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Kañch

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

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GLASS – A Sustainable Building and Packaging material

Prof. (Dr.) A. K. Bandyopadhyay

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

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T: +91 11 2331 6507 F: +91 11 2335 0357 E: info@aigmf.com

Editor MOHAN LALVANI

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Vol. 3 | No. 4 | January-March 2016

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Kanch April - June 2016

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From President's Desk

The Executive Committee of the AIGMF met on March 12, 2016 at Hotel Sea Princess, Mumbai.

An exclusive session on "Glass as Vital Building Material for Smart and Solar Cities" was organized with active support of Central Public Works Department's (CPWD) and other stakeholders in association with Western India Glass Manufacturers' Association (WIGMA).

The session provided an opportunity to debate on use of Glass as a Green Building Material. Presentations were given on Smart Approach in Using Performance Glass to Design Smart Cities, Why Glass is here to Stay and to Grow, Smart Solar Glass for Smart and Solar Cities, Glass for Contemporary Architecture, etc.

As a part of the social responsibility, AIGMF decided to compile some of the articles, published in their quarterly journal KANCH (Glass), encompassing different subjects to release a book on glass entitled as "Glass - A Sustainable Building and Packaging Material" by a well-renowned Glass Technologist, Prof. (Dr.) Asis Kumar Bandyopadhyay.

The book was launched by Mr. Kamal Preet Singh, Special Director General (Western Region) CPWD, Mumbai. Book contains Technical Articles written by Dr. Bandyopadhyay covering Smart / Solar Cities, Glass Packaging and more.

About 60 participants from CPWD, flat and solar glass companies (i.e., Asahi India Glass, Saint Gobain, HNG Float, Gujarat Borosil), Confederation of Construction Products and Services (CCPS), Federation of Safety Glass (FOSG), Architects, Engineers, Glass Technologists, etc., attended the event.

To appropriately gel with the event, an Online Library of Indian Articles in Association with Glass Worldwide was also launched. All Indian Articles published in Glass Worldwide since 2009 have been uploaded online at http://www.aigmf.com/glass-worldwide.php

These articles are freely available and can be downloaded from the website.

As a Corporate Social Responsibility, AIGMF gifted 300 glass water bottles (specially manufactured by Hindustan National Glass and Industries Ltd.) to CPWD for use in their Secretariat, which carried a logo of Swachh Bharat Abhiyaan (Clean India Campaign) enabling people demand responsible and safe packaging. Fifty glass water bottles were also gifted to Hotel Sea Princess by Mr. H.R. Bhandari, President, WIGMA under Swachh Bharat Abhiyaan initiative.

Presentations and select photographs of the event are available at http://www.aigmf.com/past-events.php ■

Sanjay Ganjoo
President, AIGMF
and COO, Asahi India Glass Ltd., Taloja (Maharashtra)

Glass as Vital Building Material for Smart / Solar Cities

&

Book Launch: "Glass - A Sustainable Building and Packaging Material"

An AIGMF Initiative

(Mumbai, March 12, 2016)

The last quarter meeting of The All India Glass Manufacturers' Federation (AIGMF) was organized at Hotel Sea Princess in Mumbai in association with Western India Glass Manufacturers' Association (WIGMA).

In the recent past, AIGMF has made sincere efforts to adopt two most important projects of the Indian Government i.e., Smart / Solar Cities and Swachh Bharat Abhiyaan (Clean India Campaign). Glass Industry has attempted to showcase goodness of glass by organizing special sessions in Delhi, Firozabad and Jaipur involving government and non-governmental organizations.

While in Mumbai an exclusive session on Glass as vital building material for Smart and Solar Cities was organized with active support of CPWD and other stakeholders. The session provided an opportunity to debate on use of Glass as a Green Building Material. Presentations were given on Smart Approach in Using Performance Glass to Design Smart Cities, Why Glass is here to Stay and to Grow, Smart Solar Glass for Smart and Solar Cities, Glass for Contemporary Architecture, etc.

Central Public Works Department's (CPWD) perspective on glass as green building material was shared by Mrs. Usha Batra, Additional Director General and Dr. K M Soni, Chief Engineer, West Zone. CPWD's presentation covered its role in glass buildings in Mumbai with emphasis for use of more solar and flat glass for building Smart Cities. Some of the main points covered in the presentation were:

- Use of Glass allows great amount of natural light giving pleasing aesthetics and better panoramic views, reduces the need for artificial lighting and energizes the interiors
- Double glass can induce acoustic comfort getting control over the outside noise
- Glass tremendously reduce the weight of the structure
- Solar control glasses can reflect heat or UV rays and maintain optimal temperature inside the building

Mr. Sanjay Ganjoo, President AIGMF and COO, Asahi India Glass highlighted that Glass is a very important material for daily life in the entire world. He spoke that Glass is almost synonymous with buildings and packaging, as the building construction industry in pursuit to conserve natural resources and keep earth clean cannot survive without having a strong relation with the glass. It is a natural material for packaging particularly items like food and medicines consumed in abundance by humans. With the advent of 'Smart Cities', glass has more significance even for solar panels for renewable energy.

Mr. V Ramaswami of Gujarat Borosil spoke on Smart Solar Glass for Smart and Solar cities. He mentioned that Solar glass plays an important role in the Photovoltaic module as it protects the solar cells against vagaries of nature. The best Solar glass is the glass which has the lowest iron, highest transmission, lowest potential induced degradation, lower incident angle effect and lowest light induced degradation ensuring that the module lasts for much more than the normal 25-year lifetime"

Mrs. Madhavi Patri of HNG Float Glass Ltd. presented an overview of the use of glass in contemporary Architecture for both interior and exterior applications with special emphasis of performance

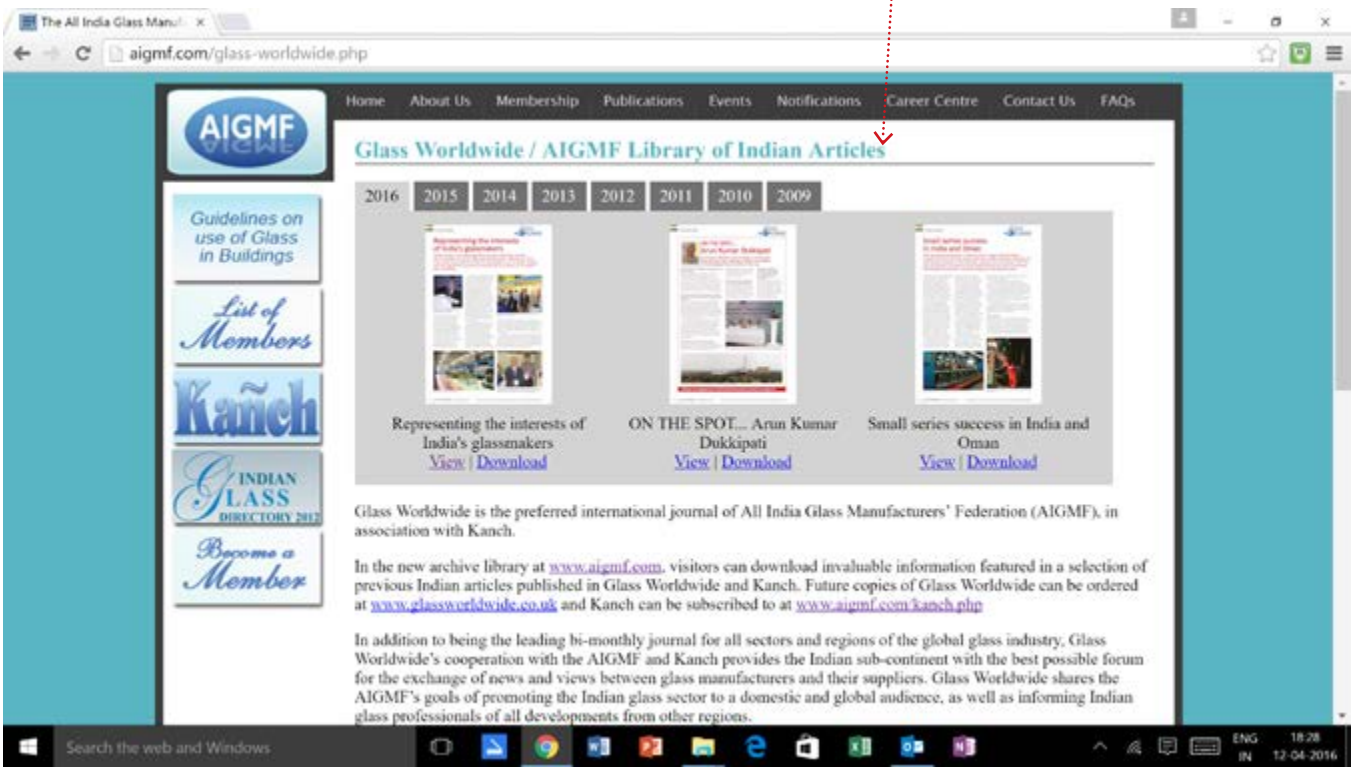
glasses for delivering energy efficient buildings.

As a part of the social responsibility, AIGMF decided to compile some of the articles, published in their quarterly journal called KANCH (Glass), encompassing different subjects to **release a book** on glass entitled as **"Glass - A Sustainable Building and Packaging Material"** by a well-renowned glass technologist, Prof. (Dr.) Asis Kumar Bandyopadhyay with a strong International background to serve the purpose of rejuvenating both the building and renewable energy sectors so that a ready-made knowledge is available at hand.

The book was launched by Mr. Kamal Preet Singh, Special Director General (Western Region) CPWD, Mumbai. Mr. Singh emphasized that for buildings, the float glass or sheet glass is used for mainly doors and windows, but in the modern buildings, there is also need for facades in different colours. Book contains Technical articles written by Dr. Bandyopadhyay covering Smart / Solar Cities, Glass Packaging and more.

To appropriately gel with the event, an Online Library of Indian Articles in Association with Glass Worldwide was also launched. All Indian Articles published in Glass Worldwide since 2009 have been uploaded online at http://aigmf.com/glass-worldwide.php. These articles are freely available and can be downloaded from the website.

Mr. Dave Fordham, Publishing & Events Director, Glass Worldwide said that "We are very pleased to be associated with this new initiative that will provide an easily accessible round-up of previous Indian-related articles published in Glass Worldwide. In addition to being circulated to our global readership, many of these market reports and interviews already received extra exposure when also being published in Kanch as part of our exclusive cooperation



with the AIGMF. Now their shelf lives have been extended indefinitely via the AIGMF archive library and we are very confident that Indian and global glass professionals will find this resource very useful now and in years to come".

As a Corporate Social Responsibility, AIGMF gifted 300 glass water bottles *(specially manufactured by Hindustan National Glass and Industries Ltd.)* to the CPWD for use in their Secretariat, which carried a logo of Swachh Bharat Abhiyaan enabling people demand responsible and safe packaging. 50 glass water bottles were also gifted to Hotel Sea Princess by Mr. H.R. Bhandari, President, WIGMA under Swachh Bharat Abhiyaan initiative.

Mr. Arun Kumar Dukkipati, Sr. Vice President, AIGMF said that apart from flat glass, container glasses are also used in modern 'Smart Cities' for tumblers, bottles, cooking wares, etc., at home and eateries. He said that Glass is the trusted and proven packaging for health, taste and the environment and is directly linked to Swachh Bharat Abhiyaan as it is 100% recyclable and can be recycled endlessly without loss in quality or purity. He further stated that Glass has an almost zero rate of chemical interactions, ensuring that the products inside a glass bottle keep their strength, aroma, and flavor.

In addition to AIGMF members, the participants included from CPWD, flat and solar glass companies (i.e., Asahi India Glass, Saint Gobain, HNG Float, Gujarat Borosil), Confederation of Construction Products and Services (CCPS), Federation of Safety Glass (FOSG), Architects, Engineers, Glass Technologists,etc.

The event concluded with question answer session moderated by author of the book, Prof. (Dr.) Asis Kumar Bandyopadhyay, who mentioned that there is low emissivity glass called E-glass which is normally used in modern buildings for keeping them cooler in hot summer months and warmer in cold winter periods. It is also used as flat-screen products, such as Tablets, TVs, Computers, Cellphones, Public Signboards, etc., for information dissemination. The advantage of glass in terms energy saving and in producing renewable energy far outweigh the so-called bad effects of using glass in our buildings -- not to forget that glass is definitely environment-friendly.

Presentations and select photographs of the event are available at http://www.aigmf.com/past-events.php ■

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Phone +91 (0)11 4855 0011
Fax +91 (0)11 4855 0099
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GLASS News

Prof. (Dr.) Devendra Kumar eyes close Partnership with Glass Industry

Recently in March 2016, Prof. Devendra Kumar, a senior Professor of Indian Institute of Technology (BHU) Varanasi, a Honorary Member of AIGMF and member Editorial Board 'KANCH' has taken charge as Head, Department of Ceramic Engineering, which is an oldest Department of Glass and Ceramic Technology in India (Established in 1924). This is his second term. He served previously as Head during 2006-2009. Prof. Devendra Kumar is an accomplished personality in the field of Ceramic and Glass Science and Technology. He is an academician, researcher and works in multifarious dimensions. Working in the areas of Electro-Ceramics, Glass Ceramics, Bio-Ceramics and Metal Matrix Composites he has published 230 research articles and supervised 20 Ph.D. and 80 M. Tech. Scholars. He is having a strong group of scholars from his and allied disciplines. He is having collaborators not only from academia but also from Industry. He has been granted several projects by DST, CSIR, DRDO and UGC, GoI. He has been awarded Materials Research Society of India Medal in 2002 and Padamshri Late Dr. T. N. Sharma Memorial Award 2013 of Indian Ceramic Society. Prof. Devendra Kumar was member of the Governing Council, Centre for Development of Glass Industry, Firozabad (U.P.) under MSME and presently acting as Chairman, Advisory Committee, CSIR-Central Glass & Ceramic Research Institute, Kurja Centre, Khurja (U.P.). He is Fellow of Institution of Engineers and Indian Institute of Ceramics. Since 2011 he is associated with AIGMF and working for Industry-Academia collaboration for sustainable development and usage of Glass. He has visited many glass industries under auspices of AIGMF and contributed many technical articles based on his visits to "Kanch".

Prof. Devendra Kumar is also an academic innovator. During his tenure as Head, Department of Ceramic Engineering (2006-09), he made dedicated effort for making Masters and Doctoral programs of Ceramic Engineering a truly interdisciplinary programme. It enhanced research potential of the Department many fold. During 2003-05 he was key person in the initiation of Integrated Dual Degree and Integrated Master Degree Programs, creating new dimensions of academics in the Institute. Presently working as Chairman, UG Curriculum Review Committee of IIT (BHU) Varanasi he developed a Project based UG Curriculum, with the concept of weaving research and innovation in undergraduate programmes. In this curriculum the students will be educated along a specified stream of his / her discipline, where he/she will have opportunity to work on projects and study the related stream courses over a period of 2-3 years. It will not only enhance quality of the projects, but the students will have in-depth skills and understanding of their discipline. A substantial outcome can be achieved through this. The

DEVENDRA KUMAR
Professor & HOD, Department of Ceramic, Indian Institute of Technology (Banaras Hindu University)

Institutions may become technology creators.

After taking charge as Head of the Department he is constantly interacting with different stake holders for formulating the vision of a century old Department. The Vision is to identify different domains of growth and work for the same. The different domains for growth as emerges today may be listed here:

1. Continuous Curriculum Development
2. Research in frontier areas
3. Development of infrastructure for education, research, development, testing and training
4. Materials and Technology development
5. Partnership with R & D Institutions and Industries

Partnership with Industries is one the very important domains, where a sustainable partnership between

Academia and Industries will be developed for education, research, development, testing and training. It will boost the quality and motivation of graduating Ceramic Engineer. The industries employing them will be greatly benefited. The creation of high quality research, development and testing facilities are not economically viable for all industries and creation of such central facility at central location of IIT (BHU) on partnership basis will be economically viable and all stake holders will be equivalently benefited. He proposes holding workshops, conferences and meetings jointly organized by IIT (BHU) and AIGMF at some regular intervals.

glasstec 2016 Presentation in Mumbai

Presentation on glasstec 2016 the International Trade Fair for Glass Production, Processing & Products was organized by Messe Duesseldorf GmbH, Germany, together with Messe Duesseldorf India Pvt. Ltd., on March 21, 2016 at The Orchid Hotel.

The Presentation was made by Mr. Michael Degen, Executive Director, Messe Duesseldorf GmbH, Germany and Mr. Timo Feuerbach, Managing Director, German Engineering Federation (VDMA) – Forum Glass Technology, Germany. Also present were Mr. Thomas Schlitt, Managing Director and Mr. Xavier Rebello, Director of Messe Duesseldorf India Pvt. Ltd.

The event was attended by around 50 people from the Indian Glass Industry, Press & Travel Agencies.

Mr. Michael Degen informed that Glasstec event is held once in two years in Düsseldorf and that it is the must attend event for everyone in the glass industry, who wants to be well positioned with his company or institution in the glass sector. Glasstec is the place where the latest innovations, industry trends and future applications connected with the material glass can be experienced. It supplies you with the networking opportunities and know how that you need to be right up front in the industry for the coming two years.

