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Kañch

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

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AIGMF

THE ALL INDIA GLASS MANUFACTURERS' FEDERATION

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The Quarterly Journal of the All India Glass Manufacturers' Federation

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The All India Glass Manufacturers' Federation
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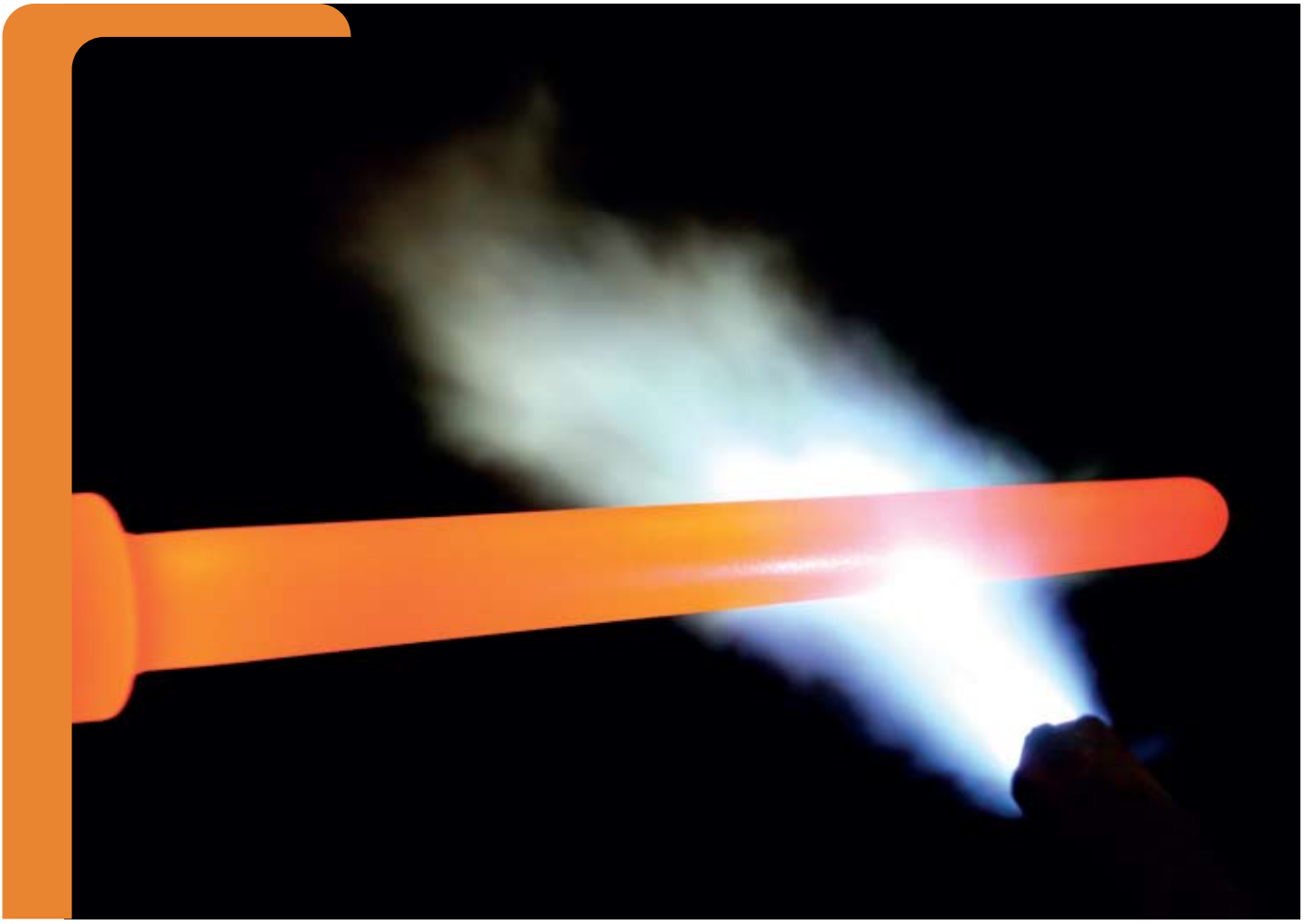

