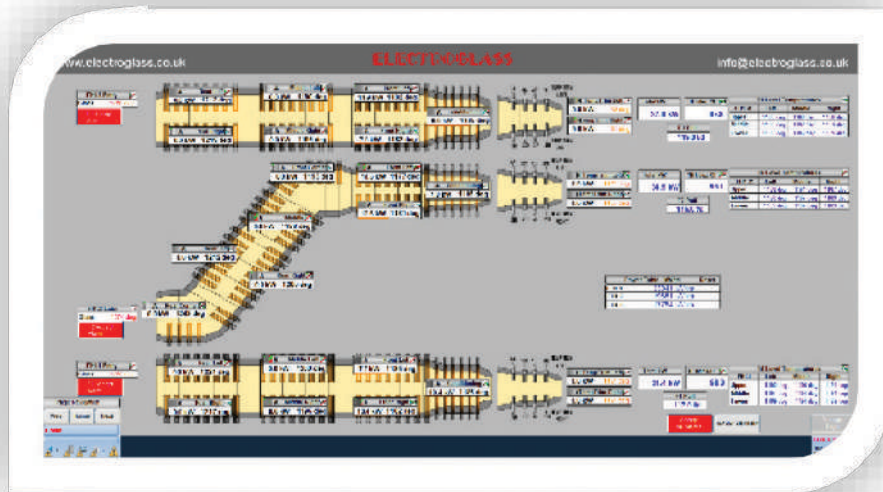
Since joining Electroglass almost 23 years ago, Mr. Grahame Stuart has held key roles in a number of the company's activities. These have included hands-on equipment installation, maintenance and servicing, followed by wider responsibilities in system design, engineering, commissioning and customer training. He has been actively involved in the company's research and development work and customer operational advice and support.

Grahame Stuart
Project Engineer
Electroglass Ltd.
info@electroglass.co.uk



Since taking on his current position of Project Sales Engineer, he has been responsible for marketing and promotional activities and for system and equipment sales. Has led many of the company's direct sales activities, handling the technical correspondence with potential and existing customers in response to enquiries, coordinating preparation of tenders for larger projects, making sales tours and targeted technical sales visits to customers in various countries. He has been a key member and sometimes the lead member of the technical sales teams at numerous trade shows around the world, has authored a range of articles that have appeared in leading glass industry publications and delivered technical presentations at a number of industry conferences and seminars.

We all understand the need to reduce our reliance on fossil fuels and much has been written about the use of renewable energy within our industry. Yet the International Energy Agency (IEA) have stated that renewable energy alone will not help us beat the climate crisis and will only contribute around 32% of what is needed to meet the IEA's sustainable development target.



Greater focus is therefore needed on energy efficiency which makes up 37% of what is needed to reach the IAE's target.

Combining the use of renewable energy with improved energy efficiency in the cooling and conditioning of container glass using an established design of all-electric distributor and forehearth can be implemented quickly, retain existing plant layouts, reuse existing support

arrangements and steelwork and in many cases be carried out without waiting for a major furnace repair.

However, all-electric forehearth designs vary greatly and care must be taken to ensure an understanding of the many different approaches to ensure the maximum benefit of any investment is felt. With this in mind this paper will look at the various approaches to all-electric forehearth design including heat



application using heating elements and dry electrodes, heating element and dry electrode design, the different approaches to cooling, including damper design and passive and forced air cooling, the use of gas back-up systems and how these may be detrimental to normal operation, and the considerations when melting low transmission or dark glasses.

All-electric forehearth design when implemented well can mean forehearth operating energy cost reductions of up to 90%, thermal homogeneity index of 98% or more and simple, stable, low maintenance operation.

In-Furnace Thermal Imaging for Process Optimization for Energy Reduction and Asset Protection



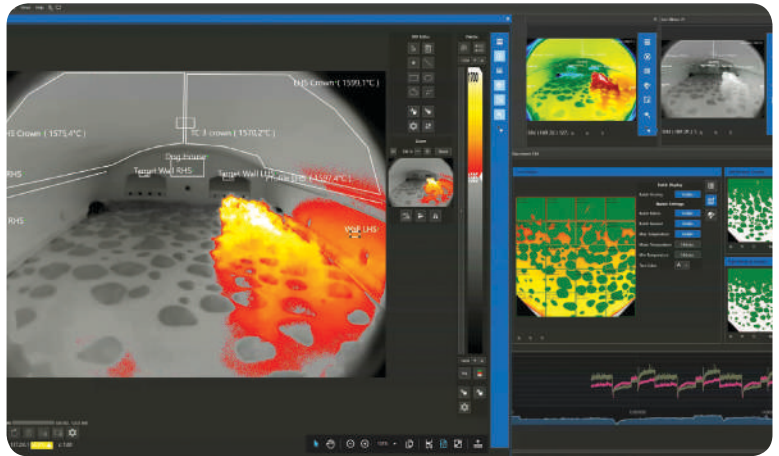
Mr. Philippe Kerbois has extensive sales and project management experience from working in the steel, glass and automotive industries including Rockwell Automation and ABB where he was specifically involved in major robot-based factory automation projects.

Philippe Kerbois
Global Industry Manager - Glass
AMETEK Land
philippe.kerbois@ametek.com

Having worked at AMETEK Land since 2012, Mr. Kerbois initially managed the sales of infrared temperature measurement solutions into line builders and glass and steel furnace OEMs within France, however now he works very closely with the global glass market and is actively promoting the award-winning Near Infrared Borescope (NIR-B) Glass thermal imaging solution for glass furnaces.

The paper's main focus is on using in-furnace thermal imaging, particularly near-infrared thermography (NIRB), for optimising industrial processes to reduce energy consumption and protect assets. The approach is demonstrated through practical case studies conducted in Container, Float and Fibre industries over a span of six years.

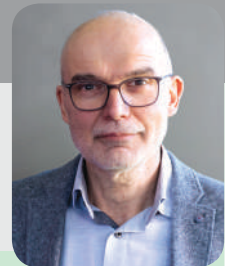
The paper emphasises the application of thermal imaging for monitoring and safeguarding refractory assets during various stages, including heat-up, repair, and cool-down. The intention is to work harmoniously with the principles of physics and thermodynamics rather than challenge them. The concept of heat flowing from hot to cold is harnessed to facilitate convection currents. Careful cooling is crucial at tuck-stones to prevent undesirable batch dragging. Identifying a stationary batch can indicate cold spots or air leaks. The underlying assumption is that repairing a small hole is generally more feasible, cost-effective, and less disruptive than addressing a larger one. By minimising the risk of NaOH condensation, the potential for developing flaws like rat holes in silica crowns is also reduced. Monitoring the temperature difference on target walls serves as an indicator of regenerator blockage in end-fired setups. For cross-fired furnaces, surveys have corroborated the efficacy of endoscopy, revealing whether the damage is hindering or bypassing flow. Furnace age dictates the feasibility of comparing conditions on a daily, weekly, monthly, quarterly, or annual basis.



Your Vision for Sustainable Glass Melting - Our Tools

Mr. Matthias Haas has been working in the glass industry for 34 years, 27 years of them with SORG. He worked for several technical departments within SORG and changed to the sales department in 2006. He used to be 5 years Head of the project management department and since 2019 he has been working in the position as Associate Sales Director at SORG.

Matthias Haas
Associate Director
SORG
haas@sorg.de



SORG has been developing and supplying sustainable technology for decades. It has always been our profession to provide the glass industry with instruments to reduce energy consumption and emission, stabilize processes and increase quality and output.

This starts with optimized furnace design and operation and ends up with highly sophisticated furnace concepts such as Deep Refiner®, LoNOx® and OxEcon®, to mention these as examples.

Besides the reduction of the energy consumption, SORG has spent a lot of efforts to keep the process-related energy losses in the system. To retain the energy in the waste gas within the process the Batch3 concept was developed. And this concept shows the responsibility of SORG: Not only the batch preheater was developed, but also a completely new doghouse design and a new generation of batch charger. The IRD® doghouse and the EME-NEND® batch charger are the solutions to avoid critical dusting, caused by the preheated batch especially in but also around the furnace.

Electrical boosting started in the past with single electrodes and electrode rows in the furnace. SORG has developed highly boosted furnaces and an important step was the introduction of the all-electric melter VSM® over 50 years ago. This furnace opened the door to the future: batch charging with the dust-free rotating crown and easy to maintain Top Electrodes. This furnace melts glass without CO₂ emissions from the melting process.

The newest development of SORG is the hybrid melter, the "CLEAN Melter®". This type of melter has an electrical share on melting energy of up to 80%, and with green energy and green fossil combustibles this furnace can operate with zero CO₂ emissions. The concept makes melting rates of up to 400 tpd possible and has the same flexibility as a standard melter.

SORG handles the future.

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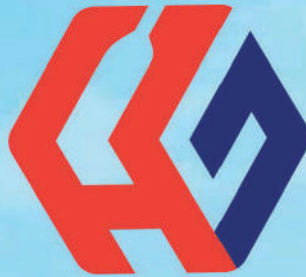
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Registered office & works:

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Monitoring methods for new melting technologies

Originally published in *Glass Worldwide* (preferred AIGMF international journal), Fred Aker outlined challenges associated with options for replacing traditional furnace operations with low-carbon melting campaigns and explains how PaneraTech is offering support for glassmakers faced with a whole new batch of unknowns.

'Sustainable World Solutions' was the theme of the AFGM's [ASEAN Federation of Glass Manufacturers] 44th ASEAN Glass Conference in 2022. There were numerous presentations dealing with decarbonising the glass industry.

Regardless of which option manufacturers choose, refractory corrosion will be different and an unknown during initial campaigns. These new melting technologies include all-electric, highly boosted hybrid melters as well as the use of hydrogen. Not new, but increasing in importance, is the increased use of post-consumer recycled content, or in simple terms: external cullet. Poorly processed external cullet can introduce impurities into the furnace.

All-electric

Commodity glass producers changing from regenerative to electric furnaces will face several challenges. First, they need to learn entirely new batching and furnace operations during their first campaign. The second challenge will be foam when trying to incorporate high external cullet content. The third challenge will be shorter furnace campaigns compared to traditional fossil fuel fired furnaces.

Initial wear will occur further down the sidewalls.

Companies that are used to taking physical measurements with a hook at the metal line will no longer be able to do so while operating. This is due to the corrosion occurring further down the wall as well as the safety aspects of dealing with an energised glass bath.

Where extensive bottom electrodes are used, there will be higher corrosion in the bottom. Due to safety concerns, these electrodes will largely be inside of 'boost cages' which will require the furnace to be de-energised before doing routine visual checks.

These furnaces will also require new maintenance skills, such as pushing electrodes and changing electrode holders during the campaign.

PaneraTech is already supporting many all-electric furnaces (borosilicate, opal, LCD) and we can apply current practices. This includes normal SmartMelter portable equipment for furnaces that are grounded. Depending on plant safety regulations, measurements may be possible while the furnace is energised. Then boost would be turned off when checking areas adjacent to electrodes. We also have highly insulated equipment that has been safely used on LCD furnaces while under power. SmartMelter portable equipment is already used to get full coverage.