2016 glasstec will be held in Duesseldorf in September 2016 from 20th to 23rd.

glasstec brings together top decision makers from all over the world.

From manufacturing of glass through processing and finishing to final application – all major players are present at glasstec. In addition to these three target groups, glasstec is also attractive for architects, construction engineers and facade planners as well as for representatives from the solar industry.

Glasstec is not only a meeting and business platform but by being the top of mind trade fair of course it is as well the first place where technological and product innovations are brought to market.

In 2016 the glasstec will focus on free-form, ultra-thin, massive and informative glass and thereby show possible applications for architects and planners but also new fields of applications made possible through advanced glass products.

MCX shares energy price risk management tips with glass makers

Multi Commodity Exchange (MCX) organised an educational programme on 'Energy Price Risk Management' for the members of The All India Glass Manufacturers Federation in Mumbai on March 12.

Senior MCX officials explained to the members how price risk management tools can facilitate effective hedging and help them make their business projections on the basis of a predetermined price of input fuel at a nominal cost.

Glass manufacturers use the by-products of crude oil as an energy source in the melting furnaces. MCX and The All India Glass Manufacturers Federation had in 2011 signed a Memorandum of Understanding to spread awareness about the energy futures segment.

The officials explained that the vital components of energy for the glass industry such as natural gas and other liquid fuels like furnace oil and LSHS are subject to high price volatility. These energy commodities are highly influenced by volatility in the global energy market. However, the price risk from these products can be managed by energy derivatives traded on MCX, which trade by taking price cues from international benchmark markets.

"This volatility in international crude oil prices also has its impact on the prices of domestic fuels and, hence, calls for a tool to mitigate this risk. MCX offers crude oil futures contracts that satisfy this need for hedging against the volatility in the prices of such fuels," said Mr. Deepak Mehta, Vice President at MCX.

He said MCX offers two size variants of crude oil futures contracts - 100 barrels and 10 barrels - to suit the requirements of the participants.

Mr. Deepak Mehta, Vice President, MCX giving presentation to AIGMF Members

Mr. Sanjay Ganjoo, President of The All India Glass Manufacturers Federation said, "With more and more uncertainty and unpredictability in the global markets, and integration of financial markets across the world, it is time for businesses to address oil price risk by crafting appropriate hedging strategies."

Mr. Ganjoo said this becomes even more relevant and important for consumers of petroleum products and natural gas as the volatility in oil and gas prices percolates to the downstream sector. Thus, use of crude oil futures contracts by glass manufacturers will prove effective for managing their fuel price risk, he said.

Global Cleantech Innovation Programme for SMEs in INDIA- 1st Regional Workshop at Firozabad (January 19, 2016)

The first regional workshop on under the GEF UNIDO Cleantech Programme for SMEs in India was organized by Alliance for an Energy Efficient Economy (AEEE)at Hotel Monark in Firozabad on January 19, 2016. The workshop saw enthusiastic participation from the glass industry in Firozabad. More than 50 participants attended the workshop, which was well supported by the Uttar Pradesh Glass Manufacturers Syndicate (UPGMS), The All India Glass Manufacturers Federation (AIGMF) and the Glass Industries Syndicate.

The workshop began with opening remarks by Dr. Koshy Cherail, President of Alliance for an Energy Efficient Economy (AEEE). Dr. Cherail welcomed all the participants at the workshop and highlighted the growing importance of energy efficiency in wake of the government's commitment towards providing 24x7 power to all the households. He spoke about the innovations that are being made by the small and the medium enterprises in the field of energy efficiency and the support extended by the United Nations International Development Organisation (UNIDO).

In wake of the thrust that is being given to the Green Industry, Ministry of Micro Small and Medium Enterprise and Global Environment Facility (GEF) joined hands to fund a unique programme by the name of MSME GEF UNIDO Cleantech Programme for SMEs which was launched in New Delhi in May 2013 jointly by the Ministry of MSME, United Nations Industrial Development Organisation (UNIDO) and Global Environment Facility (GEF). Under the supervision of the UNIDO Project Manager, and in close cooperation with the National Project Coordinator and Project Management Unit (PMU), Alliance for an Energy Efficient Economy (AEEE) as one of the national counterpart executing agencies conducted the first workshop related to Global Cleantech Innovation Programme.

The Global Cleantech Innovation Programme, primarily aims at identification and promotion of clean technology innovations in SME sector in the four clean technology areas: Energy Efficiency, Renewable Energy, Waste to Energy and Water Efficiency.

After the opening remarks, Amrit Raj (Ms.), National Project Coordinator, GEF UNIDO CLEANTECH Program, Development Commissioner Office, Ministry of MSME addressed the gathering comprising of members of the two local glass associations. In her presentation she highlighted that it is imperative to promote sustainable development and reduce carbon footprint by the introduction of new technology and innovation. The objective is to enable all the small and the medium enterprises to become energy efficient and adopt clean technologies by 2025.

The need for creating awareness among the glass industry in Firozabad was felt so that they could also develop as well as adopt innovative measures with an aim to become more energy efficient. The conventional technologies which are currently prevalent in the glass industry are currently low on energy efficiency, thereby resulting in unwarranted use of fuel consumption and expenditure. Further, most of the machinery is low on profitability and there are high levels of emissions.

The real message that was driven across in the workshop was to find as well as showcase new ways through which the medium and small enterprises would be able to meet the challenges of the rapidly changing technology, increase the productivity and competitiveness.

While interacting with the glass and bangle manufacturers at the workshop, it was found that the furnaces that were designed were high guzzlers of energy. It is important to do capacity building of the proprietors who came to attend the workshop.

During the workshop, case studies were discussed with regards to the new innovations that were identified under the GCIP programme and how they were benefitting from it.

Mr. GurinderJeet Singh of Delta Energy Nature, who was one of the semi-finalists at the GCIP programme, addressed the audience and showcased his innovation to the audience and how much of energy he was saving by developing a furnace. One of the sections of the furnace was made highly efficient and the insulation was improved so that the skin temperature does not exceed more than 60 degree centigrade and the temperature had to be controlled within narrow range.

In the presentation made by Mr. Pradeep Kumar of AEEE, he showcased to the audience the innovations that were selected by UNIDO under the GCIP programme and how the organisations benefitted from them. He also highlighted various

energy efficiency opportunities which are available in the glass sector, especially in Firozabad, as it is a highly energy intensive industry.

One of the ways by which the glass industry can become energy efficient is by the use of recuperator; using muffle furnace for baking the glass bangle; reheating the furnace for reheating of glass lumps.

He also showcased the innovation made by Jyoti Cero Rubber who developed an energy efficient and reliable conveyor system. Before the development of an energy efficient conveyor system, there used to be frequent breakdowns of conveyor lines, thereby resulting in loss of production of 25-30 lakh in eight hours and due to frictional losses, there was high energy cost.

However, with the use of the new technology, the energy savings have been 10-12%. One of the accomplishments of Jyoti Cero Rubber has been that Tata Steel adopted their technology and had replaced 30 per cent of the total conveyer line.

The other case study showcased at the event included that of Agnisumukh who developed a burner, which produced flameless, smokeless and noiseless uniform radiant heat just like charcoal, by using LPG as a fuel source.

The advantages of the innovation were that it helped in faster cooking thereby saving almost 30 per cent of the time. It helped in the accomplishment of thermal efficiency at 69% as compared to conventional burner at 45% and there was no emission of carbon soot. Moreover there was 50% water and detergent saving.

Mr. Sanjay Agarwal, Secretary of UP Glass Manufacturers Syndicate and Treasurer AIGMF hailed the initiative undertaken by AEEE and UNIDO as it created a lot of awareness among the participants about the GCIP programme and inspired them to innovate.

SCHOTT India conducts its FIOLAX® Scholarship Program for the second year

In the second year of SCHOTT FIOLAX® Scholarship Program, SCHOTT awarded nine scholarships to meritorious students pursuing Bachelors (B. Pharmacy) and Masters (M. Pharmacy) Degrees in Pharmacy in Mumbai and Gujarat.

Seven B. Pharmacy students: Ms. Rachana Subhash Kelkar, Ms. Deepika Ratanlal Patel, Mr. Rehman Irfan Jirait, Ms. Rupali N. Madapura, Ms. Vrishali Salian, Ms. Malvika Rangu Chandnani and Mr. Deep Raithatha, and two M. Pharmacy students, Ms. Shachi Vipul Kumar Bheda and Ms. Khushboo Patel were awarded gift cheques of Rs. 25,000/- each by Mr. Sundeep Prabhu, Vice President Sales and Marketing, SCHOTT Glass India Pvt. Ltd during a special award ceremony. The winners have also been offered an exclusive tour of SCHOTT Glass India's pharmaceutical tubing plant in Jambusar District, Gujarat.

After the successful launch of the Scholarship program last year wherein SCHOTT awarded financial aid of Rs. 25,000 each to six candidates from Mumbai, the number of recipients was increased to nine. "Due to a very encouraging response from students and faculty, SCHOTT decided to expand the program both geographically and in number of students supported. We feel proud that a second time in a row, this year, most scholarships have been bagged by young women pursuing B. Pharmacy and M. Pharmacy", said Mr. Prabhu.

"With increased demand for patient services and the growing number of prescriptions filled each year in India, we feel it is our responsibility to recognize the outstanding academic performance, dedicated commitment and community service of the most promising pharmacists of India" Mr. Prabhu shared. "We feel honoured to encourage qualified individuals to fulfill open positions in the field of Pharmacy and to leverage their skills during their academic progression through this program."

Winning students from Mumbai at the award ceremony with SCHOTT representatives and college professor.

The process of selecting candidates for the SCHOTT FIOLAX® Scholarship Program 2016 was completed in December 2015, in which nine meritorious students were shortlisted from various colleges in Mumbai and Gujarat. More than 100 applicants were able to clear the eligibility criteria that demanded more than 70 percent in Second Year for B. Pharmacy and M. Pharmacy students. It took more than six months to complete the screening process.

Change at the top of BV Glas – Dr. Frank Heinricht takes over Presidency for glasstec 2016

The Federal Association of the Glass Industry (Bundesver band Glas industriee. V.) has elected Dr. Frank Heinricht, Chairman of the Board at Schott AG, for its new President. This means he will also take office as President for glasstec 2016. Presidency for this, the world's leading trade fair alternates in line with its two-year cycle of glasstec between the Bundesver band Glas industriee. V. (BV Glas) and the Federal Association of Glazier Trades (BIV). Both organisations alongside the VDMA, the German Engineering Industry Federation (Verband Deutscher Maschinen- und Anlagenbauere.V.). serve as conceptual sponsor of glasstec.

CCPS organized two Training programs on "Use of Glass and Glazing Systems in Buildings" and "Selection of Appropriate Glass in Modern Buildings" in February 2016

Use of Glass and Glazing Systems in Buildings at IBC, New Delhi

In the endeavor of promoting appropriate glass use in buildings, Confederation of Construction Products and Services (CCPS) organized two days training on "Uses of Glass and Glazing systems in buildings" for Govt. officials of various departments and professionals in collaboration with Indian Buildings Congress (IBC) on Feb 23–24, 2016 at IBC Head Quarters, New Delhi. The program was participated by 47 senior officers from various departments, which included Military Engineering Services, PWD Delhi Govt., Airport Authority of India, Delhi State Industrial and Infrastructure Development Corporation Limited, Western Railway, Kindle fire protection, Stanley Black & Decker, Wellwood and Consultants & Professionals from industry. A group of seven participants comprising of faculty and students of Amity School of Engineering & Technology (ASET), Amity University, Noida were also invited to attend the program. The participants were exposed to the various types of glasses, manufacturing process, properties, fire/human safety, energy conservation, Wind & Seismic load and facade design requirements, ECBC, GRIHA & IGBC parameters and codal provisions, smoke exhaust and motorized solutions etc along with associated materials like hardware, Silicones and Sealants.

The Training Program started on Feb 23, 2016 with a Key Note address by Mr. Deepak Gahlowt, Convener, CCPS and introductory remarks and overview on types of glass and its applications by Mr. D. S. Sachdev, Former Director General, CPWD. Various topics on Glass and Glazing system were covered in 11 sessions on both the days by the industry experts and professionals which include Mr. Jaskirat Singh, Saint Gobain India Pvt. Ltd.; Mr. Sourabh Kankar, Gujarat Guardian Ltd.; Mr. Hatinder Vohra, Saint Gobain India Pvt. Ltd; Mr. Shashi Kant, Adviser, CCPS and former Dy. Adviser,

Planning Commission; Mr. Sandeep Choudhary, Director, Glaze Tecno India, Mr. Gopal Kumar & Ms. Jignasa Suthar, McCoy Soudal Sealants; Mr. Andreas Deil & Mr. Frank Korbel, Pilkington Deutschland AG Germany, Mohd. Hasham, Ozone Overseas Pvt. Ltd.; Mr. Ashim Chugh, LGF Sysmac India Pvt. Ltd. The program was supported by participating CCPS members.

Participants were given certificate for attending the Training Program along with the CD of presentations and teaching material for further propagation and dissemination of the knowledge in their respective departments. Participants were also invited to visit glass processing and manufacturing plants. This was the third two days training program on glass subject organized by CCPS in collaboration with IBC and was very much in demand.

Selection of Appropriate Glass in Modern Buildings at Hotel Ambassador, New Delhi

Confederation of Construction Products and Services (CCPS) organized one-day training program on Feb 27, 2016 in collaboration with Xebec Education at Hotel Ambassador, New Delhi. Mr. Deepak Gahlowt, Convener CCPS and Director, Xebec designed the contents of the course covering A to Z of glass. The training course covered the basics of glass selection in relation to Heat Control, Acoustics, Thermal Breakage, Safety against impact & fire and security, Quality parameters for insulated, laminated and other processed glasses and many more. Mr. Punitt Sharma, Director, AGV ALFAB Ltd and Mr. Harish Sokhi, Consultant, Wellwood India covered the topics on Façade Solutions and Hardware respectively. The program was supported by AGV ALFAB Ltd., CCPS and Xebec Education.

The program was attended by 40 participants comprising of senior architects, engineers, project managers, professionals and consultants from various prominent organizations like Xebec Design and facilities Pvt. Ltd., Abhimanyu Dalal Architects, AGV ALFAB Ltd, Urban Arc, S. P. Phogat Architects, Mahamaya Infra, and architect students. CCPS planned to organize similar training programs in collaboration with Xebec Education in other parts of the country.

Heye offers retrofit solutions for every budget

Retrofitting of existing inspection machines is often a good alternative to buying a new one. Existing modules and toolings can be used further. On the Heye site in Nienburg, Germany, there are skilled technicians who have comprehensive experience with the different variants of inspection machines.