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Kañch
Quarterly Journal of **THE ALL INDIA GLASS MANUFACTURERS' FEDERATION**

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Contents

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From President's Desk

Two important happenings after publication of January-March, 2013 issue of Kanch were GLASSPEX INDIA 2013 – International Exhibition and Conference and selection of Mr. C K Somany for 'Glass Person of the year 2013' by Phoenix Award Committee. Mr. C K Somany, fondly called as CK, is a seasoned entrepreneur and veteran of Indian Glass Industry. His Selection as 'Glass Person of the year 2013' is most befitting. Entire glass fraternity responded loud applause and joy when this announcement was made by the member of the Phoenix Award Committee at the opening of programme for the cultural evening at the 3rd Glasspex India. With this, image of the AIGMF and Indian Glass Industry attained greater heights. I once again convey hearty greetings to Mr. Somany on my behalf and on behalf of the entire glass fraternity.

3rd GLASSPEX INDIA 2013 - International Exhibition for Glass - Production, Processing, Products held at Mumbai was successful inspite of economy being in low profile. Despite the current difficult market environment more than 180 exhibitors from 22 countries exhibited their latest products and innovations in the areas of glass production, process and applications. There was a footfall of about 3,347 visitors from India and abroad.

Concurrent with the exhibition, AIGMF organised the 10th International Glass Technology Conference themed "Managing Sustainable Growth" wherein papers were presented by Nikolaus Sorg GMBH, Horn Glass Industries, Sheppe International, Siemens, Zippe, Bottero, Asahi India Glass, Lattimer and Poona Cement.

With a view to ensure that right type of glass is used in buildings, etc., Architectural Glass Panel of the AIGMF engaged services of Confederation of Construction Products & Services (CCPS) to formulate guidelines for use of suitable quality of glass in buildings including residential, commercial, office complexes, etc. CPWD, PWD, IBC and CEAI, etc., have been duly consulted and were fully involved in formulation of these guidelines.

The Guidelines have been mandated by 13 States, Central and State Government departments and other organizations including PSUs. These include Government of Andhra Pradesh, Government of Rajasthan, Central PWD, Greater Hyderabad Municipal Corporation, NBCC, Airport Authority of India, Government of Manipur PWD, Government of Delhi PWD, Delhi Development Authority, Rajasthan Housing Board, Town Planning Department, Government of Rajasthan, Haryana PWD, Andaman & Nicobar Islands PWD. Soft copy of guidelines is available at http://www.aigmf.com/Guidelines.pdf

S C Bansal
President AIGMF

and Managing Director, Adarsh Kanch Udyog Pvt. Ltd./
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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. Western India Glass Manufacturers' Association-Mumbai, Eastern India Glass Manufacturers' Association-Kolkata, U.P. Glass Manufacturers' Syndicate-Firozabad, Northern India Glass Manufacturers' Association-Sahibabad, Ghaziabad (UP) and South India Glass Manufacturers' Association-Hyderabad. The Federation was incorporated under the Companies Act, 1956 (No. 1 of 1956) as a Limited Company on 15-6-1970. The main aims & objects of the Federation are:-

a) 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.
b) To form a common link amongst Glass Manufacturers' in India and thus develop a spirit of mutual help and co-operation with one another.
c) To promote the study and research in Glass Technology.
d) To consider all matters relating to the manufacture and marketing of glass articles in India and the question of export and import thereof.
e) 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.
f) To collect necessary information and data and propagate it for the benefit of Glass Industry and trade in India.
g) 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.
h) 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.
i) 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.

Manohar Lal
Secretary AIGMF

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We understand your needs as an industry and are committed to assist you in making your advertising most profitable. This also popularises your brand and product portfolio by establishing contacts to suit your company's requirements.