For constant refractory thickness monitoring of high wear



Fred Aker presenting at the ASEAN Glass Conference in Thailand last year.

areas, inaccessible areas in a boost cage or to gauge general corrosion, Polaris will be the answer. Polaris is already being used on conventional furnaces to measure high wear areas. For an annual monitoring fee, we can lease and install permanent sensors that monitor refractory thickness 24 hours a day.

When the remaining refractory thickness fall below pre-defined thresholds, Polaris sends out alerts. These can be in our XSight platform, in the form of emails or however the customer defines.

Polaris sensors are robust and maintenance-free in areas up to 1,000°C. They can be placed



A technical session at 44th ASEAN Glass Conference.



This article is based on a paper presented at the 44th ASEAN Glass Conference in Pattaya, Thailand, in November 2022 www.aseanglass.org

Glass Worldwide is the official journal of AFGM



Polaris sensor on a throat.

anywhere there is refractory. The sensors can be installed during construction or on the fly. They can also be moved during the campaign or replaced on top of overcoats.

Hydrogen melting

Hydrogen offers the advantage that much of the existing furnace infrastructure can be modified and reused. Melting processes remain very similar. Challenges related to hydrogen include the fact that it is the smallest molecule [of all elements] and that leaks can occur easily. The other challenge is that with 100% H₂, glassmakers will be monitoring an invisible flame. Combustion expert Neil Simpson said at the 2022 Furnace Solutions [the Society of Glass Technology's Furnace Solutions meeting held 8–9 June 2022] that "In regard to hydrogen combustion it could be beneficial if you cannot see the flames. In many air fuel applications you have to wait for the reversal to be able to see the batch pattern or the thermal impact of combustion on the process. In hydrogen firing with invisible flames you can see the batch and thermal data all of the time."

I would add that it can also be a bad thing with misaligned burners impinging the superstructure.

Up until now, SmartMelter has primarily been used below the glass line; however, PaneraTech is developing Digital Endoscopy to monitor superstructures. Hydrogen may lead to new refractory selections and different wear patterns. Digital Endoscopy employs laser scanning from outside multiple peepholes together with external reference points to provide depth. By comparing multiple scans, it will be possible to quantify superstructure changes over time. This can include erosion of the

crown or leaning superstructure walls. At least initially, Digital Endoscopy will be limited to our Digital Furnace Monitoring clients using PaneraTech for all of their refractory auditing needs (visual, thermal, traditional endoscopy, and SmartMelter radar).

Hybrid melting

If you speak with three people on hybrid melting, you will come away with six different definitions. Definitions include:

- High boost with natural gas. Varying opinions on what high boost is range from 20-80%.
- Mixing natural gas and hydrogen with and without boost.
- The above combinations with bio-fuels.
- All of the above alternatives in oxy-fuel variations.

For the sake of the AFGM conference, I considered hybrid melting to be natural gas with high levels of boost. In this case, all of the PaneraTech technologies discussed are relevant. Portable SmartMelter inspections for wide coverage. Polaris online monitoring for high wear or difficult/dangerous areas to access. Traditional and possibly digital endoscopy for the superstructure.

To tie everything together, we have developed our XSight Refractory Monitoring Platform. This is the same web-based 3D interactive platform that all of our radar customers receive their SmartMelter reports in. Our Digital Furnace Monitoring and platform clients receive a full license which allows them to store all refractory observations and measurements. These can be photos from daily shift walks, thermal, radar or endoscope images. Also, all refractory maintenance records are stored in XSight. The platform can be multi-furnace, multi-plant, as well as multi-



Fred Aker (right) with Somporn Temudomsomboon, Chairman of the Organising Committee of the 44th ASEAN Glass Conference and CEO of Kabinburi Glass Co., Ltd.

language. It also includes a corporate user rights structure and can be stored in the client's private cloud.

In addition, live data can be incorporated as well. This live data can be from a SCADA system, display the status of Key Performance Indicators as well as live Polaris thickness measurements.

Digital Furnace Monitoring

Digital Furnace Monitoring is our programme using the best tools available to manage refractory maintenance to extend furnace campaigns safely. DFM is not a predefined off-the-shelf product or service. We define DFM together with our clients to enable them to meet their furnace campaign goals (e.g. younger furnaces have different monitoring needs compared to one which has operated past its designed lifetime); then we jointly calculate the client's return on investment.

I want to express my gratitude to the AFGM for the opportunity to present this topic as well as for the incredible programme and organisation. ●

SmartMelter, SmartAudit, Digital Endoscopy, Polaris and Xsight are registered trademarks of PaneraTech, Inc.

About the author:

Fred Aker is Vice President Individual Sales at PaneraTech

Further information:

PaneraTech, Inc., Virginia, USA
tel: +49 1621982200
email: Fred.aker@paneratech.com
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Decarbonisation in glass machinery manufacturing

Originally published in *Glass Worldwide* (preferred AIGMF international journal), the VDMA (Machinery and Equipment Manufacturers Association) presented findings from its research and technology working group concerning approaches that glass machinery manufacturers can take to reduce their CO₂ footprints.

The European Green Deal – climate neutrality by 2050 – is having a massive impact on society and industry. European regulation, financial and capital markets, market perspectives as well as product branding and the handling of resources and nature are topics that companies have to deal with when it comes to their future competitiveness. There is no way around measures that serve to improve one's own environmental balance. This is primarily a matter of reducing and avoiding carbon dioxide, as opposed to compensating for it.

According to the Greenhouse Gas Protocol – a recognised international standard for accounting and reporting greenhouse gas emissions, this reporting distinguishes between direct emissions from a company's own combustion (Scope 1); indirect emissions from the purchase of grid-bound energy (Scope 2); and other indirect emissions from processes and products caused directly or indirectly by the company (Scope 3).

More transparency via software

It's not just the company's own production, but also the climate footprint of its suppliers that plays a decisive role

(Scope 3) – especially with regard to the European Supply Chain Act. A global corporation with 66,000 suppliers in 145 countries Siemens AG wants to reduce its upstream CO₂ footprint (Scope 3) by 20% by 2030, and to be climate-neutral by 2050. In response to the supply chain challenge, Siemens has developed a software tool together with the company ctrl+s. Using the tool, suppliers go through an assessment that influences the company's purchasing decision. The aim is not only to evaluate primary data provided by suppliers, but also to make suggestions to the supplying business partners regarding steps they can take to improve their own CO₂ footprints.

How it works

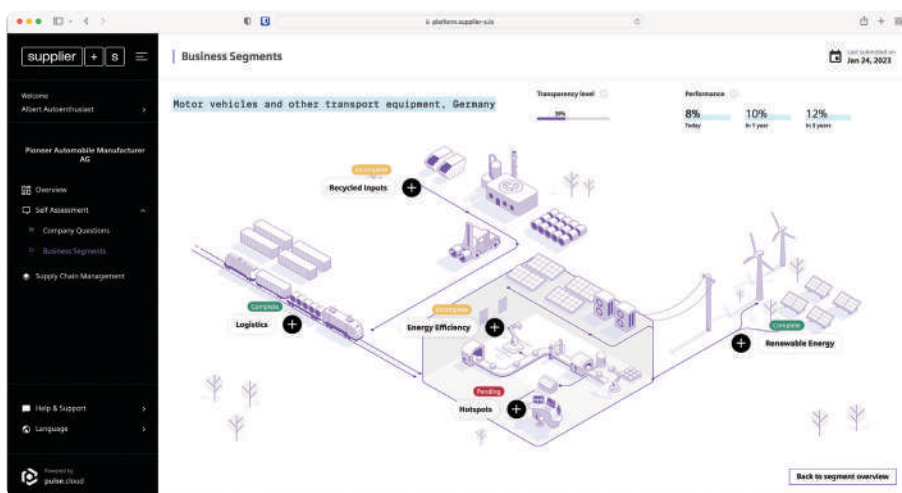
Two years ago, Siemens launched its 'Carbon Reduction@Suppliers' programme. With the help of the 'Carbon Web Assessment' (CWA) tool it designed – now renamed 'supplier+s' – Siemens asks its suppliers about categories such as energy efficiency; green electricity; economic options for low-carbon electricity and low-carbon heating and cooling; energy-efficient processes; logistics; use of recycled products; and business travel. Suppliers can enter both current values and target values for subsequent years. The system calculates an overall rating in percent from the individual entries and shows the deviation from the industry average. Since not every supplier already knows their processes so well that they can provide detailed information on them, the tool allows adjustments and updates at any time. The system uses model graphics, for example, to illustrate where further optimisation possibilities exist, and provides suggestions. In this way, it helps companies to continuously improve their carbon footprint and develop a net zero strategy. Siemens makes the assessment tool available to its suppliers free of charge.

To enable other companies to manage emissions in their own supply chain, at the beginning of 2023 Siemens transferred the rights to the company ctrl+s, which now offers 'supplier+s' on the market.


Reduced power consumption

There is an increased focus on electrical energy consumption during the production of parts with machine tools – also in glass machine manufacturing, according to Siemens Digital Industries. Besides the associated CO₂ emissions that have a negative impact on the manufactured components, rising costs of electrical energy are also making the production process more expensive. Reason enough to take a closer look at potential savings.

The focus here is on the auxiliary units of the machines. According to a study by the Technical University of Darmstadt, these account for 80% of the energy consumption over the life cycle of the machine. Automatic shutdown of the auxiliary units during breaks [in production] brings noticeable energy savings. Adjusting the speed of the auxiliary units to the respective machining situation by means of a frequency converter is another important change. Finally, measures to avoid 'non-cutting' time [when machines are not in cutting/working mode] – in addition to maximising productivity – also automatically lead to minimising the consumption of electrical energy. Digital twins for the 'offline' creation of CNC programmes or features for quick machine set-up are further steps.



New software highlights the importance of mapping the transparency of the CO₂ footprint in the entire supply and value chain.

Originally published in *Glass Worldwide*, preferred international journal of 



Direct current technology

Making production plants more energy-efficient and CO₂-neutral is another building block for a successful energy transition. DC [direct current] grids enable a technological leap towards climate neutrality, resource conservation and grid stability. The latter is essential to ensure a reliable energy supply, even when using renewable energies. Factory-internal DC grids can compensate for their fluctuations, absorb peak loads and make energy generated in-house from renewable sources available with a time delay.

Weidmüller Interface GmbH & Co. KG was a partner in a co-operation project with 35 companies that looked at the possibilities of using DC technologies. The company offers system specifications as well as components and solutions for the construction and operation of DC networks.

So, what does it mean to set up such a grid? The energy supplier continues to supply the company with energy in AC [alternating current] technology, which is converted into DC

at the transfer point in the production plant. Adjustments are necessary for feeding in the energy, for switchgear technologies and protection concepts as well as some other components. Then an energy bus routes the transformed energy on to the consumers such as machines, vehicles or the technical equipment in the building.

Some machines – for example, injection-moulding machines – have been operating internally with DC technology for years. Furthermore, in-house systems for energy generation and storage can be integrated more easily (e.g. photovoltaic systems or battery storage). This automatically reduces the power that has to be fed into the grid from the energy supply company for production. Other advantages are that valuable copper is saved, and the cross-section of the cables is reduced. Since the manufacturer can decouple itself from the disposal company, the internal network is much more robust and stable; storage systems provide the balance and dealing with EMC becomes easier.