Generally, there are two types of inspection machines, which are ideal for retrofitting: The CO starwheel machine and the M1. Both are still very popular and in use in many plants. Beside the financial advantage, refurbishment of an old machine also brings along further benefits: The retrofitted machine is equipped with a reliable and state-of-the-art Smart Line machine control, latest servo components can be installed. Spare parts and toolings are provided for a long period of time. Mechanical parts are also retrofitted and the machine gets a completely different, modern look. Finally, the retrofitted machine increases a plant's productivity. ■

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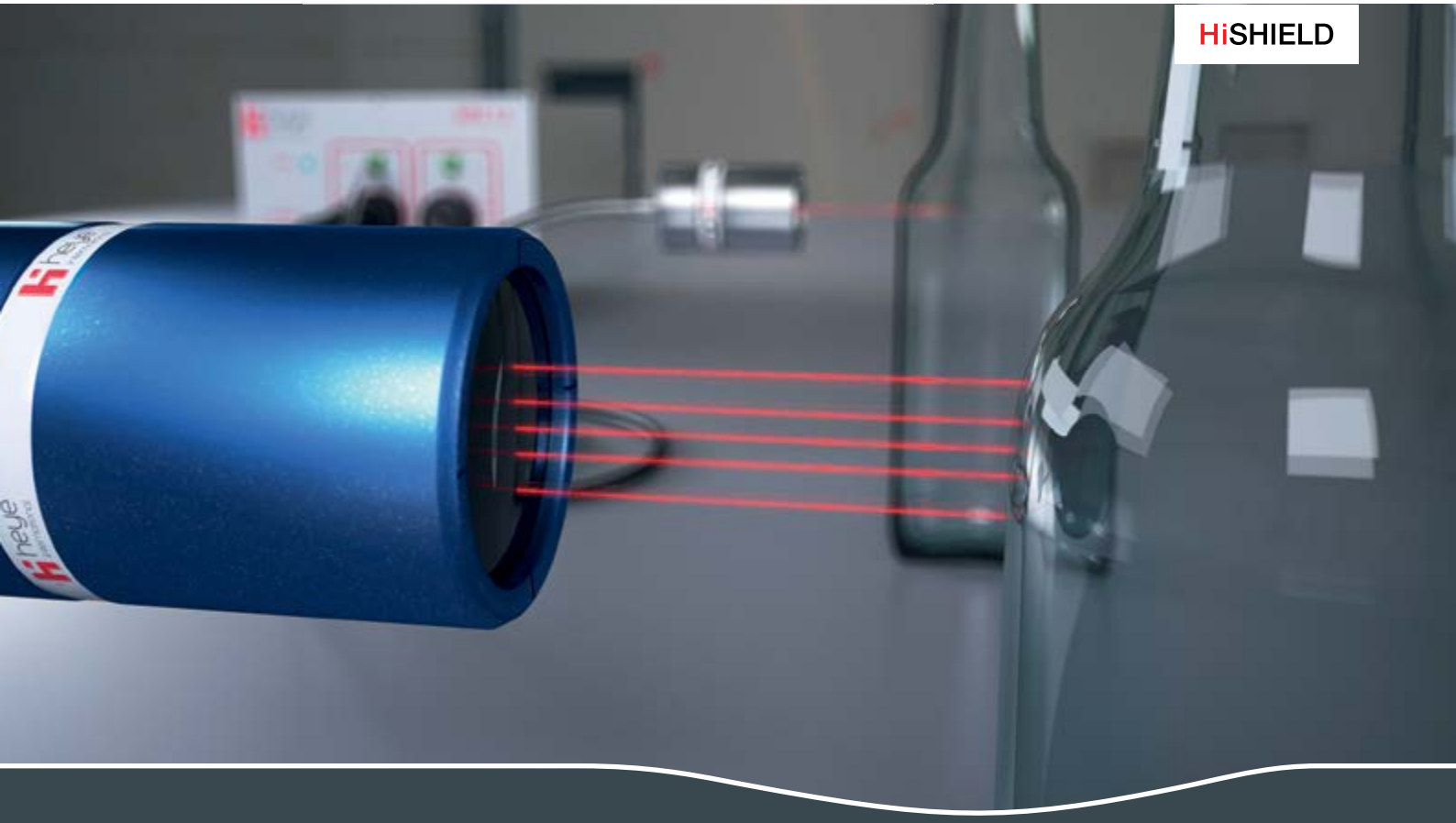

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Smart City and Glasses for Flat-Screen Products – Part II

Prof. (Dr.) A. K. Bandyopadhyay
Technology Consultant & Ex-Principal
Govt. College of Engg. & Ceramic Technology
West Bengal University of Technology, Kolkata
asisbanerjee1000@gmail.com

Abstract:

For designing and creating 'Smart Cities' in India, there is no doubt that a huge demand is coming up for float glass for windows and doors, and also there is a new surge of activity to equip these cities with various types of gadgets – mainly electronics type that needs glass flat-screen products. So, the terms such as 'Smart City' and 'glass technology' are quite synonymous or rather compliment each other. This new entity of 'Smart City' also needs glass 'flat screen' products and gadgets for various types of electronic displays and information systems. In the previous issue of KANCH, an article on glass science behind the production of such flat-screen products was written to highlight the importance of estimating the liquidus temperature (i.e. thermodynamic) and liquidus viscosity (i.e. kinetic) for better understanding of the required properties. In Part-II of this topic, various other aspects of 'flat-screen' glasses are described with an angle on different applications.

INTRODUCTION

In our modern day living, various electronic items, such as Widescreens, Tablets and Smartphone involving flat-screens, have almost no parallel example in terms of their utility and importance, whereby the aggregated demand for flat-screen products will shot to about 2.5 billion pieces in 2017. India is not far behind in this race and in case of recent Skill-India movement by Govt. of India, such demand will exceed the 100 million mark with about 57% annual growth rate. This is due to the fact that these gadgets and various other types of devices that are necessary to make the smooth running of the general administration of different public utilities successful, in a smart-city format, also need huge amount of displays of flat-screen variety made of glass. To make these 'Smart Cities' energy efficient, there is also a great need of creating 'green energy' installations, as already pointed out in several articles of KANCH. It is quite pertinent to attract the attention of the 'climate change' proponents for no adverse reactions, as electronics industry is environment-friendly causing no carbon footprint.

It is also pertinent to mention that although the glass industry creates some pollution, its effect on building Smart Cities should be categorically added to the zero effect of electronics and building construction industries – the main components in the Smart-City entities – eventually to calculate the overall "impact" of such business activity on our environment. This should be taken as an important tool for developing strategy for any relevant discussion on glass industry by AIGMF to the Govt of India and other concerned authorities.

For 'Smart Cities' to be run effectively and also efficiently, we need more and more of such smart gadgets, particularly the products involving 'flat screen' with touch-screen facility in public utility or locations for letting people know different types

of necessary public information. So, there is no point of assessing the 'actual demand' of such products at this moment, as it will be continuously evolving, along with many other types of glasses, such as float glasses for windows, doors for shops and offices, E-glass for smart windows, and also a large segment of container glasses that are needed by domestic as well as commercial users. However, the important point to be mentioned here is that it is overall good for the glass industry, as mentioned in several recent articles of KANCH **[1,2]**, and it is definitely of great concern to AIGMF.

In a previous article in KANCH **[3]**, it was shown that to design new oxide glasses for the next generation of such flat-screen items, there is a clear need of fine-tuning various properties simultaneously, such as viscosity, coefficient of thermal expansion, elastic moduli, chemical durability, etc. However, some of the most important properties to consider are "liquidus temperature" and "melt viscosity" to strike a balance between thermodynamics and kinetics of the concerned system of glass. In Corning Glass Works (USA), a new system of SrO-Al2O3-SiO2 glass-forming composition with SiO_2 contents of 65–80 mol% and alumina contents of 10–15 mol%, it was found that the liquidus temperature decreases as the SrO/Al2O3 ratio increases. A Similar trend was also observed in the MgO–Al_2O_3–SiO_2 system for increasing MgO/Al_2O_3 and in the CaO–Al_2O_3–SiO_2 systems for increasing the ratio of CaO/Al_2O_3 **[4]**. In this article, the flat-screen products are briefly described in terms of quality and various segments of items. First of all, let us give a historical perspective, which is important to understand the impact of such products in the field of electronics.

HISTORICAL PERSPECTIVE

The products with flat-screens are also described as "Flat Panel Displays" (FPDs), which covers a growing number of electronic visual display technologies. These items are generally far lighter and thinner than traditional television sets and video displays, which are known to use cathode ray tubes (CRTs). They are usually less than 10 cm (3.9 in) thick. The FPDs can be further divided into two general categories of display technology, i.e. volatile and static.

For many modern devices such as computer laptops, mobile phones, digital cameras, camcorders, point-and-shoot cameras, and pocket video cameras, the portability is the name of the game. For such devices, there are certain display disadvantages, which are made up for by the advantages of portability. Most of the modern FPDs use LCD technologies and they are portable. Most LCD screens are back-lit to make them easier to read in bright environments. They are thin and light. They provide better linearity and higher resolution. The latter is quite important to give certain edge to the products in the fierce marketing competition.

There is also a Multi Functional Monitor (MFM), which is a FPD that has additional video inputs that is more than a typical LCD monitor. It is designed to be used with a variety of external video sources. In many cases, an MFM also includes a TV tuner that makes it similar to a LCD TV, which offers computer connectivity.

General Electric (GE) is one of the largest multinational corporations in the USA for developing and marketing a large number of electronic products with a combined sales revenue of about 250 billion US$ (Rs. 17 lakh crores). For flat-screen TV, there is need of a good amount of engineering. GE is the first company in the world to have made such a proposal for a flat panel TV, while developing a 'radar monitor' for various applications. Their finding on such efforts was published which gave all the basics of future flat panel TVs and monitors. However, GE did not continue with the R&D that is required and never built a working flat panel after the basic research was completed **[5]**.

It should be mentioned here that a large number of electronic products were developed by private sector players in Europe and USA for defense establishments. In the process of such endeavours, many other conjugate, hybride and novel items were co-developed and/or co-discovered that found a great admiration in our day-to-day modern living. One example is that the first production of FPDs was the "Aiken Tube" that was developed in the early 1950s and produced in limited numbers in 1958. This type of item witnessed some use in military systems as 'special displays', but conventional technologies overtook its development. Then, there were attempts to commercialize the system for home TV that ran into continued problems and the system was never released commercially **[6]**. The Philco Predicta featured a relatively flat panel for its day CRT setup and it was meant to be the first commercially released "flat panel" upon its launch in 1958, but the Predicta was a commercial failure.

The University of Illinois at Chicago (UIC) is one of the top US Universities that is known for its excellence in research and development work in the field of electronics. The plasma display panel was first invented at the UIC in 1964, according to 'The History of Plasma Display Panels, as reported in **[7]**. The efforts are still continuing for further development of quality.

There is also a large research establishment in the USA employing thousands of engineers and technologists called Westinghouse Electric Corporation (WEC). The first-ever "active-matrix addressed" display was made by the department of 'Thin-Film Devices' at WEC in 1968 **[8]**. As of 2012, 50% of global market share in flat panel display (FPD) production are solely dominated by Taiwanese manufacturers such as AU Optronics and Chimei Innolux Corporation (AUOCIC). Let us discuss about various types of displays.

COMMON DISPLAY TYPES

There are many types of displays for different types of applications. Some of these are mentioned below to get an idea on the overall subject.

Liquid Crystal Displays (LCD) →

LCDs are lightweight, compact, portable, cheap, more reliable, and easier on the eyes than CRTs. A thin layer of liquid crystal, a liquid that exhibits crystalline properties, is sandwiched between two electrically conducting plates. The top plate has transparent electrodes deposited on it, and the back plate is illuminated. By applying proper electrical signals across the plates, various segments of the liquid crystal can be activated, causing changes in their light diffusing or polarizing properties. These segments can either transmit or block light. An image is produced by passing light through selected segments of the liquid crystal to the viewer. They are used in various electronic items like watches, calculators, and notebook computers, and also different types of displays, as seen in the Railway Stations, Airports, Public Places, etc. The importance of such illuminated displays to draw attention to the public was mentioned in Ref. **[3]** for 'Smart Cities'.

LCDs with Light Emitting Diodes (LED) →

A light-emitting diode (LED) display is a two-lead semiconductor light source that resembles a basic pn-junction diode as the main architecture, except that an LED also emits light. This form of LCD (liquid crystal) display is the most common and most pervasive in use today. This type of LCD display is still a Liquid Crystal Display that uses a LED (light emitting diode) backlight. It is not a separate technology from a LCD display.

Plasma Panels →

A plasma display, as initially developed in the University of Illinois at Chicago (USA), consists of two glass plates separated by a thin gap filled with a gas, such as neon. Each of these plates has several parallel electrodes running across it. The electrodes on the two plates are at right angles to each other. A voltage applied between the two electrodes one on each plate causes a small segment of gas at the two electrodes to glow. The glow of gas segments is maintained by a lower voltage that is continuously applied to all electrodes.

Electroluminescent Panels →

In an electroluminescent display (ELD), the image is created by applying electrical signals to the plates which makes the phosphor inside the system glow.

Organic Light Emitting Diode →

An OLED (organic light-emitting diode) is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound which emits light in response to an electric current. This layer of organic semiconductor is situated between two electrodes; typically, at least one of these electrodes is transparent. OLEDs are used to create digital displays in devices such as television screens, computer monitors, portable systems such as mobile phones, handheld game consoles, PDAs and many others.

A major area of research is the development of white OLED devices for use in solid-state lighting applications, for which there is a tremendous effort in many important laboratories, as reported in **[5]** to **[7]**. The glass technologist must keep abreast of this knowledge data-base to be able to design and plan for fabrication of various new glass product items in this ever-growing field.

Next, let us briefly discuss about two different types of displays, such as Volatile Display and Static Display.

Volatile Display →

A Volatile Display requires that the pixels be periodically refreshed to retain their state, even for a static image. This refresh typically occurs many times a second. If this is not done, the pixels will gradually lose their coherent state, and the image will "fade" from the screen. This is the reason why many cheap quality displays fade away within a shorter

time and we blame the device. There are many different types of displays that are in use, which are described below.

Examples of Volatile Flat Panel Displays →

Let us look at an impressive list of items under the category of volatile segment of the flat panel displays:

1) Active-Matrix Liquid-crystal Display (AMLCD)
2) Electronic Paper: E Ink, Gyricon
3) Electroluminescent Display (ELD)
4) Digital Light Processing (DLP)
5) Field Emission Display (FED), also named as Nano-emissive Display (NED)
6) Interferometric Modulator Display (IMOD)
7) Light Emitting Diode Display (LED)
8) Liquid Crystal Display (LCD)
9) Organic Light Emitting Diode (OLED)
10) Plasma Display Panel (PDP)
11) Quantum Dot Display (QLED)
12) Surface-conduction Electron Emitter Display (SED, SED-TV)

The latter two items are recently discovered after a prolonged research in various laboratories and they are very expensive. Only a few of these displays are commercially available today, though OLED displays are beginning deployment only in small sizes, mainly in cellular telephones. The above list also shows that considerable amount of research has been and are still being done in the most sophisticated laboratories in the world, notably in many private electronic corporations, with a large budget on R & D activities. It has to be noted that, many of the products still not being commercially exploited do not obviously give immediate return on such capital and human involvement, which is almost unthinkable in the Indian context, as our country is capital-starved. So far human capital is concerned, our industry has to take initiative to convince various state-owned laboratories to do some fruitful work, as this will have a tremendous impact in building our 'Smart Cities'. Let us now look at Static Flat Panel Displays.

Static Flat Panel Displays →

Static Flat Panel Displays rely on materials whose color states are bistable. This means that the image they hold requires no energy to maintain, but instead requires energy to change. This results in a much more energy-efficient display, but with a tendency towards slow refresh rates which are undesirable in an interactive display.

Bistable Flat Panel Displays are beginning deployment in limited applications, such as Cholesteric displays and in outdoor advertising. There are also examples of Electrophoretic Displays in e-book products, Computer Monitor, Display Motion Blur, Electronic Paper, FPD-Link, Flexible Display, Large-screen TV Technology, LED-backlit LCD TV, Mobile Display, Sony Watchman, Stereoscopy 3D Displays -- requiring no special glasses, Touch Panel, Transparent Display, etc. Again it is seen that the list is also quite impressive and there are various possibilities of innovation, where trained engineers and scientists could be employed in a Smart City format, where environment friendly atmosphere will persist.

CONCLUSIONS

After raising the issue of making flat-screen glass panels for various applications in a previous article, here we are dealing more on the application. First, the historical perspective was described, and then different types of displays were explored to give an idea to the readers of KANCH on the realm of possibilities in the context of innovation in this ever-evolving field of activity. Finally, both volatile and static displays are discussed with the same intention and impressive list of items are mentioned that should guide our future ideas on building 'Smart Cities'.

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United by taste... and glass

No other packaging material can claim the inert qualities of glass to preserve products. The Friends of Glass movement has conducted a campaign that maps European taste preferences and habits.

Since the Friends of Glass 'Taste of Europe' campaign was launched at EXPO Milan, over 29,000 people from 30 European countries have taken part in a quiz. Organised by the consumer movement Friends of Glass, part of the campaign explores various European taste preferences and how they are potentially affected by cultural influences in a fun way.

SALTY OR BLAND?

The quiz ran over a six month period online, via social media and at a series of events throughout the continent. The key findings show that overall, European taste can be classed as 'bland', otherwise known as 'savoury' or 'umami'.

The culinary definition of bland is "a taste found in diets rich in grains, beans and tomatoes." It is associated with the Japanese term 'umami', which roughly translated means 'delicious flavour'. It is fair to say that modern Europe has adopted a vibrant appreciation for taste (for example, the love of curry in the UK) and throughout the history of Europe, flavours have been dominated by numerous herbs and spices that came to the continent from the East.

EUROPEAN TASTE HABITS

But taste itself can differ. The quiz identified several diverging tastes, depending on the country. Beer reminds the UK of home, yet they are more likely to enjoy a Friday night out with a glass of sparkling wine, while the French reach for a cocktail to start their weekend. On another note, the Germans always like to have their spices next to them in the kitchen, whereas the Italians have a love affair with fresh herbs.

In addition to taste, the quiz explored numerous character traits of European citizens. Interestingly enough, while the continent as a whole would describe themselves as fun, the Germans say they are quiet, the Croatians innocent, the Swiss reserved and the Czechs sarcastic. Jane Peyton, the UK beer sommelier said: "It's so interesting to consider what tastes we are naturally drawn to and how much where we grow up influences our preferences or in some cases, how our taste buds evolve over time."

Shopping habits have a large influence on the type of food that shoppers choose at the supermarket. A majority of Europeans choose fresh and natural ingredients when making purchasing decisions at the market, whereas some citizens prefer to make a list and stick to what they need. In Italy, however, shoppers look out for special discounts and offers.

OLIVE OIL AND EUROPEANS

While all Mediterranean bordering countries in Europe see olive oil as a reminder of home (as expected), a majority of all Europeans prefer to buy it at the supermarket, when given a choice of products. According to the European Commission, no other place on Earth rivals Europe, as it is a leader in both the production and consumption of olive oil. The continent produces 73% of the world's olive oil and consumes 66% of it.

An overwhelming majority of mainland Europeans have indicated their preference for coffee when asked about their daily breakfast ritual but unsurprisingly, the UK and Ireland have a preference for tea to start their day. The European Coffee Federation estimates that the European Union consumes 2.5 million tons of coffee each year, giving it the highest consumption rate in the world. According to research from Quartz and Euromonitor, 13 European countries are included in the top 15 coffee consuming nations worldwide. On a wider scale, out of the top 80 countries that consume coffee, 33 are European.