VDMA's practical guide

The VDMA supports companies on their way to climate neutrality. The association offers a practical guide 'Climate-neutral production – recommendations for action for mechanical and plant engineering' (available in German). It describes how companies can achieve climate neutrality in eight steps. The starting point is the Corporate Carbon Footprint (CCF), which illuminates the current situation. Based on this, planning and adjustment of future emissions takes place by investing in more energy-efficient production facilities. At the same time, a switch to renewable energy sources can take place. In the long term, it is important to map the transparency of the CO₂ footprint in the entire supply and value chain (Scope 3 emissions). In the future, the digital product passport will store all information on the life cycle of a product so that customers and end consumers can retrieve and understand the production conditions. The VDMA has developed a guideline for determining the PCF [product carbon footprint], which is currently in the consultation phase. ●

Further information:

VDMA Forum Glass Technology, Frankfurt am Main, Germany
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Glass Industry celebrates success with Youth and Manufacturers'



(Aug 26, 2023 DELHI)

Under the banner of the International Youth Day an Industry meet was organised at AIGMF's Annual General Meeting at Hotel Lemon Tree, Aerocity, DELHI.

The program provided an excellent platform to honour Youth of the country who participated in AIGMF's annual contest on 'Green Energy via Solar Glass' or सोलर ग्लास से हरित ऊर्जा । The contest was made open to Youth between 7-24 years who were asked to submit online entries by means of drawings, photos, poems, essays, technical articles etc. Hundreds of entries were received from schools and colleges across India. Winning entries may be viewed at: www.aimf.com

1st Prize (Rs. 25,000) was given to Mohd. Juned aged 21 years, a student of Bachelor of Arts, Jamia Millia Islamia, DELHI. 2nd Prize (Rs. 15,000) was given to Sarthak Kumar aged 15 years, 10th class student of Sant Nandlal Smriti Vidya Mandir, Ghatshila, JHARKHAND. 3rd Prize (Rs. 10,000) was given to Sparsh Tejwani aged 21 years, a student of MSc. Economics with BTECH EEE, BITS Pilani, RAJASTHAN.



Remembering Dr. A K Bandyopadhyay, Member Editorial Board KANCH and Mrs. Neetu Gupta w/o Former President AIGMF Mr. Pradeep Kumar Gupta who passed away on June 28 and July 22, respectively



1st winner of the Youth Contest Mohd. Juned being felicitated by Mr. Shreevar Kheruka, Vice President AIGMF



Principal Ms. Neel Kamal Sinha of Nandlal Smriti Vidya Mandir (SNSVM), JHARKHAND felicitating 2nd winner Sarthak Kumar at the School Assembly on August 25



3rd winner of the Youth Contest Sparsh Tejwani being felicitated by Mr. Purvish Shah Hon. Treasurer AIGMF



Er. Pulkit Gaur (left) receiving AIGMF's Innovation and Technology Award from former President AIGMF Mr. Sanjay Somany



As Sarthak Kumar was unable to travel to Delhi for the awards giving ceremony, he joined the program virtually with his parents, students and school authorities.

Dignitaries who joined online from SNSV Mandir Ghatsila, JHARKHAND were: Ms. Neel Kamal Sinha, Principal; Mr. S K Deorah, Joint Secretary; Ms. Sobha Ganeriwal, Administrator; Dr. P. Karmakar, Manager; Mr. A K Patnaik, Teacher Incharge; Mr. S R Dutta, Academic Incharge; Ms. S R Patnaik, Incharge Co-Scholastic Department; Ms. Neelima Sarkar, Deputy Incharge Co-Scholastic Department; Mr. Arpa Bhattacharya, Technical Support and students of the school.

The prestigious annual CK Somany Award for Innovation and Technology was given to Er. Pulkit Gaur, Chief Technology Officer, Gridbots Technologies.





Mr. P K Shukla (left) Managing Director, Schott Glass India Pvt. Ltd. receiving AIGMF's Export Award from former President AIGMF Mr. Raj Kumar Mittal



Principal, Members of the School Management, Parents of Sarthak Kumar (2nd winner) during hybrid meeting of the awards giving ceremony who joined online from SNSVM, JHARKHAND

The Balkrishna Gupta Award for Exports was bestowed to Schott Glass India Pvt. Ltd. Both awards are supported by Glass Worldwide, preferred international journal of the AIGMF in association with Kanch.

Er. Pulkit Gaur currently serves as the Chief Technology Officer of Gridbots Technologies and drives the companies Innovation and Technological advancements. An Engineer by education and the founder of Gridbots Technologies - Robotics is his passion. He has been building robots since his childhood.

Er. Gaur is primarily responsible for having designed and developed non-contact pattern glass thickness measurement sensors which can



sample glass for thickness 100 times a second and measure it with an accuracy of 50 Microns. The device can be installed on the Semi-Hot End of the production line to detect the thickness and has been validated to be working with 100% accuracy for the last 1 year. The system can detect any change in thickness in real-time and provide an alert to the rolling operator to adjust the system accordingly. The system provides digital output which can be interfaced with multiple devices like IPC, LED Display Panels, and Display Monitors, etc.

Er. Gaur and Gridbots Technologies have won a number of awards and accolades from many Indian and



International agencies. Gridbots was awarded India's hottest start-ups award. Er. Gaur has received TED Fellowship – MIT Young Innovator Award and Rajiv Motwani Circle Fellowship for his technological innovations. Gridbots is a winner of NASSCOM Innovation Awards – 2011 under most promising technologies. In 2015, Siemens steering committee (Comprising of Nobel Laureates) invited Er. Gaur to provide inputs on their future policy on robotics. In 2017, PM Narendra Modi invited Er. Gaur for their flagship program "Champions of Change" for providing inputs of policy matters.

SCHOTT Glass India Pvt. Ltd, is a 100% subsidiary of the German technology group SCHOTT AG. SCHOTT is one of the world's leading manufacturers of special glass tubing, FIOLAX® established and long-standing experience since 1911. SCHOTT has foreseen in 2018, a global 5.0 pharma tubing demand



is going to increase. As already that time the supply was short compared to demand, the expected market growth offers the opportunity to increase market share by establishing incremental capacity faster than competition.

The overall investment for installation of 4 new tanks in phased manner (First tank in 2019, second in 2020, third in 2022 and fourth in 2024) at Jambusar plant has helped to triple the production capacity. Success in India is vital to SCHOTT's growth in the world market. This facility is the world's second largest manufacturing hub for borosilicate glass tubing, a high-quality material that is converted to pharmaceutical containers, such as vials, ampoules or syringes, to store life-saving drugs.

Apart from the domestic Indian market, it is an excellent export hub to other Asian countries, such as Thailand, Bangladesh, Turkey, Taiwan, Korea, China, Singapore, and Indonesia. SCHOTT export quantities are increased 10 times and the ratio of export sales is increased from 13% to 50% of total sales. For FY 2022-23 SCHOTT Glass India Pvt. Ltd., achieved the export sales over approx. INR 250 crores.

The jury for Glass Awards comprised of Mr. P K Kheruka, Former President AIGMF and Chairman Borosil Ltd.; Dr. K. Annapurna, Chief Scientist,

Glass Division, CSIR-Central Glass & Ceramic Research Institute (CSIR-CGCRI); Mr. Dave Fordham, Publisher, Glass Worldwide, London (UK); Mr. Sanjay Somany, Former President AIGMF; and Mr. Vinit Kapur, Secretary AIGMF.

"I feel privileged to be a part of the Jury to select worthy contenders for 6th AIGMF Glass Awards. My heartfelt congratulations to Er. Pulkit Gaur for winning the prestigious C K Somany award for Innovation and Technology for his innovation of designing and developing an indigenous non-contact thickness measurement device to monitor the thickness of patterned glass online which has improved the quality of glass production. Further, I congratulate Schott Glass India Pvt. Ltd., to receive the esteemed Balkrishna Gupta Award for its attaining remarkable exports." said Dr. K. Annapurna, Chief Scientist, CSIR-Central Glass & Ceramic Research Institute, Kolkata.

"The jury received glowing reports about innovations from Pulkit Gaur that are positively influencing productivity in Indian glass plants and he deservedly joins the distinguished recipients of the CK Somany Award. SCHOTT also fully warrant commendation for their export figures and are the worthy winner of the 2023 Balkrishna Gupta Award," said Mr. Dave Fordham, Publisher, Glass Worldwide, London (UK).

Parallel to these events and for the

benefit of Members, a special session on RISK MANAGEMENT was also held where Mr. Mahesh Tanwar, IRDA, AMFI, MDRT Qualifier for Life Insurance Corporation of India gave a presentation on Employer-Employee Insurance.

Ms. Ruchi Shukla, Head Energy, Multi Commodity Exchange of India Limited, gave a presentation on Energy Price Risk Management for glass companies. Emphasis was laid on the importance of hedging in today's competitive business environment and how price risk management can help companies protect their budgeted costs & profitability margins.

The Jury for the annual contest on 'Green Energy via Solar Glass' comprised of Mr. Shreevar Kheruka, Vice President AIGMF & Vice Chairman- Borosil Renewables Ltd.; Mr. Varun Gupta, Chief Executive Officer- Triveni Renewables Pvt. Ltd.; Mr. Purvish Shah, Hon. Treasurer AIGMF & Director- Gobind Glass and Industries Ltd.; and Mr. Dave Fordham, Publisher, Glass Worldwide (Preferred International Journal of AIGMF in association with KANCH) as well as Honorary Member of the AIGMF.

As a token of appreciation, top 100 entries for the annual youth contest on 'Green Energy via Solar Glass' will get 80 years AIGMF Glass Mementoes specially designed by M/s La Opala RG Ltd ■



Select photos of the event and presentations are available at www.aimf.com/past-events.php



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T: +91 11 2331 6507 E: info@aigmf.com

Member Editorial Board:

K ANNAPURNA
Senior Principal Scientist, Glass Division, CSIR-Central Glass & Ceramic Research Institute (CGCRI), Kolkata

VINAY KUMAR SINGH
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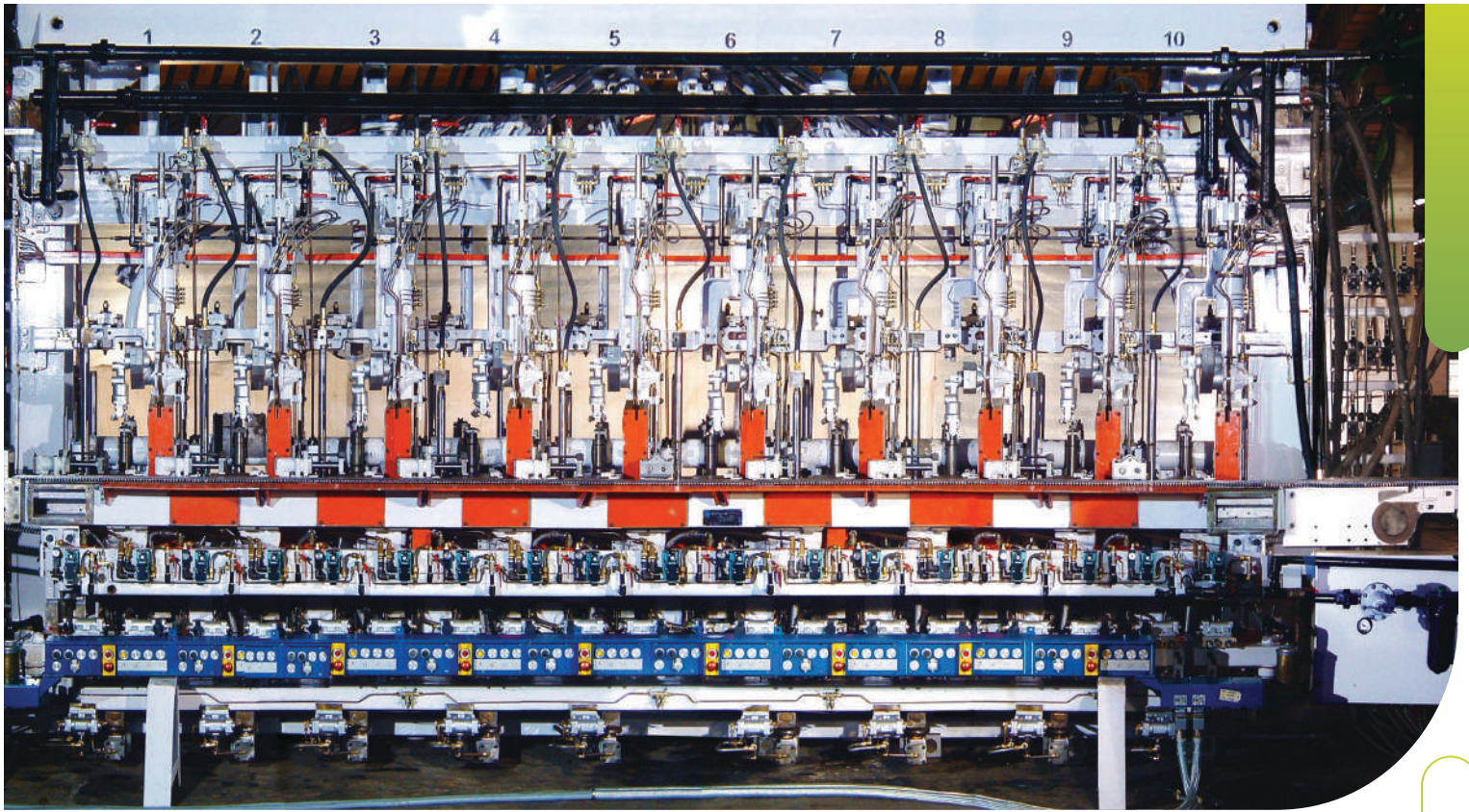
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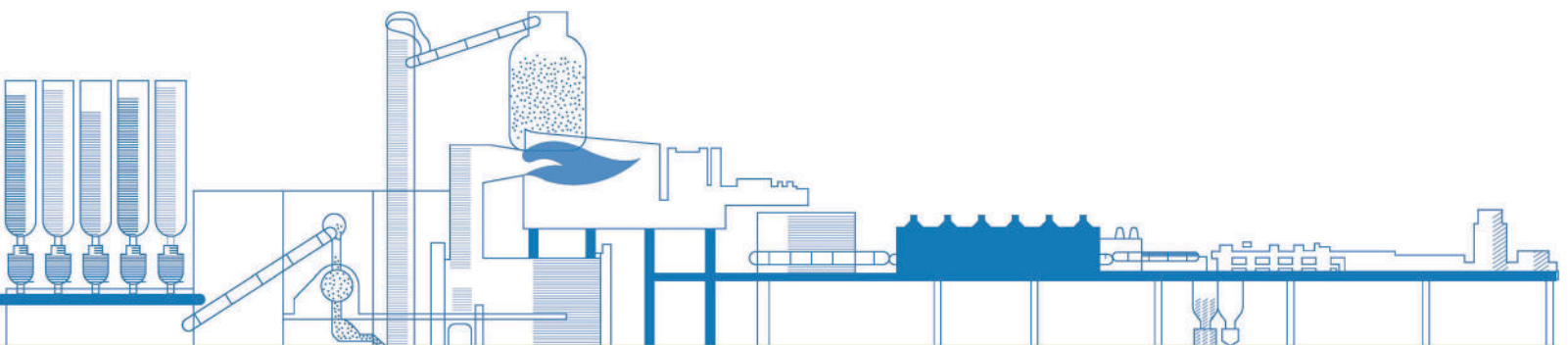


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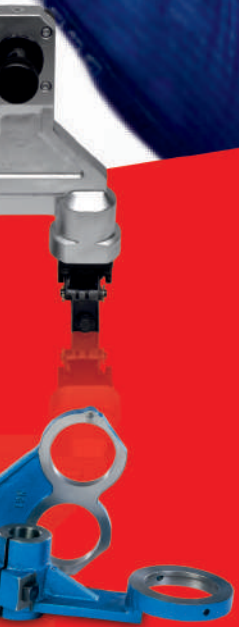
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CORPORATE OFFICE

Nirmal Glasstech Industries

📍 F370-371, Road No. -9-F, V.K.I. Area, Jaipur, Rajasthan-302 013 (INDIA)

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National Workshop on Ascertaining a Skill Centre for Glass and Glazing

(Aug 11, DTU DELHI)



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

A one-day national workshop on ascertaining a skill centre for glass and glazing was organized by the Department of Applied Physics, Delhi Technological University at their campus on August 11, 2023.

The whole idea was to bring Industry and Academia together which was initially discussed at the Glass & Glazing Knowledge Forum (GGKF) in early July, where members were of the view to ascertain and establish a training center for Glass and Glazing at DELHI NCR. GGKF represents following industry associations: FOSG (Federation of Safety Glass), GSI (Glazing Society of India), CCPS (Confederation of Construction Products and Services), UWDMA (uPVC Window & Door Manufacturers Association), Glass Academy and AIGMF (The All India Glass Manufacturers' Federation).

The program started with a Registration followed by a National Anthem, Lamp Lighting & Floral Welcome of the Guests. The Welcome Address was given by Prof. A. S. Rao, HoD, Department of Applied Physics, Delhi Technological University (and Chairman of the workshop) which was followed by an Address by Prof. Rishu Chaujar, Convener of the one day National Workshop.





A special address was given by Prof. Madhusudan Singh, Registrar, Delhi Technological University (DTU) who was upbeat on Glass recycling so as to make our surroundings clean.

Mr. Gurmeet Singh, Chairman, Federation of Safety Glass (FOSG) and Managing Director, Gurind India (P) Ltd., interacted with the students and faculty on Glass Safety by citing suitable examples of Glass installations.



Mr. Amit Malhotra, President of Confederation of Construction Products and Services (CCPS) and Managing Director McCoy Silicones Ltd., spoke about Glazing- its need and installation.





In the end, Mr. Vinit Kapur, Secretary, The All India Glass Manufacturers' Federation interacted with participants on bringing Industry and Academia together for a win-win situation. Participants were told that 4 students of DTU and Prof. A S Rao (Member Editorial Board KANCH) will be a part of the 14th AIGMF International Conference on "Decarbonization for the Sustainable



Glass Industry" on Sept 15 covering technical presentations from the world's renowned glass technology providers. The conference will be held concurrently with glasspex and





glasspro India exhibitions at Bombay Exhibition Centre, Goregaon (East), Mumbai, India to be staged from Sept 14-16, 2023.

The session concluded with a vote of thanks by Dr. Mukhtiyar Singh, Co-Convener for the day-long Workshop. The program was followed by lunch and discussions with the Registrar, DTU on the next steps and to



ascertain what all needs to be done to move ahead in the right direction ■

Select photos of the event are available under past events at www.aigmf.com



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

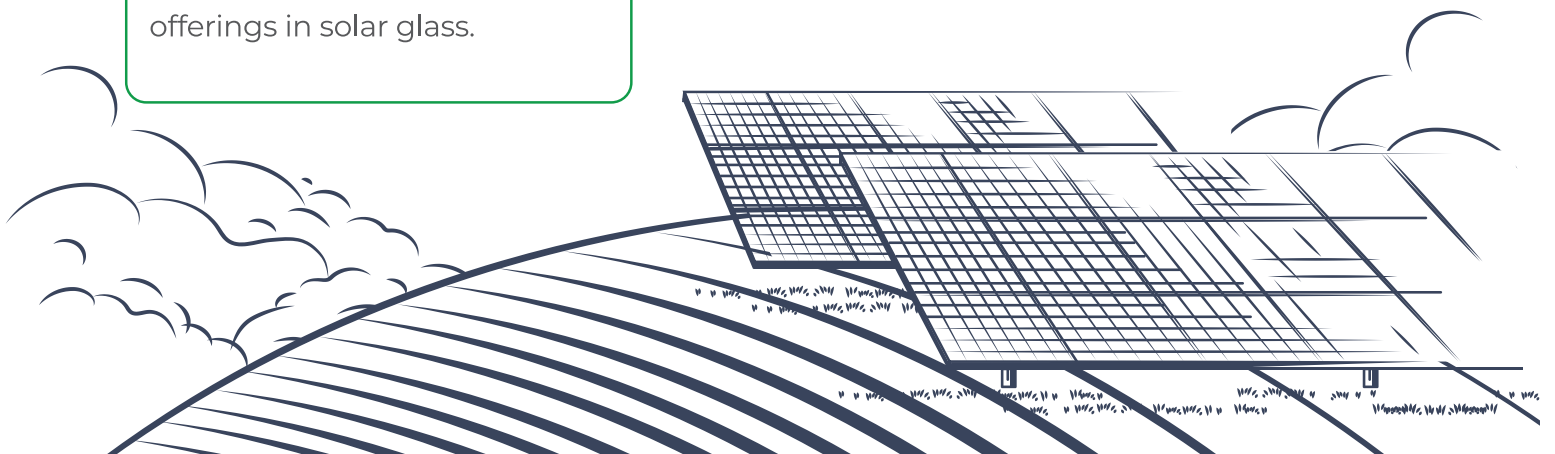
Our Solar Glass manufacturing capacity at GMB Glasmanufaktur Brandenburg GmbH in Tschernitz, GERMANY has now also been enhanced to 350 tons per day after a recent rebuilt of the furnace.

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

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SCHOTT's Jambusar plant is the company's second-largest tubing manufacturing facility.

On the Spot... Pawan Kumar Shukla

Pawan Kumar Shukla, President and Managing Director of SCHOTT Glass India Pvt. Ltd, a 100% subsidiary of the German technology group SCHOTT AG, spoke exclusively to *Glass Worldwide* (preferred international journal of the All India Glass Manufacturers' Federation) about a €75 million investment to establish its Jambusar plant as SCHOTT's second largest glass tubing manufacturing facility and a production hub for pharmaceutical glass in Asia.



Pawan Kumar Shukla is President and Managing Director of SCHOTT Glass India and an Executive Committee member of the AIGMF.

GW: What are the highlights of SCHOTT's recent performance in the glass tubing sector in India?

Just a few months ago, SCHOTT launched an amber glass tubing production in Jambusar, Gujarat. With this strategic move, we now offer our entire pharmaceutical glass tubing portfolio produced in India to manufacturers of drug containment

solutions. FIOLAX amber – SCHOTT's premium packaging medium for light-sensitive drug formulations – is a globally sought-after product but until now, all the local demand was fulfilled by import. As of today, SCHOTT is the only company that manufactures amber glass tubing in India.