PREFERRED PACKAGING

Consumers shared many differences in taste and culture but many common points too. One of them is the large preference for glass packaging as the best packaging material. According to a previous consumer research carried out in 2014, some 87% of European consumers prefer glass packaging for their food and drinks. One of the key reasons to buy products packed in glass is that glass preserves taste better than any other packaging material.

The foundations of the Taste Map were built with the support of renowned taste experts called 'Taste Makers': Andreas Larsson, Swedish Wine Sommelier, voted Best Sommelier of the World; Arno Steguweit, Europe's first Water Sommelier from Germany; Caroline Furstoss, French Wine Sommelier 2014; Professor Giorgio Calabrese, a renowned Italian nutritionist; Guillermo Cruz, voted Spain's Best Sommelier in 2014; Jane Peyton, UK Beer Sommelier of the Year 2014-2015; and Christophe

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Baert, chef and Vice President of the Belgian Euro-Toques Association. Although they were all coming with their specific way to define the taste of a product, they all agreed that glass packaging is the ultimate taste preserver. ■

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Pioneering the circular economy since 1974

At the end of last year, the European Commission published the reviewed legislative package that will pave the way for a real EU circular economy. The proposal includes a revision of the packaging and packaging waste legislation, which sets recycling targets for the sector and for glass containers. These targets will provide incentives and obligations for public authorities, industry, value chain partners and consumers to drive progress in waste collection systems and infrastructure.

The proposed recycling targets are ambitious but they must also be based on a sound recycling calculation methodology that effectively accounts for achieving the circular economy. For glass packaging, targets are among the highest (75% by 2025 and 85% by 2030) and will apply to all Member States. So although an average of 73% of glass packaging is today collected for recycling across the EU 28, a lot of investment and commitment will be required in those countries where there is still potential for improvement. The industry is ready to take on its part of the challenge, with the right support on a level playing field for all materials.

HISTORICAL CONNECTION

Glass holds a special place in the EU circular economy and has done so for a long time, not only because of its inherent recyclability properties but because these properties have been so well optimised by glass packaging manufacturers. Glass is a permanent material that is 100% and endlessly recycled without degradation, as long as it is collected separately and treated. Once emptied, a recycled glass container becomes a precious secondary raw material and a vital input to glass production. By using 100kg of recycled glass, the container glass industry is able to replace 120kg of virgin raw material and every ton of recycled glass that goes into the furnace represents a saving of 0.67 tons of CO_2[1].

Post-consumer glass packaging recycling started in 1974 with the establishment of the first collection systems in Europe, sparked by the oil crisis of 1973. For 40 years, these separate collection systems for glass have created a huge incentive for consumers to be part of the solution. Bottle banks have become iconic waste disposal schemes and where these systems have been put in place, recycling rates have been substantially increased. By doing so, local authorities have invested in a waste collection system that has benefited the environment and largely contributed to the development of a vibrant economic model.

Enabling and improving closed loop systems is the basis for the future circular economy, with benefits to the environment, the economy and employment. In Europe, the glass packaging closed loop value chain has created local businesses and jobs that help to recover more than 70% of all post-consumer glass packaging in the EU and keeping valuable resources out of landfills. This is a win-win situation for all stakeholders in the glass production, consumption and collection phase.

FUTURE GOALS

Much still needs to be done to exploit the potential of glass bottles and jars that are not yet put back in the closed loop. The glass packaging industry - together with all players along the value chain - would like to optimise closed loop recycling in those EU countries where it already works well and to better develop glass recycling in those countries where there is still potential for growth. For this approach to succeed, it is key that recycled glass is of the best quality and economically viable, so that the industry is able to use more recycled glass than virgin raw materials.

Hence, it is essential that the future legal framework provides clear, strategic and targeted measures that can enable the upcycling of waste to value for the environment and the economy. All stakeholders in the value chain from production, consumption, waste collection and treatment should be part of the solutions of the future. They should look comfortably ahead and plan public and private investments to reduce waste, improve separate collection systems and foster research into the use of technology, as well as behavioral science to engage the end consumer.

FEVE is highly involved in the Brussels debate to position glass as a reference material in the future circular economy and make sure that the final legislative framework acknowledges the sustainably sound characteristics of glass as a permanent material that can be endlessly recycled in a bottle-to-bottle system. ■

FEVE
The European Container Glass Federation

REFERENCE
1. FEVE LCA study, http://www.feve.org/index.php?option=com_content&view=article&id=16&Itemid=18

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Modern Glass Façades: Air Conditioning and Energy Production Included

Modern, transparent and prestigious – large glass façades are very much in vogue for office complexes and industrial buildings. Yet their use only makes sense in terms of energy savings and cost effectiveness if they also have air-conditioning functions and help the energy supply. The glass industry is therefore keen to promote the development of multifunctional windows and façade elements – an area where it has already achieved numerous promising innovations.

Architects and engineers are currently facing major challenges. In modern architecture there is an increasing demand for glass façades that add brightness and which make the building look more prestigious. According to forecasts, as many as 1.33 billion square metres of new façades will be in place by 2021. This is roughly the area of Greater London. However, there is a problem: During the summer months, in particular, a building encased in glass needs a lot of energy to keep the inside temperature at a reasonable level. Air conditioners are dreadful energy guzzlers and largely responsible for buildings producing around 40 per cent of all carbon emissions in the industrialised countries.

Anyone planning to use glass therefore needs to install additional functions that create both shade and air conditioning. This is all the more important as fewer and fewer emissions are permitted under international climate protection targets. The member states of the European Union, for instance, have agreed that from 2020 any energy requirements of new buildings must be almost zero for heating, hot water, ventilation and air conditioning and that any additional energy requirements must be met by facilities within the building itself. This is where multifunctional façades can be helpful. "Even in the past many elements already formed part of the façade, such as various control functions and sun protection. In the future we will see further functions being added," says the architect Stefan Behnisch from Stuttgart. He mentions lighting elements, heat exchangers for the production of solar heat and also mechanical ventilation and aeration elements.

At the moment such façade systems are not standard yet. Façades are still very much seen in terms of their individual components which are developed by different manufacturers. Planners therefore need to spend a lot of time and effort combining

A flagship project: the building envelope of the new Festo Automation Center consists entirely of climate-active glass, adding a touch of modernity and prestige to this new building. Photo: Festo

Energy efficiency: the glass façade of the new Festo Automation Center has been designed as an exhaust air façade. Using electrochromic window panes, it adjusts itself automatically to the prevailing lighting conditions. Photo: Festo

those components. However, this will soon change, as industry and research have understood this need and are now focusing more closely on the development of integrated solutions. "All façades follow a consistent physical pattern, even when conditions keep changing, both indoors and outdoors," says civil engineer and architect Werner Sobek, head of the Institute of Lightweight Design and Construction at the University of Stuttgart. "What everyone would really like to see is a façade that can adjust itself at the flick of a switch, so that it adapts to circumstances, both inside and outside."

We can have a foretaste of future architecture when we look at some building projects that are already in existence, such as the 67-metre Festo Automation Center with its 16 floors in the southern German town of Esslingen. The building was officially inaugurated at the end of 2015 and is based on an ingenious energy scheme. Its glass façade, which covers 8,500 square metres in all, can be described as an exhaust air façade where the air is continually siphoned off between the inner anti-glare shield, the aluminium components of the unitised façade and the glazing. This means that the heat of summer cannot penetrate to the inside of the building in the first place, thus reducing the need to cool down.

Further light and heat protection in the new Festo building is created with the help of so-called electrochromic glass which can be dimmed as required, blocking off sunlight. In all, 441 so-called sandwich panels have been installed, covering a total area of 1,000 square metres. Inside they are gently covered by an extremely thin layer of tungsten oxide nanoparticles. Whenever voltage is applied, the panels turn blue, thus reducing the level of translucence. At the Automation Center this is handled automatically by the facility management system in response to a signal from sensors, although it is also possible to take manual control, via a button or touchscreen. The East German manufacturer, Econtrol-Glas, says it takes 20 to 25 minutes for the system to switch from the brightest to the darkest colour. When dimmed, only 12 per cent of sunlight can get through, while the rest is reflected back by the particles.

Econtrol-Glas has so far equipped as many as five European projects of a similar size, totalling 15,000 square metres of switchable glass. And the demand is rising. "There's a greater awareness of energy-efficient buildings now," says CEO Hartmut Wittkopf. Commenting on the economic efficiency of electrochromic glass, he says that although such glass is more expensive to buy compared with conventional insulation glass and although additional electricity is

Quality control: Econtrol-Glas produces electrically dimmable glass that reflects almost 90 per cent of sunlight. Photo: Econtrol-Glas

required for the switching function, the investment nevertheless pays off. This is because the light and temperature management creates a substantial improvement in energy efficiency, without the need for external shading such as blinds. "We reckon," says Wittkopf, "that, on average, Econtrol-Glas breaks even after four to six years."

Econtrol-Glas is not the only company that offers electronically dimmable façade elements. The same technical principle is applied by Sage Saint-Gobain whose glass is sold, for instance, as dynamic glass by the façade specialists Schüco. The German science and technology group Merck follows a different option in switchable glass. Working together with its industry partners, the company is currently testing window panes which can respond even faster to changes in lighting than similar switchable glass solutions. To do so, Merck uses a mixture of liquid crystals – the kind that is also used for TV, laptop and smartphone screens.

"This enables us to adjust the intensity of incoming daylight within seconds and to create a wider diversity of colours," says Martin Zitto, Business Development Manager at Merck. Even though the technical basis differs from that of other switchable glasses, the operation of liquid-crystal glass is similar, as it involves a mixture which fills the space between two bonded glass panels. The crystals can be arranged in different ways through the application of voltage. Depending on the arrangement, more or less light can get through the coating, making the window more or less transparent.

However, liquid crystal panes are not yet available on the market. They are currently being produced in small numbers by Merck's subsidiary

A coloured view: the windows at the Merck Innovation Center in Darmstadt contain liquid crystals which switch from light to dark and back again within seconds. Photo: Merck

Merck Window Technologies in the Dutch town of Eindhoven, to show how the idea can be implemented in production. Merck is now hoping to attract companies that will translate this technology into commercial manufacturing. "Our expertise," says Zitto, "is more in the development of the chemicals, and not production." However, it seems that Merck is doing well in its quest for interested parties. The first products, says the manager, may even be available at the end of 2017.

Another company that is aiming at late 2017 is the Seele Group which wants to start selling its Iconic Skin around that time – a modular system of opaque glass façades. Seele's glass sandwich panels, which are specially designed for offices and industrial buildings, involve the use of a multifunctional component that integrates all the necessary functional and support elements. Iconic Skin combines several efficiency benefits at the same time. Firstly, according to Seele's Marketing Manager Christine Schauer, it is designed as a highly heat-insulating component, with a heat transfer coefficient (U-value in W/m^{2}K) of only 0.15 to 0.47. This means that very little energy is required for heating or air conditioning. Secondly, its production costs are relatively low, thus bringing down the price of a glass façade to a reasonable level. And thirdly, Iconic Skin offers plenty of leeway in the design, as it allows a length of up to 16 metres, can be installed either horizontally or vertically and permits a variety of printing options.

glasstec 2016 in Düsseldorf, the world's biggest and most international trade fair for the glass industry, is held from 20 to 23 September 2016. It offers opportunities for a close look at the innovative products of façade specialists and for information about key trends in the industry. Seele's new glass façade, too, will be among the exhibits of a special show called glass technology live, organised by the University of Stuttgart. Using large-format façade mock-ups and one-to-one models, the exhibition will showcase the latest developments in

Multitalented: Iconic Skin, the new opaque glass façade from Seele, is doubly efficient. It has been designed as a highly heat-insulating component and, according to the manufacturer, offers good value for money. Photo: Seele

façades and energy. This year's special emphasis will be on energy efficiency and heat insulation. Directly next to glass technology live, visitors will find the Glass & Façade Competence Center. The thematic focus of the centre will be on glass for façade planners, construction engineers and architects. The exhibitions will be accompanied by talks at the International Architecture Congress with detailed expert presentations of the exhibits and of current trends in façades.

But the events at glasstec 2016 will also feature forward-looking concepts for building envelopes that are not yet available on the market. Glass façades that automatically adjust to lighting conditions and siphon off hot air are merely the beginning. Future solutions are set to integrate solar technology even more closely, producing heat and electricity which can be stored directly on site, using batteries and heat storage units. This means that energy will become available even when the sun is not shining – a basic requirement for buildings which are to obtain energy as independently as possible from their own sources, without any external energy supply.

Thanks to technical progress in photovoltaics and in lithium-ion batteries as the preferred storage medium for solar power, it is reasonable to expect a breakthrough in power-generating façades in the very near future. For instance, Heliatek in Dresden and the flat glass manufacturer AGC Glass Europe in Belgium are currently working on solar elements which integrate organic photovoltaic films in different dimensions and in different shades of colour and transparency for use as architectural glass. Thanks to such films, says Heliatek, the various elements will be easier to handle and easier to integrate into façades than today's solar modules which are based on relatively large silicon solar cells. Heliatek says there is great interest among the construction industry in setting up pilot projects based on the new solar elements. **glasstec 2016 in Düsseldorf gives companies an opportunity to exchange ideas on new technologies and to initiate cooperation ventures, thus ultimately paving the way for energy-efficient buildings ■**

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Have you ever wondered why employees fail to do what you want them to do?

During my interaction with various leaders / managers from both manufacturing and service industries, one of the things which clearly come out is that people are not willing to come out of their comfort zone. They perform that much only, so as to keep their bosses of their backs. Most of them are not ready to take on new challenges / opportunities which the organization has to offer.

Why does that happen? Why people are not willing to go beyond status quo and work to their full potential?

The answer is Motivation.

Most of the time, leader's think of motivating employees by using a carrot or stick method, often forgetting that these factors are external and temporary.

So what can be done to ensure people are motivated from within and permanently?

Remember, motivation which comes from within is long lasting. Listed below are 3 simple and cost effective ways, which you as a leader can use, to motivate your employees without using the carrot and stick method.

1. KNOW YOUR EMPLOYEES BETTER

Most of us know our employees quite well from professional point of view. We know their strengths, weaknesses and attitude at work. What about knowing your employees at personal level? We spend 8 to 10 hours a day in office and yet we don't personally know our colleagues and direct reports quite well. We are only talking about issues, challenges, reports, forecasts and nothing else.

Take a moment to do a small exercise:-

- List down names of your employees (who directly report to you) along with their spouse and children's name.
- What do their spouse do and where do their children's study?
- Do you regularly remember and wish your employees on their birthdays and marriage anniversaries?
- When was the last time when you shared a lighter moment and laughed with your employees?

- When was the last time you appreciated or recognized your employee's efforts? Do you do this on a regular basis or wait for quarterly or annual events to appreciate your employees.

70% of the leaders will be doing little or nothing with regards to the above question. Another 25% will be doing something and only 5% of the leaders will be doing most of it. In which bracket do you belong?

What's the way ahead?

Take some time out each day to have an informal one-on-one talk with your employees. Don't send any meeting invites for this. You can randomly go to their desk or catch them over a cup of tea. During that small conversation don't talk about work. Talk about things other than work like a movie or some upcoming event in the city. Refrain from asking any personal question until and unless the person himself is sharing with you. Make it a habit, have one such informal talk per employee per week. Doing this on a regular basis will tremendously increase your connect with your employees.

What is the benefit of this?

Remember, employees are motivated to work for leaders whom they know, rather than whom they know off (i.e. by virtue of their designation).

2. PERSONALIZE THE MOTIVATION FOR INDIVIDUALS

People come to work for their own reasons, not yours.

Everyone's favourite radio station is WIIFM, "What's in it for me". As a leader if you want an employee to do something new then it's your responsibility to show how the employee will benefit from it. WIIFM is one of the most power self motivators. It motivates employees from within, to act and take responsibility on the assigned task. Employee will take pride in what they do and will enjoy doing the work.

Clarify results which need to be achieved by answering what, why and by when.

Remember not to tell the person how to do it, give him an opportunity to come up with a plan of action. Note, this doesn't mean that you withhold information which is critical to the successful compilation of the work. Also while using this approach you need to ensure that your employee doesn't wastes time in reinventing the wheel. Once he comes up with a plan of action, you can suggest changes as necessary.

There are two benefits with this approach. First, there is a possibility that the person might come up with a creative idea to solve the task. Secondly, the person will feel that it is his plan and he himself will be motivated to take full ownership and responsibility to achieve the desired results. In other words he will be motivated from within to work on the assignment.

Use Reward and Recognition to personalize motivation for the employee. Reward is something tangible like a gift or an award. While Recognition is something intangible like thanking an employee in front of the team for the job well done or sending out an appreciation email to the employee.