GW: What was the motivation for the recent investment into the glass tubing factory in Jambusar, Gujarat?

India's pharmaceutical industry is growing at a rapid pace. India is becoming one of the key providers of medicines for the world, the storage of which cannot be overlooked. This is why a few years ago SCHOTT decided to expand in Asia. In the last three years, we have invested €75 million to expand our pharmaceutical glass tubing production in Jambusar. With the expansion, we have contributed to the Indian government's vision of further strengthening India as a global pharmaceutical hub, while also supporting Germany's commitment to increasingly investing in India.

GW: What were the key elements of the upgrades and what are the new manufacturing capabilities?

We ramped up additional capacity for our amber pharma glass tubing. Our facility in Jambusar is now SCHOTT's second largest production hub for pharmaceutical glass tubing.

FIOLAX amber glass is a highly specialised product. In comparison to our clear glass tubing, amber glass production is much more complicated. This is due to the

specific properties of the glass tubing that protect light-sensitive medications from sunlight and UV-radiation.

FIOLAX amber, converted to pharmaceutical containers, is engineered to protect light-sensitive medications, and used to store many life-saving drugs to ensure that they remain safe.

To ensure the same high quality across the globe, we use smart manufacturing technologies such as perfeXion to detect even the tiniest deviations in glass tubing in order to ensure that the quality remains above the industry standard.

GW: How will the enhanced production facility assist SCHOTT to achieve its goals in India?

In the past, all the demand for the Indian market was fulfilled by imports. Now, manufacturers of drug containment solutions in the region can receive our complete pharmaceutical glass tubing portfolio produced in India. This will improve availability, planning reliability, and cost efficiency for them. ▶



FIOLAX is special glass tubing for pharmaceutical packaging with proven quality credentials.

GW: During such a significant investment programme, what are the main advantages of being part of a vast global group like SCHOTT?

With the SCHOTT network we have the advantage of global production close to our customers. Specifically for India, we increased our production capacity a few years ago to secure supply for the pharma industry. Furthermore, we have an integrated supply chain and ample supply of tubing through the SCHOTT network.

GW: Does your Indian operation contribute to SCHOTT's business in the wider Asian region?

Success in India is vital to SCHOTT's growth in the world market. The domestic Indian market represents one of the most attractive growth opportunities, and it is an excellent export hub to other Asian countries, such as Thailand, Singapore, and Indonesia among others.

GW: How would you summarise SCHOTT Glass India's strategy for future investment into the production operations?

The overall investment of €75 million that SCHOTT announced in 2021 and that is spread across three years is meant to double the overall production capacity of the Jambusar facility and will create additional jobs. It is expected to be exhausted next year, so further expansions are already scheduled.

GW: What can you tell us about the recent agreement for the supply of renewable energy to the Jambusar factory?

To switch our electricity supply to 100% green energy, SCHOTT is also relying on power purchase agreements (PPAs). We purchase green energy from a wind-solar hybrid project in India. Such agreements support the clean energy transition and help to reduce carbon emissions. Furthermore, with a PPA, you and your energy partner lock in at a fixed electricity rate, so you can more accurately predict energy expenses over the short and long terms. Because you agree to a fixed rate upfront, you don't have to worry about surprise energy expenses or the financial risk of traditional energy sources.

GW: In general, how would you describe prevailing market conditions for the tubing sector in India?

The pharmaceutical sector is expanding in India because of government initiatives. Pharmaceutical glass tubing is more in demand now than ever before because of the rise in

chronic diseases and the use of self-injectable syringes to treat them.

GW: And your expectations for the next 12 months?

Looking forward to the easing up of increased raw material and energy prices, which will further improve the overall market condition.

GW: Are there any particular examples of recent or impending product innovations that you are particularly proud of?

Our fully automated inspection and measurement system perfeXion sets the benchmark for quality. We are the only supplier of glass tubing with a 100% process control. The system removes the need for manual interference in the entire production process – which is one of the most critical factors when it comes to eliminating risks of contamination in the primary packaging. Using this smart technology, every piece of glass tubing is fully traceable. This allows our customers to track issues and batches and ensures safety for the pharma packaging industry.

GW: To summarise, what are the main opportunities and challenges for SCHOTT's tubing operations in India?

Our main opportunities are that we have a strong team with rich experience, favourable government policies, and the availability of raw material, packing material, and energy at our site.

A major challenge now is to train the new, additional workforce and at the same time keep performance at the desired level. ▶



SCHOTT has invested €75 million to expand its pharma glass production in India.



Pawan Kumar Shukla with Hargun Bhambhani, Former Hon. AIGMF General Secretary at the AIGMF Executive Committee meeting last December in Guwahati in the Indian state of Assam.

GW: What role does SCHOTT Glass India play in AIGMF activities?

I am part of the executive committee of the AIGMF. As an active member of AIGMF, SCHOTT Glass India plays a significant role in advancing the interests of the Indian glass industry and promoting industry growth and development through its participation in various activities and initiatives undertaken by the federation.

GW: How important is the overall role of the AIGMF in the furtherment of the Indian glass industry?

It plays a crucial role! The AIGMF is a representative body that works

towards the development and growth of the glass industry in India by promoting research and development, providing technical and commercial assistance, and addressing industry-related issues.

It acts as a platform for glass manufacturers to collaborate, exchange ideas, and share best practices. It also represents the interests of the industry to the government, regulatory bodies, and other stakeholders. By working closely with the government and policymakers, the AIGMF has been successful in securing favourable policies, regulations, and incentives for the glass industry in India.



SCHOTT's team of highly experienced staff is able to provide valuable resources such as scientific research and in-depth consultancy.



Pawan Kumar Shukla is a member of the AIGMF Executive Committee.

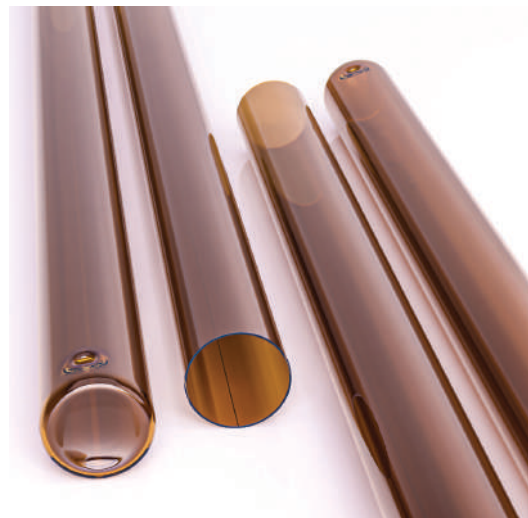
GW: What do you consider to be the main benefits of being a member of the AIGMF?

Being a member of AIGMF can offer numerous benefits that can help glass manufacturers in India stay competitive, grow their businesses, and succeed in the industry. This includes networking opportunities, advocacy and representation, access to information, training and education, as well as industry recognition.

GW: Glass Worldwide acts as exclusive preferred international journal of AIGMF in association with Kanch. What benefits does this longstanding cooperation bring?

Glass Worldwide's exclusive preferred international journal status with AIGMF in association with Kanch brings a win-win situation for both parties, as well as for the global glass industry as a whole. It allows for a closer collaboration, exchange of knowledge, and mutual benefit that can foster growth and development in the sector. ●

FIOLAX and perfeXion are registered trademarks of SCHOTT AG



FIOLAX amber is a neutral glass, chemically highly resistant, for pharmaceutical packaging of light-sensitive medications.

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Seeing the light

Purvish Shah, Director of Gopal Glass Works and Hons. Treasurer of the All India Glass Manufacturers' Federation, spoke exclusively to *Glass Worldwide* about opportunities for innovation in the manufacture of patterned, rolled and wired glass, and explained why his family's firm has recently diversified into the solar glass business.



Purvish Shah, Director of Gopal Glass Works.

Founded in 1978 in Ahmedabad, Gujarat, west India by Shri Jayantilal J Shah and the late Shri Dhirajlal Sheth, Gopal Glass Works began with a production capacity of just 50tpd of patterned and wired glass. Today, the company's facility is spread over 30 acres and output from its three furnaces exceeds 380tpd, ensuring the manufacturer maintains its 50–60% share of India's patterned glass market, in addition to supplying dealers and distributors in SAARC countries, Africa, the Middle East and



Gopal Glass Works has a state-of-the-art manufacturing facility spread over 30 acres with a production capacity of over 380tpd.

Europe with high quality products. Specialising in clear and coloured patterned glass and wired glass (the only company in India to do so), Gopal Glass Works offers more than 30 designs – of which several are trademarked, predominantly for use in windows, partitions and louvres.

Patterned glass – a sheet of glass with a pattern of

translucent texture embossed on one or both sides to enable light transmission whilst offering various privacy levels – is made by squeezing semi-molten glass between two metal rollers, one of which is engraved with the desired marking. Thickness is controlled by adjustment of the gap between the rollers. The depth, size and shape of the patterns largely determine the magnitude and direction of reflection – from almost clear to completely obscured. Gopal Glass Works produces a range of traditional and contemporary designs (e.g. linear, geometric, organic, floral...) in clear, coloured and mirrored form, and in 3–8mm thickness. The company's wired glass (made by infusing wired mesh in between two glass layers) offers additional security and safety – it does not splinter if broken – and is produced in 6mm and 8mm thickness. Gopal Glass Works' rolled glass, widely used for photo framing, is produced in 2, 2.5 and 3mm thickness, in both clear and tinted varieties.



The new solar glass factory boasts a 150tpd furnace capable of producing all types of photovoltaic glass.

New blood

A third-generation member of the family business, which now employs 1,000 people, Purvish Shah joined Gopal Glass Works after completing a masters in entrepreneurship management. Since 2006, his areas of focus as a Director have been technology, strategy and innovation at the company, with responsibility for looking after plant operations, resource optimisation, new product development and diversification opportunities.

Demand for flat glass is “robust in India” and the market is currently growing, reports Mr Shah. “Per capita consumption is pretty low compared to the world average of flat glass usage, so there is ample opportunity.”

Under Mr Shah’s watch, Gopal Glass Works is “at the forefront for technology adoption,” able to produce different colours of glass simultaneously from its multiple furnaces. “For furnace design we have preferred [to use] SORG who are one of the best in efficient furnace design,” he attests. “With SORG we have done two projects and have a successful partnership.”

Other suppliers are “more or less domestic-based,” but “the logic to procure the technology is not limited to demographic boundaries,” Mr Shah underlines. “There is a concrete process of project identification and the selection of right supplier who can offer the desired solution.”

Solar glass

Challenges to Gopal Glass Works’ patterned/wired glass business include “inflation, cheap and subsidised supply from China and the [fact that] patterned glass usage is very niche and limited,” acknowledges Mr Shah. Therefore it seems expedient that in 2021, the group conceptualised a project to diversify into solar glass.

“The biggest motivation was the demand and awareness for green energy business,” says Mr Shah. “India [receives] a lot of sunshine and solar photovoltaic modules are the ‘need of the hour’ to mitigate carbon emissions [from traditional energy sources].” Gujarat state is the hub for Indian solar module manufacturing facilities, observes Mr Shah, therefore “all the solar

photovoltaic module manufacturers are our potential customers.”

The basic manufacturing process of solar glass is similar to Gopal Glass Works’ traditional flat glass operations, “as both are rolled glass,” notes Mr Shah. “The only difference is iron content, which is much less in solar glass.”

Commissioned this year, Gopal Glass Works’ new state-of-the-art fully-automated solar glass factory is equipped with a 150tpd furnace to produce all types of solar photovoltaic glass, particularly small sizes of anti-reflective coated and non-coated glasses.

“We announced the start of our new solar glass manufacturing plant at our group entity Gobind Glass & Industries [acquired by Gopal Glass Works in 2012], thus becoming the second Indian manufacturer of solar glass,” explains Mr Shah.

“There is huge gap [in] solar glass manufacturing in India,” he continues. “We have a capacity of 1GW with a market demand of 20GW per annum in the country. It will not be a challenge for such a small capacity.”

The majority of equipment at the factory was designed and supplied from Europe, “with the latest and sophisticated technology,” according to Mr Shah. “Suppliers selection was based on the expertise of the subject their reliability and cost effectiveness.”

The solar plant employs around 250 people – “We have an experienced team and have hired a talented pool

from the industry,” states Mr Shah. “With the country’s focus on green energy and CO₂ mitigation, India is poised to take the lead in the solar sector in the coming future.”

Responsibility for the future

Strongly focused on environmental, social and governance business practices, Gopal Glass Works consumes more than 50% of its power from renewable energy sources (including wind and solar), and the company has made several investments for achieving energy efficiency, resource optimisation and environmental protection. “We are extremely conscious of our environmental impact,” states Mr Shah.

“We were one of the earliest to install wind turbine and rooftop solar panels. We make a conscious effort to reduce our water consumption.”

As the Hon. Treasurer of the All India Glass Manufacturers’ Federation (AIGMF) and a previous executive committee member of the ‘umbrella organisation’ for all segments of the Indian glass industry, Mr Shah takes an active role in a body that he believes plays a “vital role” in the betterment of the country’s glass manufacturing – enabling meaningful representation of “the industry’s issues with the government and different organisations.”

Being a member of the AIGMF “helps in understanding the different glass manufacturers’ aspects of business and helps in getting information on current trends and the direction of glass technology,” he adds.

With a whole new business strand to future-proof, Gopal Glass Works stands to benefit from this forward-looking approach to sharing know-how and staying abreast of the latest developments.

“We are a growing company with high ambition and a family of glass technocrats who are hungry for success,” concludes Mr Shah. ●



The rolled glass process at Gopal Glass Works.

Further information:

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Membership of the Federation

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

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

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

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

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

ADMISSION FEE / ANNUAL SUBSCRIPTION

Ordinary Members:

- Admission fee ₹ 5,000/-
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Affiliate Members:

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

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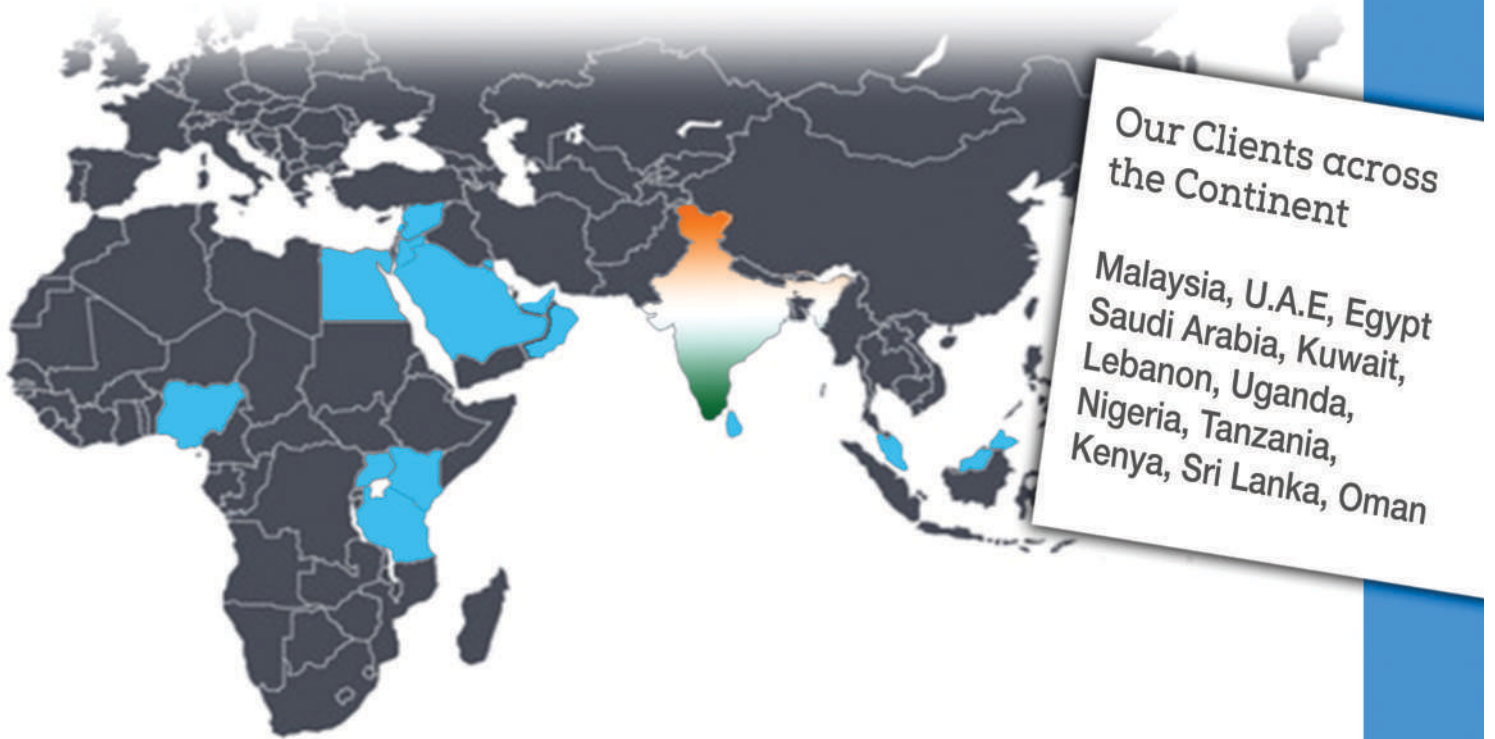
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GLASS News

20th ATMA RAM MEMORIAL LECTURE ON THE OCCASION OF 73rd FOUNDATION DAY CELEBRATION OF CSIR-CGCRI

Dr. (Mrs.) N. Kalaiselvi, Secretary DSIR and Director General CSIR delivered the 20th Atma Ram Memorial Lecture for the year 2023 on August 26, 2023. The event was held to commemorate the 73rd Foundation Day of the institute and also coincided with the conclusion of the week-long One Week One Lab (OWOL) programme of CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI), Kolkata, India.

The lecture was entitled "SDGs and S&T Opportunities", wherein she touched upon the alignment of Council of Scientific and Industrial Research (CSIR) themes with the sustainable development goals *vis-a-vis* national mission programmes; the challenges in their implementation and the road ahead for achieving the same.

A very large number of persons joined the lecture through both physical and virtual modes and the programme was also live streamed on social media platforms.

Established on August 26, 1950, CSIR-CGCRI is among the oldest laboratories set up under CSIR and works on cutting-edge science, technology and innovation in the domain of glass and ceramics. The Atma Ram Memorial lecture represents one of the most prestigious annual oration lectures organized

by CSIR-CGCRI to mark its foundation day. This has been always delivered by the most eminent personalities in the field.

Dr. Kalaiselvi also opened 'the Atma Ram Memorial Museum & Archives' to the public. This has been set up at CSIR-CGCRI, through funding from the CSIR, the museum envisages tracing the technological evolution of glass and ceramics from historic period; and the journey of CSIR and CSIR-CGCRI since their inception.

INDIA TO EMERGE AS ONE OF WORLD'S LARGEST SOLAR MODULE MAKERS

India is set to emerge as one of the largest solar module manufacturers and has the fastest growing capacity in renewable energy said Union Power Minister Mr. R K Singh.

Stating that India has a considerable existing solar manufacturing capacity, he pointed to "even larger

capacities under construction, including polysilicon".

"India is poised to become a global powerhouse in renewable energy, including green hydrogen, fostering a robust ecosystem."

"With one of the largest manufacturing ecosystems in wind energy and rapidly growing capacity in solar energy, India is the world leader in this regard", said Mr. Singh.

The Minister said the country has the fastest growing capacity in renewable energy and is also set to emerge as one of the largest solar module manufacturers.

"India has achieved the Nationally Determined Contribution (NDC) target of 40 per cent capacity from renewable sources", he said.

Further, he said the country is on course to meet the target of 50 per cent capacity share from renewable energy well ahead of NDC's 2030 timeline.



President AIGMF Mr. Sanjay Agarwal (addressing) and former President Mr. Sanjay Ganjoo (second from the left in sitting) at FICCI/RICCO event: Rajasthan- Gas based Industries, conference on advantages and opportunities, supported by the AIGMF, held on 3rd August at Jaipur.

Mr. Agarwal in his address said that they would look-up at Rajasthan and RIICO's plan for developing a zone in Dholpur for the glass industry if gas prices are reduced and an uninterrupted water supply is guaranteed.

Mr. Singh said India is one of the fastest-growing economies in the world, yet the per capita emission of greenhouse gases is substantially lower than the global average.

"The country is striving to achieve a fine balance between meeting its surging energy needs and reducing carbon emissions", he said and added that the country remains steadfast in its commitment to sustainable growth, renewable energy expansion and electric vehicle adoption.

"By strategically balancing economic growth with environmental consciousness, the nation is determined to carve a brighter, greener future for generations to come", he said.

NEW OFFICE BEARERS ELECTED

Following were elected as Office Bearers of the AIGMF for the Year 2023-24 at the Annual General Body Meeting held on August 26, 2023 at New Delhi.