3. BE A ROLE MODEL FOR THE BEHAVIOUR YOU EXPECT

Leaders cannot forget the power of their own example. An important motivation principle is that everything a leader does either promotes or pollutes the work environment.

a. Maintain Honesty and Integrity- People hate to work with leaders who are dishonest, are not transparent or leaders who don't keep their promises.
b. There is an old saying "Give respect, Take respect". This holds true today also. Would you like to work for a leader who do not respects you? The same is true for other.
c. Be a good listener, so that people are encouraged to come and share their problems with you.
d. Never give negative feedback to a person in front of other employees. It's one of the biggest demotivating factors, not only for the employee who is receiving the feedback but also for others who are listening.
e. Don't play favourites; it pollutes the environment very fast.
f. Stop micro-managing. Many leaders claim that they just like to keep close tabs on their team, but those are poor excuses for excessive meddling.
g. Help your team members overcome their weakness.
h. Look for opportunity for your employee's growth.
i. Last but not the least, be motivated yourself. You cannot accept your employees to be motivated if you yourself are not motivated enough ■

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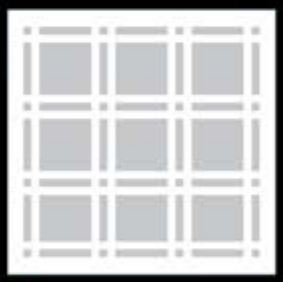
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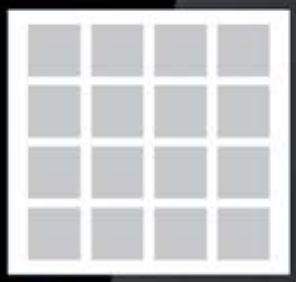
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Borosilicate as an Important Component in the Glass World

Prof. (Dr.) A. K. Bandyopadhyay
Technology Consultant & Ex-Principal
Govt. College of Engg. & Ceramic Technology
West Bengal University of Technology, Kolkata
asisbanerjee1000@gmail.com

Abstract:

By glass, we normally mean an 'oxide glass' and for most of our day-to-day applications, we mean silicate glasses -- mainly a variety of soda-lime-silica glasses for different usages, such as container glass for both home and industrial applications, float glass for building construction industry such as windows and doors, and many others. There are various other types of non-silicate glasses (borates, borophosphates, alumino phosphates, boro-aluminophosphates, etc.) for different types of application requiring special types of properties. Among all these glasses encompassing a wider composition base, the borosilicate glasses stand apart in terms of impressive list of applications at home as well as in the scientific and industrial fields. A brief description of borosilicate glass will be given in this article with a flavour of their various usages.

INTRODUCTION

The main network-forming constituent of silicate-based glasses is silica, which by itself melts at very high temperature, and when it is mixed with network-modifying oxide (e.g. sodium or potassium oxide), the liquidus temperature considerably decreases. As lime (CaO) gives rise to good chemical resistance to soda-silica glass, it is added to the soda-silica glass yielding to a variety of soda-lime-silica glasses, such as container glasses for packaging and float glasses as windows, doors, panels, etc. for building construction industry, commercial fibre-glasses, and many others. However, lime increases the temperature of the ternary system compared to that in the binary soda-silica system. The overall temperature of melting comes within the domain of 'glass tank' furnaces **[1]**. On the other hand, boron as boric oxide melts at very low temperature at 280^{0}C, but when it is added to form a binary mixture of boro-silicate, the temperature considerably rises that is even higher than that of common glasses.

Borosilicate glass is a type of glass with the main glass-forming constituents as silica and boron trioxide. These glasses are known to have very low coefficients of thermal expansion ($\sim 3 \times 10^{-6}$ / ^{0}C at 20^{0}C), which gives them a high resistance to thermal shock, more so than any other common glass. Such glass is less subject to thermal stress and is commonly used for making 'reagent' bottles in the chemical laboratories. Borosilicate glass is sold under a variety of trade names, most notably Borosil and Pyrex, but there are many others in the market such as Simax, Borcam, Suprax, Kimax, Heatex, Endural, Schott, or Refmex. The market potential is huge for such glasses in the chemical labs of different schools and colleges as well as in various research organizations. As the Govt. budget and also private investment increase with the new schools and colleges, the demand for such glass products keep on increasing with time. However, in a smaller part of this market segment, there is some competition from the porcelain wares that are chemically resistance as there

is a glass coating (i.e. glazing) on the inner surface.

Without going into the details of competition between borosilicate glass-wares and porcelain-wares, it could be safely said that even if the chemical stability being the same in both cases, the former is definitely more thermal-shock resistant than the latter. Hence, for the experiments with harsh thermo-chemical reactions, borosilicate glasses stand apart much more than any other products including plastics, although thermally resistant plastics are available in the market with innovative compositions. Another important property of borosilicate glasses makes them unique in the sense that they are completely transparent so that many chemical reactions could be directly visualized in the open eyes, when needed.

In this article after discussing the historical perspectives of borosilicate glasses and their properties, various applications will be depicted to eventually have a better understanding of the importance of this system of glasses in the market. Let us first look at the historical events.

HISTORY OF BOROSILICATE

Otto Schott was a famous glass company in Germany in the 19th century. In this period, borosilicate glass was first developed by this German glassmaker that was sold under the brand name "Duran" in 1893 **[2]**. Corning Glass Works is also a famous company in the USA, and 22 years later, they introduced Pyrex in 1915. This name became a synonym for borosilicate glass in the entire western world.

The brand name Pyrex is manufactured in Europe by Arc International, which uses soda-lime glass compositions for kitchen products that are used widespread at almost all homes. However, the U.S. manufacturer of Pyrex kitchenware uses tempered soda-lime glass to give toughening property **[3]**. Hence, Pyrex can refer to either soda-lime glass or borosilicate glass when discussing kitchen glassware, while the other trade names such as Bomex, Duran, TGI and Simax all refer to borosilicate glass when discussing laboratory glassware. The real difference is the trademark and the company that owns the Pyrex name. The original Corning-ware made of borosilicate glass was trademarked in capital letters (PYREX). When the kitchen ware division was demerged and sold, the trademark was changed to letters with lowercase (pyrex) and was made out of low thermal expansion soda-lime glass. The bottom of both new and old kitchen wares could be checked to see an immediate difference. The scientific division of Pyrex has always been made of borosilicate glass.

In addition to the quartz, sodium carbonate and alumina traditionally used in the glassmaking process, boron is used in the manufacture of borosilicate glass. However, certain other oxides are also used to balance the composition, as is the usual practice in the field of glass technology. This is generally called "composition engineering". The composition of low expansion borosilicate glass such as those laboratory glasses mentioned above is approximately 80% silica, 13% boric oxide, 4% sodium oxide, and 2-3% alumina. 1% lime is also added in some cases. As said earlier, although more difficult to make it than traditional glass due to the high melting temperature, it is still economical to produce. Its superior durability, chemical stability and heat resistance are quite noteworthy. Thus, borosilicate glass finds excellent use in chemical laboratory equipment, cookware, lighting and, in certain cases, windows. Therefore, from the usage viewpoint, the borosilicate has quite an importance in the market.

Most borosilicate glass is colourless. Coloured borosilicate, for the 'art glass' trade, was first widely brought onto the market in 1986, when Paul Trautman founded Northstar Glassworks. Now, there are a number of small companies in the USA and Europe that manufacture and sell coloured borosilicate glass for the 'art glass' market, which is considered as very good value-addition.

OTHER CONSIDERATIONS

The Manufacturing Process

Borosilicate glass is created by adding boric oxide (B_2O_3) or proportionate amount of boric acid **[4]** to the traditional glassmaker's frit of silica sand, soda and ground lime. Since borosilicate glass melts at a higher temperature than ordinary silicate glasses, some new techniques were necessary for industrial production. Borrowing from the welding trade, the burners combining oxygen with natural gas were required. This is the way the glass melt is made and refining is done via the correct viscosity of the melt, as boron gives significantly required fluidity to any melt for forming into different shapes and sizes depending on the market requirement.

Physical Properties

It was stated earlier that the common type of borosilicate glass used as laboratory glassware has a very low thermal expansion coefficient (3.3 x 10^{-6}/K) **[4]**, i.e. about one-third that of ordinary soda-lime-silica glass. A temperature gradient causes 'thermal stress', which is reduced. This makes borosilicate a more suitable type

of glass for certain applications, where 'thermal shock resistance' is the key issue in choosing the right type of material. It is known that 'fused quartz-ware', which has 15 times lower thermal expansion than ordinary soda-lime-silica glasses, is even better in this respect. However, it is also known that there is difficulty in working with fused quartz that makes quartz-ware much more expensive.

So, in terms of composition engineering, one has to have a low-cost compromise, and hence borosilicate glass stands as a good candidate for this purpose. It has to be noted that the borosilicate glass could still "crack or shatter" when subjected to rapid or uneven temperature variations, despite being more resistant to thermal shock than other types of glass. If broken borosilicate glass is considered, it tends to crack into large pieces rather than shattering or, it snaps rather than splinter.

The softening point (i.e. temperature at which viscosity is approximately $10^{7.6}$ poise) of type 7740 Pyrex is 820°C **[5].** Borosilicate glass is less dense, i.e. about 2.23g/cc than typical soda-lime-silica glass due to the low atomic weight of boron. Optically, borosilicate glasses are "crown" glasses with low 'dispersion' or low 'Abbe Number' (i.e. around 65) and relatively low 'refractive indices', i.e. 1.51–1.54 across the visible range of 400-700 nm **[6]**.

THE USAGE

Borosilicate glass has a wide variety of uses ranging from cookware for home application to lab equipment in the scientific and industrial labs as well as a component of high quality products -- such as implantable 'Med' borosilicate glass could still crack or shatter when subjected to an abrupt temperature gradients, 'Ical' devices and also for devices that are used in space exploration.

Health and Science

All modern laboratory glassware is almost always borosilicate glass, which is widely used for this application due to its various interesting properties, such as chemical and thermal resistance, and good optical clarity. Fused quartz is also found in some laboratory equipment when its higher melting point and transmission of UV are required, e.g. for tube furnace liners and UV cuvettes, but the cost and difficulty of working with quartz make it excessive for the majority of laboratory equipment.

Moreover, borosilicate tubing is used as the 'feedstock' for the production of a variety of drug packaging, such as vials and pre-filled syringes. It is also used for making of ampoules and dental cartridges. For injectable drug application of borosilicate glass, its chemical resistance minimizes the migration of sodium ions from the glass matrix to the drug thus making it suitable. This type of glass is typically referred to as USP / EP JP Type I.

This type of glass is also widely used in implantable medical devices, such as Prosthetic Eyes, Artificial Hip Joints, Bone Cements, Dental Composite Materials for 'White Fillings' **[7]** and even in Breast Implants. Many implantable devices benefit from the unique advantages of borosilicate glass encapsulation. Such applications include Veterinary Tracking Devices, Neuro-stimulators for the treatment of Epilepsy, Implantable Drug Pumps, Cochlear Implants, and Physiological Sensors.

The Electronics

The borosilicate glass tubing was used to pipe coolants that are often distilled water through high power vacuum tube-based electronic equipment, such as commercial broadcast transmitters, during the evolution period in the mid-twentieth century.

Moreover, the borosilicate glasses have application in the semiconductor industry in the development of micro-electro-mechanical systems (MEMS), as part of stacks of etched silica wafers that are bonded to the etched borosilicate glass. MEMS are extensively used as important sensors in various industries.

The Cookwares

Another common usage for borosilicate glass is cookware. It is used for measuring cups, featuring screen printed markings providing graduated measurements. This type of glass is sometimes used for high-quality beverage glassware. Borosilicate glasses are thin and durable, and they are also microwave and dishwasher safe.

The Lighting

As the optical clarity of borosilicate glass is very high, many high-quality flashlights use this type of glass for the lens. This allows for a higher percentage of light transmittance through the lens compared to plastics and lower-quality glass, which cannot compete in this respect.

Several types of high-intensity discharge (HID) lamps, such as

mercury vapor and metal halide lamps, use borosilicate glass as the outer envelope material. Also, new lampworking techniques led to artistic applications, such as contemporary glass marbles for decorative purpose. The modern studio glass movement has responded to color. The availability of colors began to increase when companies such as 'Glass Alchemy' introduced the Crayon Colors, which brought a whole new vivacity to the glass industry **[8]**. Borosilicate is commonly used in the glassblowing form of lampworking and the artists create a range of products ranging from jewellry, kitchenware, to sculpture as well as for artistic glass smoking pipes. Lighting manufacturers use borosilicate glass in their refractors.

Organic light emitting diode for display and lighting purposes also uses borosilicate glass (BK7). The thicknesses of the BK7 glass substrates are usually less than 1 mm for the fabrication of OLED. Due to its superior optical and mechanical characteristics in relation with cost, BK7 is a common substrate in the OLEDs. However, depending on the application, soda-lime-silica glass substrates of similar thicknesses are also used in OLED fabrication.

The Optics

In case of astronomical reflecting telescope, the glass mirror components are mostly made of borosilicate glass due to its low coefficient of expansion with heat. This makes it possible to have very precise optical surfaces that change very little with temperature, and the matched glass mirror components that track across temperature variations and also retain the characteristics of the optical system.

Schott BK-7 is the preferred optical glass that is most often used for making instrument lenses, or the equivalent from other makers. It is a very finely made borosilicate crown glass. It is also designated as 517642 glass after its 1.517 refractive index and 64.2 Abbe Number **[6]**. Other less costly borosilicate glasses, such as Schott B270 or the equivalent, are used to make "crown glass" eyeglass lenses. Ordinary lower-cost borosilicate glass, like that used to make kitchenware and even reflecting telescope mirrors, cannot be used for high-quality lenses because of the striations and inclusions common to lower grades of borosilicate glass. The maximum working temperature is 268°C. While it transitions to a liquid starting at 288°C just before it turns red-hot, it is not workable until it reaches over 538°C. This means that in order to industrially produce this glass, oxygen/fuel torches must be used. This is the reason why 'glassblowers' borrowed technology and techniques from welders.

Borosilicate Nanoparticles

Initially, it was thought that borosilicate glass could not be formed into nanoparticles, since an unstable boron oxide precursor prevented successful forming of these shapes. However, a group of scientists from the Swiss Federal Institute of Technology at Lausanne were successful in forming borosilicate nanoparticles of 100 to 500 nm in diameter in 2008. The researchers formed a gel of tetra-ethyl-orthosilicate and tri-methoxy-boroxine. When this gel is exposed to water under proper conditions, a dynamic reaction ensues, which results in the nanoparticles **[9]**.

The Lampworking

Borosilicate, or 'boro' as it is often called, is used extensively in the glassblowing process lampworking. The glassworker uses a burner torch to melt and form glass, using a variety of metal and graphite tools to shape it. Borosilicate is referred to as "hard glass" and has a higher melting point of 1648°C than "soft glass", which is preferred for glassblowing by beadmakers. Raw glass used in lampworking comes in glass rods for solid work and glass tubes for hollow work tubes and vessels/ containers. Lampworking is used to make complex and custom scientific apparatus. For this type of 'scientific glassblowing', the specifications must be exact and the glassblower must be highly skilled and able to work with precision. Lampworking is also done as art and common items made include goblets, paper weights, pipes, pendants, compositions and figurines.

The Beadmaking

With the resurgence of lampworking as a technique to make handmade glass beads in recent years, borosilicate has become a popular material in many glass artists' studios. For beadmaking comes in thin, pencil-like rods. The metals used to color borosilicate glass, particularly silver, often create strikingly beautiful and unpredictable results when melted in an oxygen-gas torch flame. Due to its high shock-resistance, and as it is stronger than soft glass, borosilicate is particularly suited for sculpting and creating large beads, including figurines. The tools used for making glass beads from borosilicate glass are the same as those used for making glass beads from soft glass. Colored borosilicate lampworking glass is most often considerably more expensive than 'soft' lampworking glass, and this is usually reflected in the selling price of handmade artisan borosilicate beads and other creations.

Other Uses

Finally, a short list is given below on

the other applications of borosilicate glass in various areas:

1) Aquarium Heaters -- due to its high heat resistance to tolerate the significant temperature difference between the water and the nichrome heating element.
2) Specialty Tobacco Pipes – due to high heat resistance for more durability.
3) Guitar Slides.
4) Evacuated Tube Solar Thermal Technology due to high strength/ heat resistance.
5) Thermal Insulation Tiles on the Space Shuttle as coating material.
6) Immobilisation and Disposal of radioactive wastes **[10]**.
7) Glass Tubing is used in specialty TIG Welding Torch Nozzles in place of standard alumina nozzles. This allows for a clear view of the arc in situations where visibility is limited.

CONCLUSIONS

The importance of borosilicate glass is highlighted in this article with the proper background and historical perspective. Its uses in various areas of application are also highlighted in the diverse fields, such as scientific and medical, electronics, cookware, lampworking, beadmaking, etc.