President- Mr. Sanjay Agarwal, Kwality Glass Works, Firozabad

Sr. Vice President- Mr. Rajesh Khosla, AGI glaspac, Hyderabad

Vice President- Mr. Shreevar Kheruka, Borosil Ltd., Mumbai

Hon. General Secretary- Mr. Mukesh K Bansal, Sri Sitaram Glass Works, Firozabad

Hon. Treasurer- Mr. Purvish

M Shah, Gopal Glass Works Ltd., Ahmedabad

On the recommendations of Zonal Associations following were nominated as Members of the Executive Committee for the year 2023-24:

Eastern India Glass Manufacturers' Association (EIGMA)

1. Mr. Vinay Saran - HNG & Inds. Ltd., Kolkata

Northern India Glass Manufacturers' Association (NIGMA)

1. Mr. NN Goyal- U. P. Twiga Fiberglass Ltd., Delhi
2. Mr. Shailendra Kumar Misra - HNG & Inds. Ltd., Bahadurgarh

South India Glass Manufacturers' Association (SIGMA)

1. Mr. Sardar Akshay Singh - SGD Pharma Ltd., Hyderabad

U.P. Glass Manufacturers' Syndicate (UPGMS)

1. Mr. Manish Bansal - G. M. Glass Works No. 2, Firozabad
2. Mr. Ritesh Mittal - Meera Glass Industries, Firozabad
3. Mr. Anurag Mittal - Geeta Glass Works, Firozabad
4. Mr. Anurag Gupta - Om Glass Works (P) Ltd, Firozabad
5. Mr. Nitesh Goyal - Goyal Glassware P. Ltd., Firozabad

6. Mr. Devansh Gupta - Tigersons Glass Inds. P. Ltd., Firozabad

Western India Glass Manufacturers' Association (WIGMA)

1. Mr. GK Sarda - Empire Ind. Ltd., Vitrum Glass, Mumbai
2. Mr. Ashok Jain - Borosil Ltd, Mumbai
3. Mr. Hemal Thakor - PGP Glass (P) Ltd., Mumbai
4. Mr. Pawan Kumar Shukla - Schott Glass India Pvt. Ltd., Bharuch
5. Mr. Brij Gupta- Shreno Limited (Glass division) Vadodara

The following are co-opted members of the Executive Committee for the year 2023-24:

1. Mr. Pradeep Kumar Gupta - Om Glass Works Pvt. Ltd., Firozabad
2. Mr. PK Kheruka - Borosil Ltd., Mumbai
3. Mr. SC Bansal - Adarsh Kanch Udyog, Firozabad
4. Mr. Sanjay Somany - HNG & Ind. Ltd., Bahadurgarh
5. Mr. SK Jhunjhunwala - La Opala RG Ltd., Kolkata
6. Mr. Sanjay Ganjoo - Asahi India Glass Ltd., Mumbai
7. Mr. Mukul Somany - HNG & Ind. Ltd., Kolkata
8. Mr. Raj Kumar Mittal - Geeta Glass Works, Firozabad
9. Mr. Bharat Somany - HNG & Ind. Ltd., Bahadurgarh

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



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Mr. M.D. Farooq
(Founder)

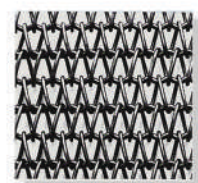
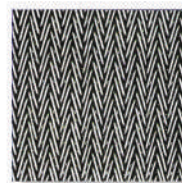
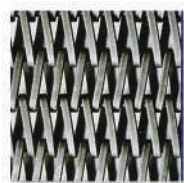
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Mr. M.D. Farooq, the founder of Umda Engineering, brings to the table more than 35 years of expertise in the manufacturing industry. Starting from humble beginnings, today more than 350 of Mr. Farooq's Lehr machines are successfully installed around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

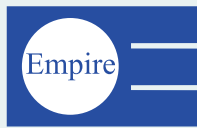
Mr. Farooq is best recognised as one of the co-founders of TNF Engineering, a company known across the industry as not only the leading manufacturers of Metallic Wire Conveyor and Lehr belts but also of Glass Plant Equipment. This mantle of superior performance and expertise has now been passed on to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

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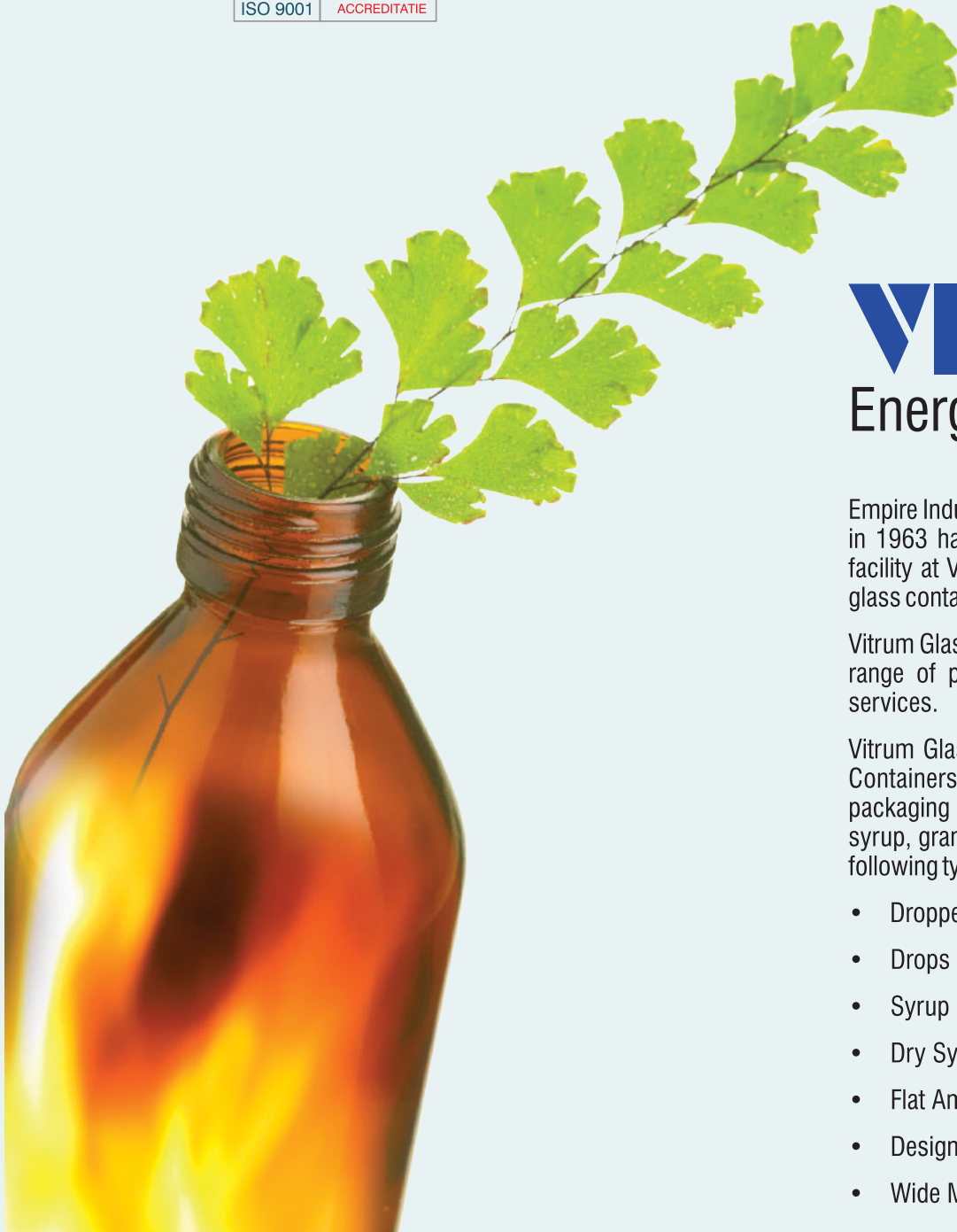


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Students upbeat on Tapping Green Energy via Solar Glass

(August 12, 2023 DELHI)

To commemorate the International Youth Day, The All India Glass Manufacturers' Federation (AIGMF) organised its annual contest for Youth on 'Green Energy via Solar Glass' or सोलर ग्लास से हरित ऊर्जा ।

1st Prize (Rs. 25,000) was given to

Mohd. Juned aged 21 years, a student of Bachelor of Arts, Jamia Millia Islamia, DELHI

2nd Prize (Rs. 15,000) was given to Sarthak Kumar aged 15 years, 10th class student of Sant Nandlal Smriti Vidya Mandir, Ghatshila, JHARKHAND

3rd Prize (Rs. 10,000) was given to Sparsh Tejwani aged 21 years, a student of MSc. Economics with BTECH EEE, BITS Pilani, RAJASTHAN

The Jury comprised of Mr. Shreevar Kheruka, Vice President AIGMF & Vice Chairman- Borosil Renewables Ltd.; Mr. Varun Gupta, Chief Executive Officer- Triveni Renewables Pvt. Ltd.; Mr. Purvish Shah, Hon. Treasurer AIGMF & Director- Gobind Glass and Industries Ltd.; and Mr. Dave Fordham, Publisher, Glass Worldwide (Preferred International Journal of AIGMF in association with KANCH) as well as Honorary Member of AIGMF.

"We are very happy to see the level of interest exhibited by all the students for this competition. Renewable Energy is the only Sustainable way to satisfy the world's growing energy demands and I am very happy that this information is being disseminated across the length and breadth of India through such competitions." said Mr. Shreevar Kheruka, Vice President AIGMF and Vice Chairman- Borosil Renewables Ltd.

"The AIGMF's Annual Youth competition on Green Energy via Solar Glass attracted a very impressive number of entries and at an exceptionally high standard too. An increasing awareness of solar glass among children and young adults was clearly evident in the submitted drawings, poems and essays which

1st Prize



इस पोस्टर के अंतर्गत सोलर ग्लास से प्राप्त होने वाले लाभों को दर्शाया गया है। सोलर पैनलों का इस्तेमाल करके सूर्य की ऊर्जा के माध्यम से बिजली (ऊर्जा) का निर्माण किया जा सकता है। इस ऊर्जा से पर्यावरण स्वच्छ व हरा-भरा रहता है। कारों, बसों को भी सौर पैनल के द्वारा रिचार्ज कर सकते हैं। खेतों में मोटर चलाने, घर और सड़कों पर बिजली के लिए भी सोलर ग्लास का प्रयोग किया जा सकता है। बोध से पानी छोड़ने, कंपनियों को ऊर्जा सुधार व जीव-जंतु संरक्षण हेतु भी सोलर ग्लास आवश्यक है। गांवों में टी.वी., फ्रिज, पंखा, कूलर आदि चलाने में सहायक है।

2nd Prize

Solar Glass

In a realm where the sun's golden light resides,
Where nature and progress in harmony collides,
There blooms a marvel, a radiant symphony,
Green energy whispers through solar glass, you see.

Oh, behold the magic in each fragile pane,
Translucent skin, a celestial refrain,
Capturing photons in a dance of delight,
Transforming brilliance into boundless might.

Gentle sunbeams, like dancers on the stage,
Caress the glass with passion, unbridled rage,
Within its depths, secrets of power unfurled,
A hymn of hope, a symphony for the world.

No longer shackled to the chains of the past,
The Earth breathes deep, a sigh of solace at last,
For in this radiant tapestry we've woven,
The greener future, a paradise unbroken.

Let solar glass illuminate the path we tread,
A gentle guardian, shielding us overhead,
With every glimmer, a promise to inspire,
A legacy of light, ignited by desire.

So raise your eyes to the heavens above,
Feel the warmth, the embrace of the sun's love,
And in that tender touch, let hope take flight,
Green energy, our beacon of eternal light.

In the embrace of solar glass, we find,
A symphony of nature and progress entwined,
For in each beam that dances through the air,
Lies the power to heal, the power to repair.

AIGMF Annual Youth Contest: Green Energy via Solar Glass (or 'सौर' 'ग्रीन' 'शक्ति' 'शुद्ध' (2023)
2nd Prize: Sarthak Kumar (15 years)
10th class student of Saint Nandlal Smriti Vidya Mandir, Ghutshila, Jharkhand

the AIGMF. The contest was made open to Youth between 7-24 years who were asked to submit online entries by means of drawings, photos, poems, essays, technical articles etc. Hundreds of entries were received from schools and colleges across India” said Secretary AIGMF Mr. Vinit Kapur.