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About
The All India Glass Manufacturers' Federation

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

Eastern India Glass Manufacturers' Association (EIGMA)-Kolkata

Northern India Glass Manufacturers' Association (NIGMA)-Haryana

South India Glass Manufacturers' Association (SIGMA)-Hyderabad

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

Western India Glass Manufacturers' Association (WIGMA)-Mumbai

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

The main aims & objectives of the Federation are:-

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

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

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

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

Welcomes New Members

COMPANY	PRODUCTS/SERVICES
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Mr. Krishan Mohan Gupta **M/s Tiger Son's Glass Industries Pvt. Ltd.** 4, Shree Krishna Market, Opp. Old. CDGI S.N. Marg, Firozabad – 203 283 (Uttar Pradesh) T: +91 48858 98370 E: tigerglass@rediffmail.com	Manufacturer of Bulb Shells, Glass Tube & Glass Bottles
Affiliate Member	
Mr. Saran Khemka **M/s Achint Chemicals** Near St. Anselms School Subhash Nagar, Ajmer Road, Post Box No. 47, Bhilwara- 311001 (Rajasthan) T: +91 1482 264431 F: +91 264909 1482 E: achintchemicals@gmail.com	Manufacturer of Refractories

Membership of the Federation

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

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

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

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

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

ADMISSION FEE / ANNUAL SUBSCRIPTION

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- More than one Unit: ₹ 1,00,000 + Service Tax as applicable

Affiliate Members:

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- Annual subscription: ₹ 10,000 + Service Tax as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 45,000 (including admission fee) + Service Tax as applicable

Affiliate Members from countries other than India:

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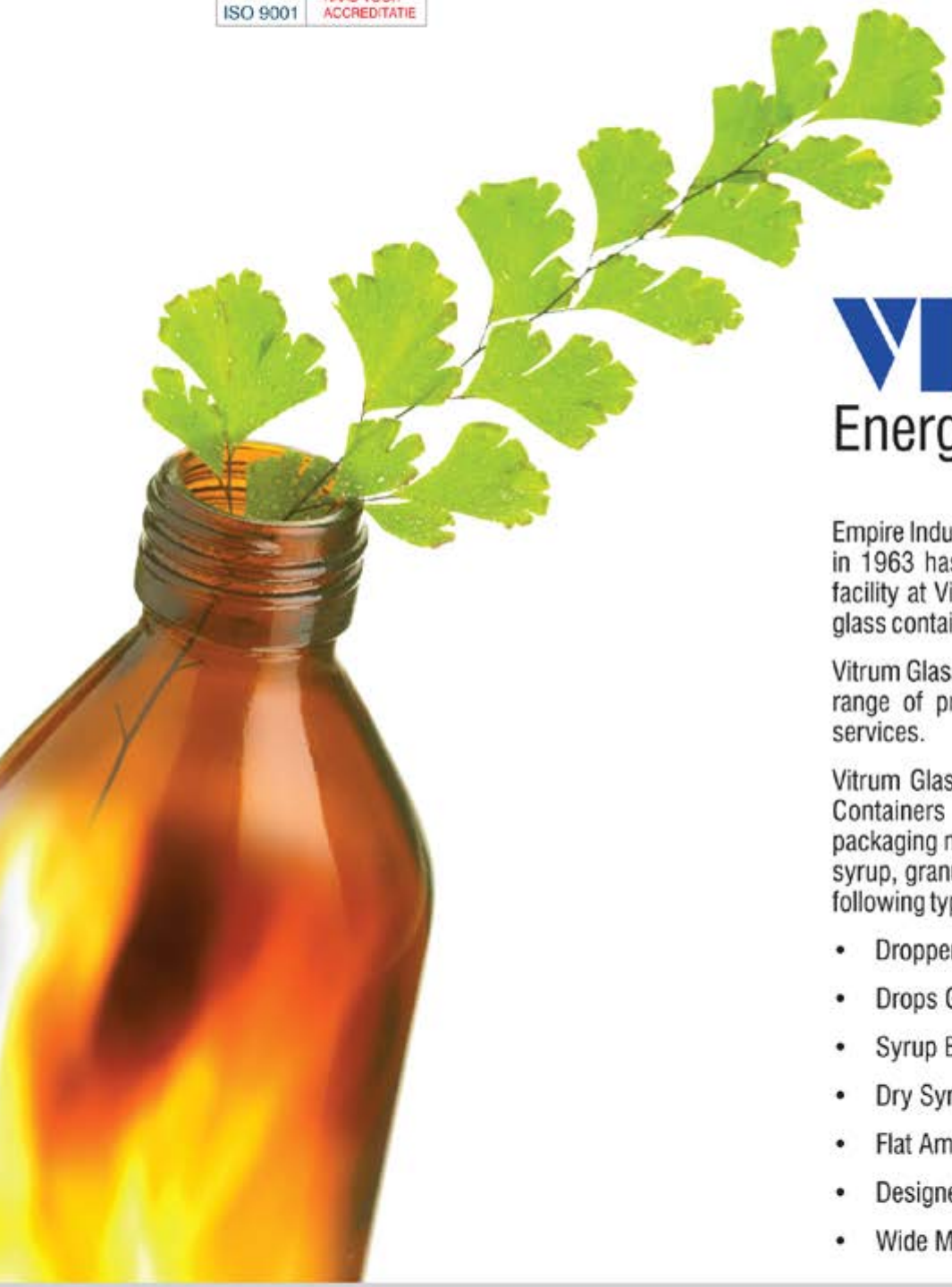

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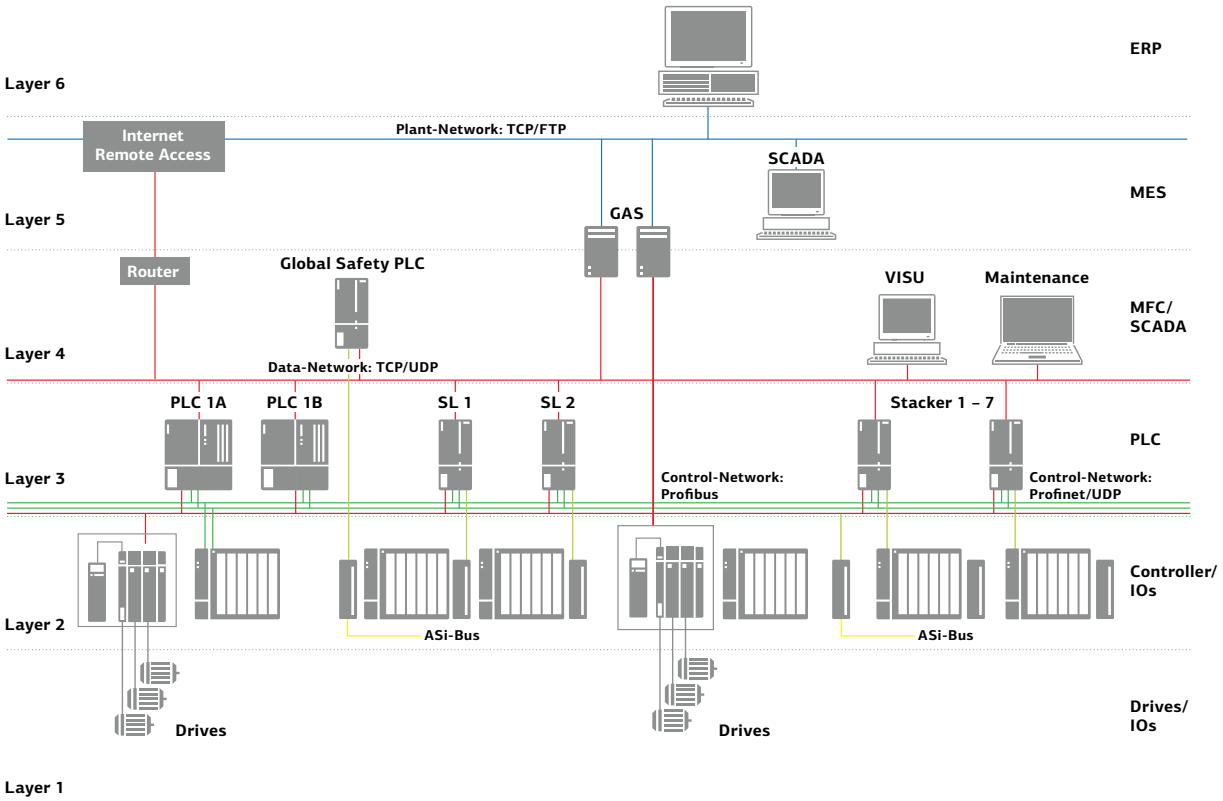
Glass Industry 4.0 – Automation and Smart Control Engineering

How central are concepts such as Industry 4.0 – the "FOURTH INDUSTRIAL Revolution" – and Smart Factory among SMEs in the glass industry? Let's have a glimpse at tomorrow's processes which have partly become reality today and also at realities which are still a long way off in the future.

SMEs are at the very heart of German industry, and indeed its growth engine. They are the ones that drive innovation, creating both jobs and training places," says the Federation of German Industry (BDI). According to recent BDI figures, the vast majority of VAT-paying companies are small or medium-sized enterprises. To stay competitive on an international level, it is therefore all the more important for such companies to accept the technical and organisational challenges of the future. And in the face of demographic change, it is equally vital for an enterprise to sustain and secure its long-term technical expertise. As many as 50% of Germany's companies have understood the signs of the time and have largely gone digital now. The two keywords are Industry 4.0 and Smart Factory. On the other hand, however, 25% still cannot relate to this development. Small companies, in particular, feel that they simply cannot cope with the large number of overwhelming challenges – and indeed partly for financial reasons. The general picture that emerges across all industries can be applied one-to-one to SMEs in the glass industry. It should therefore be a major priority to show those companies the enormous opportunities they can tap into if they convert their operations and to help such enterprises overcome their insecurities.

The primary reason why there is so much scepticism is that although glass is produced in large dimensions



The Grenzebach Application Server (GAS) is the answer for the integration of customers' components and processes into the Grenzebach plant.

"I'll just scan it in ..." Using a barcode reader, the M-RX operator calls up the relevant data (measurements and processes) of the current disc on the A+W production monitor.

and quantities, it is by no means a mass product. Today's glass, too, is in fact fairly smart, as multifunctional glass can distinguish light and shade, produce energy and control temperatures. In communication and consumer electronics tempered glass for smart phones and touch screens is more in demand than ever before. Thermally pre-stressed and functional glasses, for instance, require precise technical specifications, continuous quality checks and robust, reproducible production processes.

Industry 4.0 is a step into the world of cybernetics. Machinery turns into smart machines which control themselves, create networks among themselves and continually communicate with each other, i.e. they exchange data. This ongoing exchange enables machine systems to learn from mistakes and to avoid them in the future. Production improves during the actual process. The value chain is optimised one hundred per cent. Thanks to data networking between the various manufacturing routines, a smart system can warrant greater transparency and better safety in the creation of high-quality products. Smart factory for smart glass.

AN EXAMPLE: GRENZEBACH

The challenge has long been tackled by software and mechanical engineering companies. These are the driving forces. One good example is the plant engineering company Grenzebach in Bavaria. Its automation solutions are fully comprehensive, including controls, networking and indeed the entire system right down to the cold end. It deals with all the processes and facilities that are relevant in the industry. Its continuous real-time analysis permits error forecasts and direct correction during the production process via the communication facilities within the actual system. This avoids costly, time-consuming interruptions and is especially relevant to visual inspections and measurements which must be conducted to analyse and centrally report the glass quality in all sections of the plant. At the same time, customers can use the Grenzebach Application Server (GAS) to enter stages of their own manufacturing processes into the system and create processes of their own.

Moreover, with its Grenzebach Secure Plants, Grenzebach has a fully comprehensive data security policy in place. This involves a combination of familiar technologies such as a firewall, system hardening, visualisation etc., and the customer receives ongoing support via a remote access facility.

ANOTHER EXAMPLE: A+W AND GLAS NOWAK

The fact is that glass SMEs cannot simply adopt Industry 4.0 under the principle "one size fits all". On the contrary, software developers and machine manufacturers need input from the glass industry: "There are

SCHRAML technology in glass processing: This innovative mechanical engineering company has been trusted by NOWAK for 15 years now. All the interfaces are from A+W.

CAD display for the M-RX operator on the A+W production monitor. The operator can now check the data and make any necessary changes.

no simple answers. All of us, including our mechanical engineering partners, need to look at the entire issue step by step,"[2] says Dr. Klaus Mühlhans from A+W Software GmbH.

A+W has put this into practice with its supplier, the Austrian machine manufacturer Schraml and also with its customer, Glas Nowak from Bochum-Wattenscheid. At the Wattenscheid plant horizontal CNC machining centres were replaced by vertical top drill M-RX drilling and milling centres. Schraml's machines, A+W's software and Glas Nowak's requirements were then combined, adjusted and recombined. In practice, the user simply scans in the code from the order slip, the data is passed on to the relevant parts of the machining centre, and the order is saved to the system as "done". If there is ever a mismatch between actual and target requirements, the machine and the software communicate with each other and attempt to find alternative solutions to continue the operations. This means that orders can be profitably mapped, even if the batch size is 1. Thanks to smart A+W interfaces, it became possible to digitally align the drilling and milling centres which were already running at the Wattenscheid plant, on the one hand, and the new machines, on the other, and then to integrate the latter into the existing system. The management of Glas Nowak has confirmed that their processes are now more reliable and more efficient. At the same time, however, they also emphasise that this would have not been impossible without close cooperation within the triangle of the customer, software developers and mechanical engineers.

Fully integrated automation: a robot inserts the discs into a grinding machine. This improves throughput, is better for the operator's back and helps to ensure high quality.

THE HUMAN ELEMENT IN THE SMART FACTORY

Self-learning must not be equated with fully automatic, and it would be wrong to talk about rationalisation. In the future we will see the emergence of new job profiles – jobs that will play important roles and of which many are still waiting to be created. BDI is aware of this problem and has brought it to the attention of educational policymakers. There is a need for professionals who must be trained and supported within our own country. Maths, IT, science and technology must be made more attractive, particularly at school, and admission criteria at universities need to be lowered.

A RESPONSIBILITY FOR COMPANIES AND GOVERNMENT ALIKE

But there is also a responsibility of companies to adjust their operations to the new challenges. The domestic glass manufacturer Zwiesel Kristallgas, which has its base in the Bavarian Forest, sees Industry 4.0 as the biggest opportunity to counteract demographic change and the resulting loss of expertise. Having embarked upon this path after 140 years of history, the company is now

transforming itself into a self-learning production facility. In the medium term, changes in vocational training can be achieved through work-focused learning methods such as mobile e-learning (with PDAs and smartphones) or a company wiki which can be actively collected, shared and edited by the entire workforce. On-the-job learning is understood as an important ongoing process that does not end after three years.

Yet despite all positive aspects which Industry 4.0 can deliver for SMEs in the glass industry, there is one final point that must not be neglected: There are companies which are very willing to transform themselves and even have an affinity for Industry 4.0, yet this is often not an option for them because they do not have any fast and robust data connectivity. Here, too, the onus is on the government to promote broadband expansion. It is encouraging to see that the German Cabinet passed the Federal German Funding Programme for the Expansion of Broadband Access, submitted by the German Ministry of Transport and Digital Infrastructure (BMVI). German glass SMEs can only enter into fair competition and survive on the market if they can operate under the same technical networking conditions.

glasstec 2016, which will be held in Düsseldorf from 20 to 23 September, will highlight the various technical innovations that are or will be available in today's and tomorrow's glass industry and which will help to make glass manufacturing and processing even smarter and more efficient. This major international trade fair

Automated order entry using the A+W CAD designer. This CAD system for flat glass also generates control data for the M-RX and other processing machines.

of the glass industry showcases the entire bandwidth, ranging from small businesses to industrial glass processing, and covering flat, hollow and solar glasses as well as a wide range of special glasses.

The issue of Glass Industry 4.0 will be addressed directly by exhibitors and will also be discussed at the Glass Technology Live symposium on 21 September 2016, under the auspices of the VDMA Glass Technology Forum.

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Glass: A Clear and Sustainable Choice

Akhilesh Tripathi
General Manager - Quality Assurance
Hindusthan National Glass & Industries Ltd.
atripathi@hngil.com

INTRODUCTION

Glass containers, which were traditionally being preferred for food packaging material due to their intrinsic safe & sustainable properties, have been replaced with new polymer packaging (flexible or rigid) due to convenience & cost pressure in India. The developed world has also gone through this phase and faced challenges for glass industry, but with the new NNPB technology and external coatings, glass packaging has become lighter, stronger and cost-effective.

In India too, glass industry had commercialised this technology first in pharma segment and now focussing on food sector to bring back the consumer preference of safe & sustainable food packaging within optimum cost. The new generation consumer, who is now more aware & conscious of health, safety, and environment, and has access to multinational retail chains of global food will definitely bring back old, but new glass packaging for food products in India. This will establish glass as a clear and sustainable choice for food packaging.

CURRENT SCENARIO

The urban population is growing at a fast pace in India and this in turn is increasing high income consumer family, where both husband and wife are working to meet quality life standards. The Indian consumer is also exposed to global tastes and brands available through global retail chain in the Indian market.

Food products offered in small retail packaging for usage of direct consumer primarily need good display value with longer shelf life, protection against adulteration and preservation of food product as it was in its virgin form, when it was packed.

Packaging technologists are committed to provide safe food and also simultaneously address the broader issue of sustainability. This is giving a cutting edge and natural choice to glass packaging as primary packaging material selection for food and packaging technologists. This is evident from the growth of global glass container market, which is estimated to reach 59.27 million tonne by 2020 with estimated CAGR of 3.35%. The Indian glass container market is estimated to be around US$1.1 billion and growing at faster rate of around 10% and poised to grow to US$2.2 billion by 2020.

This is happening because of increase in demand for glass in food and alcobrew sectors, which contribute around 56% of total packaging requirement.

The global consumer is also aware of food safety & sustainability, therefore in case of available choice he prefers glass packaging vis a vis alternative packaging due to following intrinsic properties of glass:

- Glass is having Best Barrier protection against any alternative packaging material. Its OTR (i.e. oxygen transmission rate) and WVTR (i.e. water vapour transmission rate) are zero.
- Glass is best preservative medium as it is inert and does not interact or migrate any substance to the content and provide longer shelf life to product.
- Glass has best display value of content and can be moulded to attractive shapes. Display value can be further enhanced with multiple options like embossing/ de-bossing/ etching/ frosting/ printing/ colouring and sleeving, without compromising the safety of content.
- Glass has multiple closure options available like RSPP, vacuum sealing lug, twist-off lug, crown cork for carbonated drinks, and ring pull crown to provide security against any adulteration and pilferation. This also gives convenience to consumer in case of multidose usage.

Last but not the least, glass packaging is also sustainable i.e. recycling/ reuse & reduction to optimise issues of environment, economic and social health pillars.

- Glass is permanent material that is 100% and endlessly recycled without any degradation of its intrinsic properties, as long as it is separately collected and treated. In Europe, it has created local businesses and jobs that are now helping to recover more than 70% of all post-consumer glass packaging in the EU and keeping valuable resources out of landfills. In India also, though not organised as Europe, ragpickers and kabariwallas are collecting back used glass and around 30-35% glass is recycled to produce new glass bottles.
- Glass does not deteriorate due to reusage and hence it is preferable to reuse glass containers than recycling according to the waste hierarchy. Refillable bottles are used extensively in many Indian soft drink industries, rather Indian soft drink is using 100% refillable bottles. In many European countries bottled water and milk is also available in refillable glass bottles. In liquor segment, some companies are even using 80% old bottles of their requirement. Approximate average reuse rate in India is 40-45%, which is supporting sustainability and preference of glass as packaging material.
- Health aspects are nearly always forgotten when talking about sustainability which is often only associated with environment. So while a cradle-to-cradle environmental Life Cycle Assessment (LCA) is doubtlessly one of the most efficient tools to measure the impact of a substance product or a service on the environment. In particular for packaging, environmental LCAs do not measure exposure to contaminants which can affect health for example, nor do they take into consideration the fact that in the case of the glass industry it is a local and integrated industry, giving employment to local people. These are some of the important elements to measure when assessing a product's social sustainability.

Though today approximately 30-35% of glass goes as landfill and other application, without any negative impact on the environment, but still in India we need to optimise the recovery of this glass for recyclability to further reduce the carbon footprint of glass as 10% increase in recycling percentage will reduce 2-3% of melting energy and if we go to 70-75% recycling rate the approximate reduction in environmental impact of glass is about 50% as per LCA study of AIGMF conducted in association with PE International.

We also need to bring back many products to glass packaging. Products which were shifted to alternative packaging due to convenience are creating long-term health and environmental issues to society at large, while glass historically is safe for food as well as it can be termed as sustainable packaging.

Glass, as you all know, is historically proven safest packaging for food products and was used in milk distribution historically. But it was discontinued and poly pouches took its place because of the following reasons - Convenience in handling; - High cost of glass packaging.

Indian glass industry realises this fact and identifies that pasteurised milk & water, which is the wholesome food and need for all, is under threat from adulteration and environmental impact as it is being packed & served in polypack. Even choice of glass packaging of these products is not available to Indian consumer.

Though to some extent people can compromise on convenience part but in cost-sensitive Indian market it was the need of the hour to develop new glass bottle for milk distribution and with the new available technology of NNPB and External Coatings, the glass industry took the responsibility of development of one general market hybrid bottle, which gives following benefits to its users: - Low Packing Cost; - Low Transportation Cost; and - Increase in productivity of filling lines due to improved impact resistance.

Though the concept is yet to be endorsed by major dairies like Amul and Mother Dairy and organic food product manufacturers like Patanjali, the back to basic journey has already started in high-end upmarket segment of metros and specialty products of milk are being reintroduced in hybrid glass bottle and taking gradual inroads in the market.

The response has been phenomenal and in first year of its availability in the market, hybrid glass bottle had touched one million mark in its sale of glass packaging option available to consumers in milk and water segment. This shows the awareness of Indian consumer and the need for safe milk and water.

We believe fresh fruits & juice products will also follow and hybrid glass will be the preferred packaging of tomorrow for milk/ premium drinking water and organic amla & alovera juices/ olive oil and so on the lines of global standard packaging of these products ■

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Key Features of Union Budget of India: 2016-2017

- Growth of Economy accelerated to 7.6% in 2015-16.
- India hailed as a 'bright spot' amidst a slowing global economy by IMF.
- Foreign exchange reserves touched highest ever level of about 350 billion US dollars.
- Regulatory architecture to be provided to ten public and ten private institutions to emerge as world-class Teaching and Research Institutions.
- Allocation for skill development – 1804 crore.
- 1500 Multi Skill Training Institutes to be set-up.
- Allocation of ₹ 55,000 crore in the Budget for Roads. Additional ₹ 15,000 crore to be raised by NHAI through bonds.
- To provide calibrated marketing freedom in order to incentivise gas production from deep-water, ultra deep-water and high pressure-high temperature areas.
- Increase the turnover limit under Presumptive taxation scheme under section 44AD of the Income Tax Act to ₹ 2 crores to bring big relief to a large number of assessees in the MSME category.
- Extend the presumptive taxation scheme with profit deemed to be 50%, to professionals with gross receipts up to ₹ 50 lakh.
- New manufacturing companies incorporated on or after 1.3.2016 to be given an option to be taxed at 25% + surcharge and cess provided they do not claim profit linked or investment linked deductions and do not avail of investment allowance and accelerated depreciation.
- Lower the corporate tax rate for the next financial year for relatively small enterprises i.e. companies with turnover not exceeding ₹ 5 crore (in the financial year ending March 2015), to 29% plus surcharge and cess.
- 100% deduction of profits for 3 out of 5 years for startups setup during April, 2016 to March, 2019. MAT will apply in such cases.
- Exemption of service tax on services provided under Deen Dayal Upadhyay Grameen Kaushalya Yojana and services provided by Assessing Bodies empanelled by Ministry of Skill Development & Entrepreneurship.
- Changes in customs and excise duty rates on certain inputs to reduce costs and improve competitiveness of domestic industry in sectors like Information technology hardware, capital goods, defence production, textiles, mineral fuels & mineral oils, chemicals & petrochemicals, paper, paperboard & newsprint, Maintenance repair and overhauling [MRO] of aircrafts and ship repair.
- Additional tax at the rate of 10% of gross amount of dividend will be payable by the recipients receiving dividend in excess of ₹ 10 lakh per annum.
- Surcharge to be raised from 12% to 15% on persons, other than companies, firms and cooperative societies having income above ₹ 1 crore.
- Infrastructure cess, of 1% on small petrol, LPG, CNG cars, 2.5% on diesel cars of certain capacity and 4% on other higher engine capacity vehicles and SUVs. No credit of this cess will be available nor credit of any other tax or duty be utilized for paying this cess.
- 'Clean Energy Cess' levied on coal, lignite and peat renamed to 'Clean Environment Cess' and rate increased from ₹ 200 per tonne to ₹ 400 per tonne.
- 11 new benches of Customs, Excise and Service Tax Appellate Tribunal (CESTAT).
- 13 cesses, levied by various Ministries in which revenue collection is less than ₹ 50 crore in a year to be abolished.
- Customs Act to provide for deferred payment of customs duties for importers and exporters with proven track record ■

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

केन्द्रीय बजट 2016-17 की मुख्य विशेषताएं

- वर्ष 2015-16 में अर्थव्यवस्था की 7.6 प्रतिशत की तेज वृद्धि हुई।
- मंद वैश्विक अर्थव्यवस्था में भारत को देदीप्यमान प्रकाश स्तंभ के रूप में आई.एम.एफ. द्वारा सराहना की गई।
- उद्योग संघों की भागीदारी से राष्ट्रीय अनुसूचित जाति और अनुसूचित जनजाति हब की स्थापना की जाएगी।
- सड़कों के लिए बजट में 55000 करोड़ रुपए का आबंटन। एन.ए.एच.ए.आई. द्वारा बांडों के माध्यम से अतिरिक्त 15000 करोड़ रुपए जुटाये जायेंगे।
- गहरे पानी, अत्यंत गहरे पानी और उच्च दाब उच्च तापमान वाले क्षेत्रों से गैस के उत्पादन को बढ़ावा देने के लिए उचित विपणन स्वतंत्रता दी जाएगी।
- सरकारी क्षेत्र के बैंकों के पुर्नपूंजीकरण हेतु 25000 करोड़ रुपए का आबंटन।
- विभिन्न मंत्रालयों में मानव संसाधन युक्तिसंगत बनाने के लिए कार्यबल का गठन किया गया है।
- एम.एस.एम.ई. श्रेणी में बड़ी संख्या में निर्धारितियों को बड़ी राहत देने के लिए आयकर अधिनियम की धारा 44 क घ के तहत प्रकल्पित कराधान स्कीम के अंतर्गत पण्यावर्त सीमा को बढ़ाकर 2 करोड़ रुपए करना।
- दिनांक 1.3.2016 को या इसके बाद निगमित नई विनिर्माणकारी कंपनियों को 25 प्रतिशत + अधिभार और उपकर पर कर लगाएं जाने का विकल्प दिया जाएगा बशर्ते कि वे लाभ संबद्ध या निवेश संबद्ध कटौतियों का दावा न करें और निवेश भत्ते और त्वरित मूल्यह्रास का लाभ न उठाएं।
- अपेक्षाकृत छोटे उद्यमों अर्थात 5 करोड़ रुपए (मार्च, 2015 को समाप्त होने वाले वित्त वर्ष में) से अनधिक के टर्नओवर वाली कंपनियों के लिए अगले वित्तीय वर्ष के लिए निगमित कर की दर को कम करके 29 प्रतिशत जमा अधिभार और उपकर तक लाना।
- स्टार्टअप के लिए जो अप्रैल, 2016 से मार्च, 2019 तक स्थापित हुई के लिए 5 वर्षों में से 3 वर्ष के लिए 100 प्रतिशत लाभ की कटौती दी जाएगी। ऐसे मामलों में मैट लागू होगा।
- कतिपय वस्तुओं पर सीमाशुल्क और उत्पाद शुल्क दरों में परिवर्तन ताकि लागत घटाई जा सके और सूचना प्रौद्योगिकी, हार्डवेयर, पूंजीगत माल, रक्षा उत्पादन, वस्त्र, खनिज ईंधन और खनिज तेल, रसायन और पेट्रो-रसायन, कागज, गत्ते और न्यूजप्रिंट, वायुयानों का अनुरक्षण, मरम्मत और पूरी जांच (एमआरओ) तथा जहाजों की मरम्मत आदि जैसे क्षेत्रों में घरेलू उद्योग की प्रतिस्पर्धा में सुधार लाया जा सके।
- कोयला, लिग्नाइट और पीट पर लगाया गया 'स्वच्छ ऊर्जा उपकर' को 'स्वच्छ पर्यावरण उपकर' का नया नाम दिया गया और इसके साथ ही साथ इसकी दर 200 रुपए प्रतिटन से बढ़ाकर 400 रुपए प्रतिटन कर दी गई ▪

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

glass WORLDWIDE
PREFERRED INTERNATIONAL JOURNAL OF AIGMF IN ASSOCIATION WITH KANCH

AIGMF
THE ALL INDIA GLASS MANUFACTURERS' FEDERATION
FOUNDED 1944

IT'S CLEAR

THAT GLASS HAS NO PEER.

AIGMF - Catering to the needs of Glass Industry

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

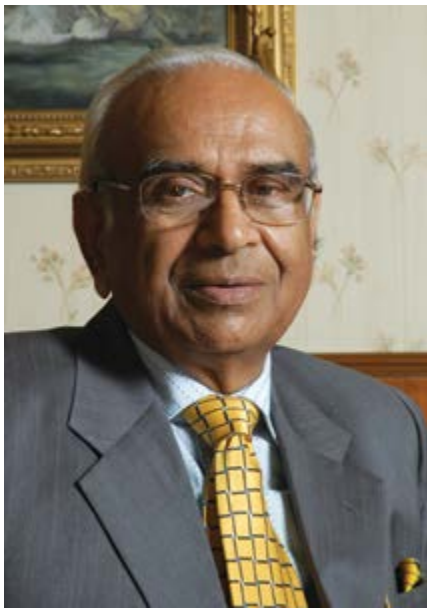
Glass bottle is **Environment Friendly** and **Hygienic**

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

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

Personality Profile:

C.K. Somany



Born on 25th June 1933 in Kolkata, Mr. Chandra Kumar Somany acknowledged expert in glass technology holds more than 60 years of rich experience in glass industry.

Mr. Somany laid the foundation of Hindusthan National Glass and Industries Ltd., (HNGIL) in 1946. Presently, he is serving as the Non-Executive Chairman of the Company and is providing policy guidelines for the management and administration of the Company.

He holds an F.B.I.M. (London) Degree and a Degree in Glass Plant Instrumentation from Honeywell Brown, Minneapolis, U.S.A.

Some of the prominent positions held by Mr. Somany are President of The All India Glass Manufacturers' Federation (AIGMF); President with Eastern India Glass Manufacturers' Association (EIGMA)- Kolkata and Chairman of Chemical and Allied Export Promotion Council (CAPEXIL).

Mr. C.K. Somany popularly known as CK is globally respected entrepreneur. Mr. Somany is the principal architect of what constitutes the modern Indian Glass Container Industry today. He joined the Indian Glass Packaging Industry when it was at a nascent stage. His family had interests in a small glass bottle plant in the state of West Bengal, which was largely based on the manual process of manufacturing. Around this point in time, his family wanted to go for substantial automation in the business process.

Today, it is his vision & constant thrust towards innovation and adoption of latest in technology that has resulted in the HNG Group emerging as a market leader in Indian glass packaging Industry, running seven fully automated container Glass plants in India and One in Germany besides a Float Glass unit in Gujarat.

Mr. Somany is presently the Chairman of the Glass & Glassware Panel of CAPEXIL (Chemical & Allied Products Export Promotion Council) which controls an export turnover of US$ 17 billion. He is also the Chairman of the Society of Glass Technology (Indian Section).

Mr. Somany was pioneer in bringing world class quality product to its customers.

The company under its leadership has used latest state of the art technology of glass manufacturing. He sets the benchmark in terms of quality of the product, his focus on continuous upgradation of technology and timely expansion of production capacity to ensure that group is in a position to satisfy the demands of customers. The customer centricity has always been of paramount importance for him. He was also well supported by his two sons Mr. Sanjay Somany and Mr. Mukul Somany.

HNG GROUP

- Hindusthan National Glass & Industries Ltd. (HNGIL) is the flagship company of the group and largest producer of Containers Glass in India having market share of over 55%. HNG is having Pan India presence with seven manufacturing units. HNGIL has a diversified Customer base across all user segments. It customers includes United Breweries, Carlsberg, Sab Miller, Diageo, United Spirit, Bacardi, Pepsico, Coca Cola, Unilever, Nestlé, Dabur, Heinz, Ranbaxy, Cipla, Pfizer, GSK and Himalaya amongst others.
- HNG Float Glass Ltd. is a significant player in Float glass market in India and has a state-of-the–art manufacturing plant at Halol, Gujarat.
- HNG Global GmbH, a wholly owned subsidiary of HNGIL was acquired as Agenda Glass AG, in May 2011. The Plant is located at Gardelegen, Germany.
- Glass Equipment (India) Limited (GEIL) is a leading Glass Machinery manufacturer in India, offers diversified spectrum of IS Forming Machines for efficient glass container production.
- AMCL Machinery Limited is High End Engineering Machinery Company, having State of the art Manufacturing facility at Nagpur, Maharashtra with well-equipped Design and Development center.

Mr. C.K. Somany at the signing ceremony (Jan 10, 2013) with Trakya Cam Sanayii for jointly pursuing the float glass business in India, under the aegis of HNG Float Glass Limited (HNGFL)

- Somany Foam is into the manufacturing of Polyurethane Foam, mattress, pillow, cushions, Sofa 'n' Bed, Couch, Peeled foam rolls & industrial foams sheets and located in Haridwar, Uttarakhand

HNG group in the field of container glass caters to various segments such as liquor, beer, pharmaceuticals and Food & beverages etc. by producing more than 15 million bottles a day. The container glass manufactured ranges in size of 5ml to 3200ml. The container glasses are produced in the colors – Flint, Amber, and Green.

In float glass, HNG caters mainly to architectural segment with a pull of 600 MTD. The float glass manufactured ranges from a thickness of 3.5mm to 12mm. Float glass are produced in the forms such as clear, tinted and reflective.