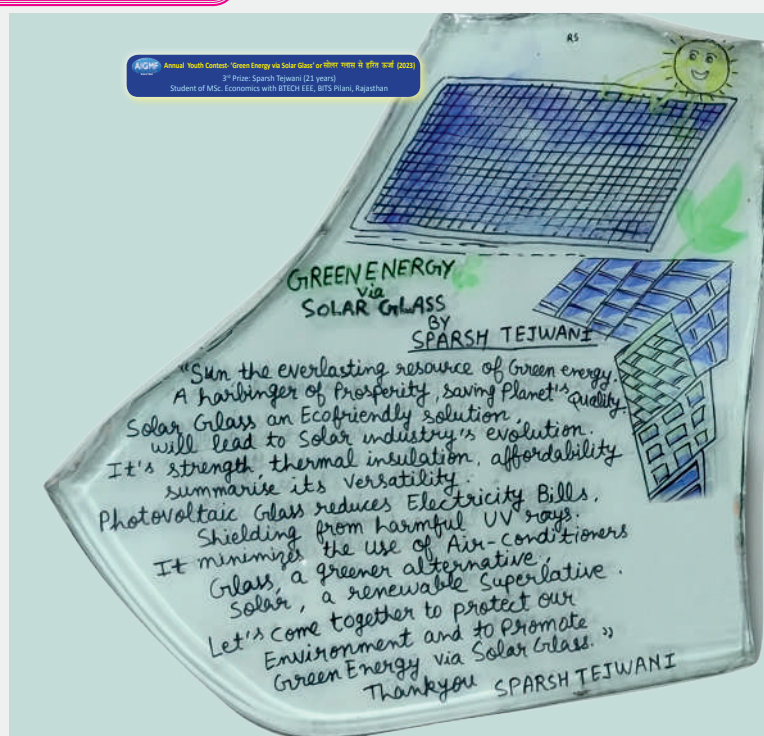
The prize money for the winners was sponsored by Schott Glass India Pvt. Ltd., producing Type I pharma tubing primarily meant for Glass Vials which were also supplied worldwide for packaging COVID vaccination. Mr. Pawan Kumar Shukla, Managing Director said “SCHOTT has entered into a Power Purchase Agreement for running our manufacturing facilities via Wind – Solar hybrid project in Babra, Gujarat, INDIA. In 2020, SCHOTT had announced its plan to become climate neutral across its production by 2030.”

Top 100 entries will get a specially designed 80 years AIGMF Glass Mementoes■

Winning entries can be viewed at www.aigmf.com

included a myriad of entries demonstrating glass as an eco-friendly and sustainable solution that will only increase in importance during the participants' lifetimes. It was a pleasure for Glass Worldwide to be involved in the judging process alongside figureheads from the Indian solar glass sector and we offer sincere congratulations to the worthy winners as well as all participants” said Mr. Dave Fordham, Publisher- Glass Worldwide, United Kingdom and Honorary Member AIGMF. “With sun shining daily in India, 10 new solar glass manufacturing units are being set up to tap Sustainable Energy which is in tune with the Indian government's vision and to boost solar energy needs. This year's Youth contest theme was well-chosen, which is also in line with the objectives of

3rd Prize





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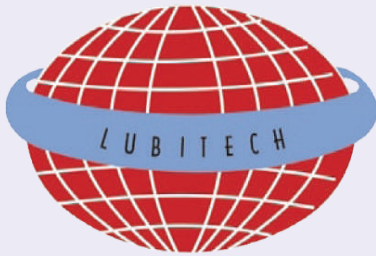
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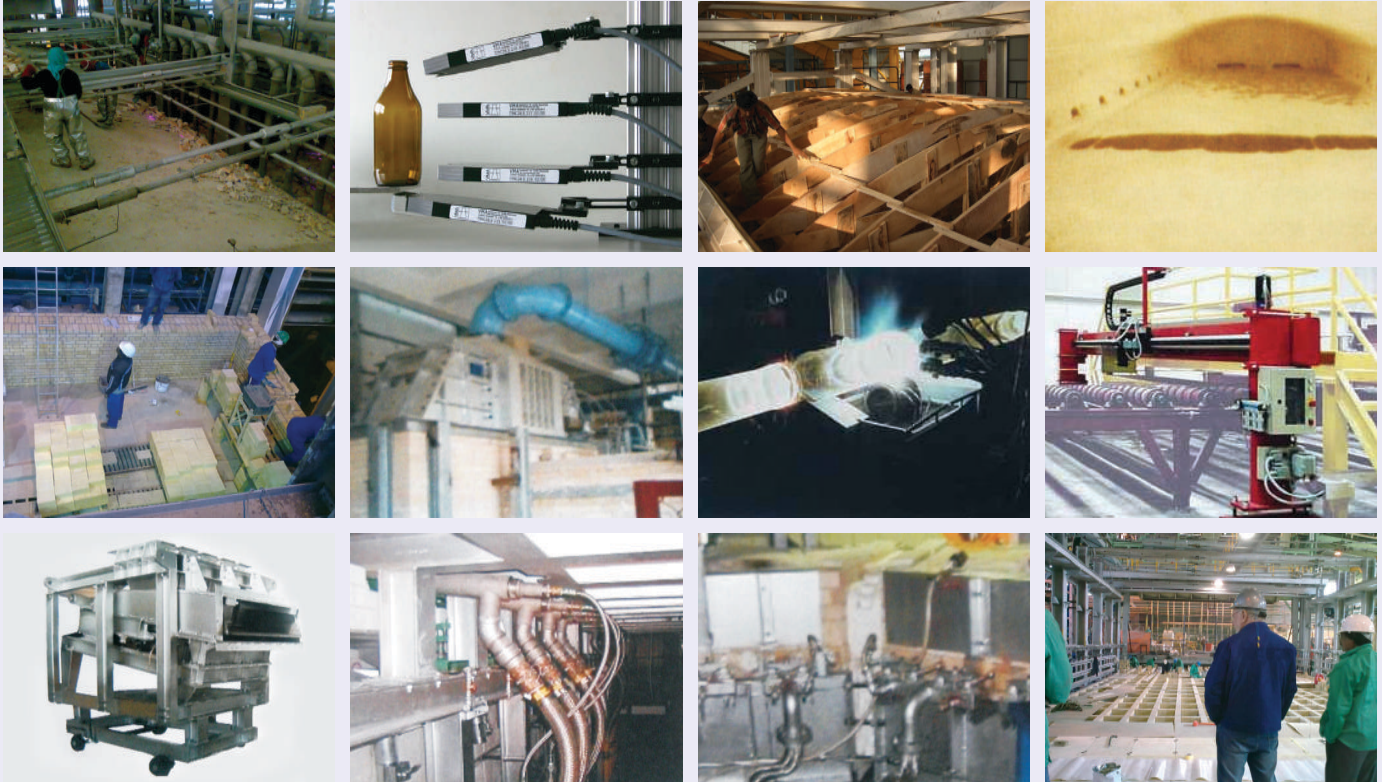


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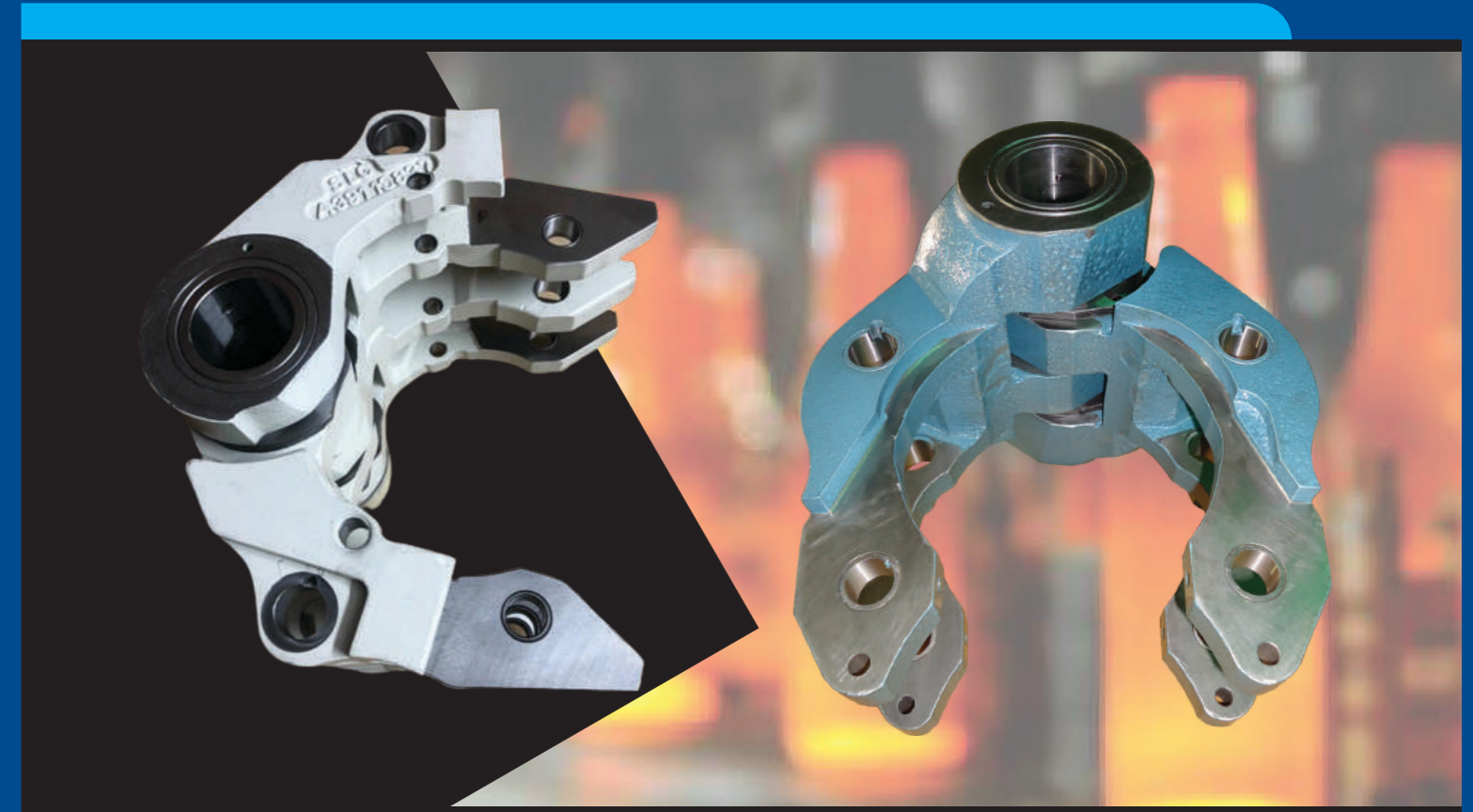


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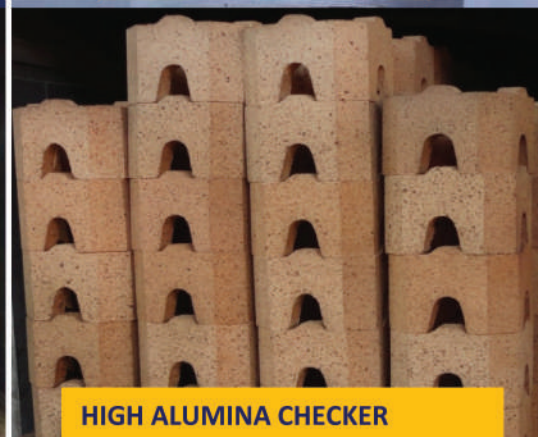
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