HNG has over the period has increased capacity in all the regions to become the largest container glass players with presence in all parts. The capacity expansion was done through both organic and inorganic route with an idea of having facility near to its customer to deliver the high quality product and also to serve them timely and in cost efficient manner. Below is the chronology of major expansion that took place:

1952 = India's first fully automated glass manufacturing plant, with an installed capacity of 30 TPD was commissioned at Rishra (near Kolkata in West Bengal)

1956 = Put up second Greenfield plant at Bahadurgarh (Haryana), with 90 TPD of capacity

1964 = Put up of third furnace at Bahadurgarh (Haryana)

1974 = Put up of fourth furnace at Bahadurgarh (Haryana)

1982 = Put up of fifth furnace at Bahadurgarh (Haryana)

2000 = Put up of sixth furnace at Rishra (near Kolkata in West Bengal)

2001 = Installed capacity was raised to 1100 TPD and was certified with ISO 9001:2000

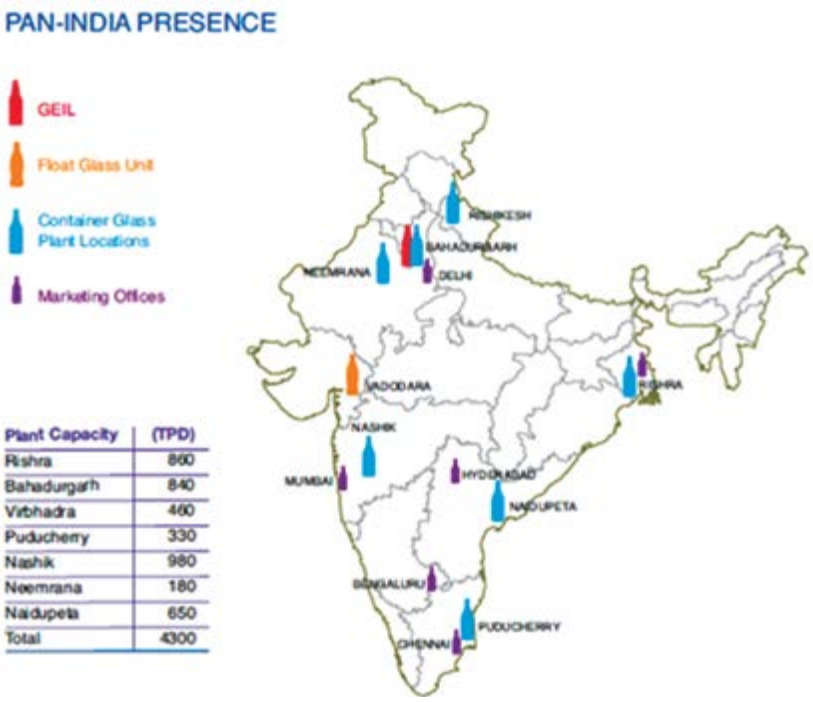
2002 = Production strength was raised to 1800 TPD with the acquisition of sick units of Owens Brockway (India) Ltd. at Rishikesh and Puducherry

2005 = Installed capacity was increased to 2150 TPD through the acquisition of Larsen & Toubro Plant (Nashik)

2006 = Incorporated HNG Float Glass Ltd. to set up a Float Glass Plant in Halol

2007 = Acquired Neemrana Plant through the merger of Haryana Sheet Glass and installed capacity was increased to 2540 TPD

2013 = Greenfield and Brown field expansion in Naidupeta, Andhra Pradesh and Nashik, Maharashtra. The capacity was increased to 4300 TPD



Plant Capacity	(TPD)
Rishra	860
Bahadurgarh	840
Virbhadra	460
Puducherry	330
Nashik	980
Neemrana	180
Naidupeta	650
Total	4300

सी.के. बाबू : स्टार्टअप से शिखर तक

एच.एन.जी. को ग्लास इंडस्ट्री में ऊंचे स्थान पर पहुंचाने में चेयरमैन सी.के. सोमानी की कड़ी मेहनत और मार्केट को पहचानने का तर्जुबा काम आया।

भारत में ग्लास पैकेजिंग खंड की दिग्गज कंपनी एच.एन.जी. की बाजार हिस्सेदारी 55 पर्सेंट के साथ पहले नंबर पर है।

सन् 1952 में मात्र 15 टन प्रतिदिन की क्षमता के काँच के उद्योग से शुरुआत करने वाले मारवाड़ी मूल के श्री सी.के. बाबू के बारे में कोई नहीं जानता था कि यह एक दिन काँच की दुनिया के बेताज बादशाह बन जायेगें। बाजार पर उपलब्धा होने वाले '**H**' मार्क वाले काँच की विश्वप्रसिद्ध कंपनी 'एचएनजी' आज उनकी सोच, कठोर-परिश्रम का ही नतीजा है। काँच के इन बादशाह के मन मस्तिष्क में ही काँच छाया हुआ नहीं है, दिल भी काँच का ही है, जिसका प्रमाण यह है कि वे समाजसेवी गतिविधियों में भी पीछे नहीं हैं।

Mr. C K Somany being felicitated for being awarded as 'Glass Person of the Year' in 2013 at Bengal Club (Kolkata) by then AIGMF President, Mr. S C Bansal as host of the function, EIGMA President and CMD, LaOpala Ltd., Mr. S K Jhunjhunwala (right) looks on.

सी.के. बाबू के नाम से जाने वाले चन्द्रकुमार सोमानी का 83 वर्ष लंबा जीवन कई उतार-चढ़ावों से भरा रहा। सन् 1933 में 25 जून को कलकत्ता में जन्मे श्री बाबू के पिताजी स्व. मुरलीधर सोमानी जूट बेग, मलमल के कपड़े व शेयर मार्केट का छोटा-मोटा व्यवसाय करते थे। आय चाहे कम थी, फिर भी माता जानकी देवी अपने परिवार को अच्छे से संभाल रही थीं। छह भाई व तीन बहनों के भरे-पूरे परिवार में माता-पिता के साथ भाई-बहनों के स्नेह की भी कमी नहीं थी। जीवन की विषमताओं का प्रथम प्रहार मात्र 10 वर्ष की अबोध आयु में ही हो गया। जिस आयु में पिता के संरक्षण व स्नेह की छत्र-छाया की आवश्यकता होती है, ऐसे समय में आपके पिता का देहावसान हो गया। बचपन तो कलकत्ता में ही बीता और प्रारंभिक शिक्षा प्राप्त की वहाँ के बंगाली माध्यम के 'हेअर स्कूल' से जो उनके मकान से लगा हुआ ही मारवाड़ियों के आधिक्य वाले क्षेत्र बड़ा बाजार में स्थित था। उच्च शिक्षा 'सेंट जेवियरर्स कॉलेज' से प्राप्त की।

Mr. C.K. Somany at the Asia Pacific Meeting of Glass and Allied Industries, jointly organized by CSIR- Central Glass and Ceramics Research Institute (CSIR-CGCRI) Kolkata, International Commission on Glass (ICG), The All India Glass Manufacturer's Federation (AIGMF), and The Indian Ceramic Society (InCerS) during December 2-3, 2013.

Mr. C.K. Somany with Ex-Presidents of AIGMF at the Lawns of Om Glass Works, during Ex Com Meeting at Firozabad in 2012.

आज़ादी के पूर्व वर्ष 1946 में श्री सोमानी जब कॉलेज में पढ़ ही रहे थे, तभी उन्हें 'काँच की दुनिया' ने खींच लिया। सोमानी परिवार का 'मेन्यूअल प्रोसेज' पर आधारित एक छोटा सा 'ग्लास प्लांट' पश्चिम बंगाल के हावड़ा में था, लेकिन वह श्रमिक समस्या के कारण लंबे समय से बंद पड़ा था। वर्ष 1946 में उनके परिवार ने ऑटोमेटिक मशीनें लगाकर 'ग्रीन फील्ड ग्लास प्रोजेक्ट' की तरह उसे प्रारंभ करने का निर्णय किया।

1964 में कोलकाता के बाद बहादुरगढ़ में ग्लास प्लांट लगाया।

व्यावसायिक उतार-चढ़ावों व संघर्षों को पार करता आज एच.एन.जी. काँच उद्योग के क्षेत्र में विश्व भर में एक जाना माना नाम बन चुका है। वर्तमान में समूह के देश में कुल 7 प्लांट स्थापित हैं और मात्र 15 टन प्रतिदिन की क्षमता से प्रारंभ उद्योग आज प्रतिदिन 4300 टन से अधिक का काँच दुनिया को दे रहा है। भारत में तो समूह का अपना स्थान है ही, साथ ही यह नेपाल, नाइजीरिया, फिलीपींस, इंडोनेशिया आदि देशों को भी बड़ी मात्रा में माल निर्यात कर रहा है।

सी.के. सोमानी 83 साल की आयु में भी एक युवा की तरह जोश रखते हैं। सुबह पांच बजे उठकर नियमित प्राणायाम करते हैं। उसके बाद रूटीन में ऑफिस जाकर काम निपटाते हैं और छुट्टियों के दिन ऋषिकेश में एकांत में गुजारते हैं।

बाबूजी ने अपने व्यवसाय व परिवार के साथ ही मानवता की सेवा में भी यथा शक्ति भागीदारी की है। प्रसिद्ध तीर्थ ऋषिकेश में आपने अपनी माता की स्मृति में जनहितार्थ 'जानकीदेवी सोमानी भवन धर्मशाला' का निर्माण करवाया। ऋषिकेश आने वाले तीर्थयात्री यहाँ घर सा माहौल महसूस करते हैं। कोलकाता 'सुनेत्र आई हॉस्पिटल' में भी आपने डेढ़ करोड़ रुपये का योगदान दिया तथा सर्जिकल यूनिट की स्थापना की। यहाँ आने वाले 20 प्रतिशत रोगियों को नि:शुल्क, 30 प्रतिशत को रियायती दर पर तथा शेष सभी 50 प्रतिशत को अत्यंत कम शुल्क पर चिकित्सा सुविधा प्रदान की जाती है। इस हॉस्पिटल का उद्देश्य लाभ कमाना नहीं है, शुल्क तो केवल उपकरणों के आधुनिकीकरण के काम में ही आता है। बहादुरगढ़ हरियाणा में आपके सहयोग से 'बाल भारती विद्यालय' संचालित हो रहा है।

उनकी इसी कामयाबी के चलते साल **2013 का ग्लास पर्सन आफ द इयर के अवॉर्ड** से उन्हें नवाजा गया। इतना ही नहीं वो पहले भारतीय हैं जिन्हें फिनेक्स अवॉर्ड देकर सम्मानित किया गया है। ये सम्मान पाने वाले वो दूसरे एशियन हैं।

Mr. C.K. Somany interacting with Honb'le Minister of Industry for Rajasthan, Mr. Gajendra Singh during Glass Industry Meet at Jaipur in 2015. The event provided an opportunity to debate on use of glass containers as responsible and safe packaging for "Clean India Campaign" and use of glass as eco-friendly building material for "Smart Cities".

FAMILY AND OTHER ACTIVITIES

Mr. Somany's elder son Mr. Sanjay Somany and younger son Mr. Mukul Somany are the Vice Chairman and Managing Directors of the company. Mr. Bharat Somany, son of Mr. Sanjay Somany is Director in the group and also serves as one of the Office Bearer of the AIGMF.

Mr. C.K. Somany is associated with various charitable and philanthropic organizations carrying on in the glorious tradition of his illustrious ancestors.

In the area of philanthropic activities, he has carved a niche for himself among the peer group.

In the last 15 years, he has set up a large Community Centre at Rishikesh, a modernized school in Haryana, helped several colleges, Universities, Temples and Social Organizations in their respective pursuits. He has set up the Somany Surgical Eye Clinic, equipped with ultra-modern machines to serve the distressed and the needy for their vision problems.

His wife, Mrs. Sudha Somany has been a constant support to him in all his CSR activities.

TITLE/ ACHIEVEMENTS

Mr. C.K. Somany has served as the President of The All India Glass Manufactures' Federation (1975-76), Eastern India Glass Manufacturers' Association (EIGMA)- Kolkata (many terms) and several other commercial and non-commercial organizations. He has served as the Chairman of the Development Panel for Glass Industry formed by the Government of India, Ministry of Industry between 1995 and 1997.

GLASS PERSON OF THE YEAR 2013

Phoenix Award Committee announced the selection of Mr. C.K. Somany for "Glass Person of the Year 2013" for his significant and major contributions to glass industry in the field of production, glass education and container glass.

Mr. C.K. Somany receiving the prize from the Hon. President of India (Mr. Pranab Mukherjee), in the Presence of Mr. Jyotiraditya M. Scindia, Minister of State for Power for HNG being conferred with the National Energy Conservation Award – 2012 by the Ministry of Power on December 14, 2012.

DIRECTORSHIPS HELD IN OTHER COMPANIES

- Spotlight Vanijya Limited
- Niket Advisory & Trading Company Llp.
- HNG Cement Limited
- HNG Power Limited
- Brabourne Commerce Pvt. Limited
- Mould Equipment Limited
- The All India Glass Manufacturer's Federation
- AMCL Machinery Ltd
- Capexil
- Bengal Rowing Club
- Eastern India Glass Manufacturers' Association (EIGMA) ■

Mr. C.K. Somany receives the 43rd Annual Phoenix Award from Mr. Gordon E Jungquist, 2013 Phoenix Award Committee Chairperson.

AIGMF

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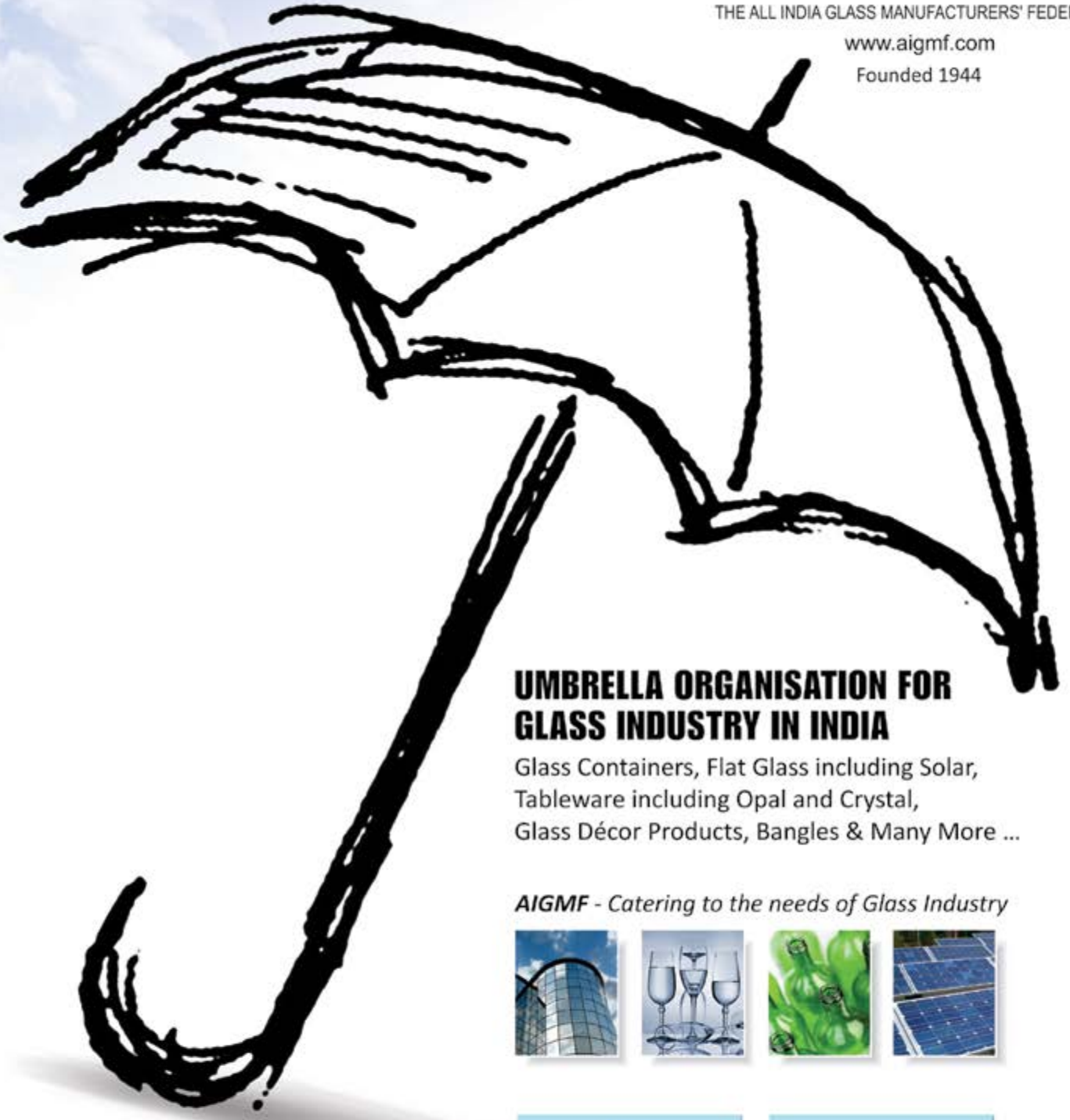

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