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It would be ideal if you could send your advertisement in PDF high resolution format (with auto enabled e-mail ID/ website address, if any) helping readers to reach you directly on a single click in KANCH's e-version / AIGMF website.

A complimentary copy of KANCH along with the invoice will be sent to all advertisers. Those wanting more than one copy are requested to send their request in advance.

For convenience, payment can also be remitted through wire transfer. Our bank details are as under:

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City : New Delhi, India

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Glass News INDIA

C K Somany
Chairman, HNG Group

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. The award will be formally conferred to Mr. C K Somany on October 11, 2013 in Berlin.

Mr. C K Somany is an acknowledged expert in glass technology and a globally respected entrepreneur. He is the founder of Hindustan National Glass & Industries Limited (HNGIL) and commissioned India's first fully automated glass manufacturing plant at Rishra (near Kolkata). The Group is now operating seven fully automated container glass plants in India and one in Germany, and produces more than 4,800 TPD of glass. The group has since ventured into manufacturing of float glass and has set up a 600 TPD float glass unit at Halol in Gujarat.

Mr. C K Somany, popularly known as CK, continues to guide the industry and is presently Chairman of HNG Group.

It is through Mr. Somany's vision, and constant thrust towards innovation and adoption of the latest technologies, that has resulted in the HNG Group emerging as a market leader in the Indian glass packaging Industry. Inspite of his preoccupation with growth and development of HNG Group of Industries, Mr. Somany has also found time for other voluntary activities. He has been closely associated with The All India Glass Manufactures' Federation and was its President during 1975 & 1976. He has also been associated with The Bengal Glass Manufacturers' Association, The Merchants Chamber of Commerce, The Society of Glass Technology (Indian Section), wherein he holds the distinguished position of its Chairman. He has also been Chairman of Glass Panel of Chemicals & Allied Products Export promotion Council (CAPEXIL) and is presently Chairman of CAPEXIL. He is also associated with various charitable and philanthropic organizations.

SCHOTT EXTENDS HANDS-ON SUPPORT TO INDIA'S PHARMA QUALITY STANDARDS

First India edition of Open FIOLAX® Academy spreads latest glass know-how

SCHOTT Glass FIOLAX® Academy attracted more than 70 Indian pharma executives to a unique training initiative: At this signature event, SCHOTT experts shared valuable information about composition, properties and production of high-quality pharmaceutical glass tubing. The program was carefully designed to help participants improve the quality standards of their company's processes and products. The academy is named after SCHOTT FIOLAX® glass tubing, the most frequently used glass tubing for manufacturing primary pharmaceutical packaging globally.

At the seminar, Dr. Bettine Boltres, Product Manager, Pharmaceutical Tubing, presented customized training modules on topics like reduction of breakage risks, drug-container interaction, hydrolytic resistance of glass containers, surface alkalinity and pH shift, so-called extractables & leachables, protein adsorption and light protection to show that all glasses are not the same.

SCHOTT holds FIOLAX® Academy events in leading pharmaceutical markets all over the world.

With this academy, SCHOTT Glass India continues to offer opportunities to leading pharmaceutical companies to learn more about the benefits of using primary pharmaceutical packaging made of high quality glass.

HNG NEEMRANA RECEIVES AWARD IN THE CATEGORY OF "MOST ENVIRONMENT FRIENDLY "GREEN" UNIT"

"RIICO (Rajasthan State Industrial Development & Investment Corporation) felicitated Industries for their outstanding contribution on industrial development of the state on its foundation day celebration on 2nd April 2013 at Birla Auditorium, Jaipur. HNG Neemrana received 2nd Runner-up award in the category of "Most Environment Friendly "Green" Unit".

Vice President, Mr. K K Sharma, and Senior Manager Commercial, Mr. Akhil Rastogi, HNG Neemrana received the award (Trophy and Certificate) from Mr. Rajeev Arora, Chairman Rajasthan Foundation in the presence of Honorable Minister of Industries, Rajasthan who was the chief guest. Chairman RIICO, Mr. Sunil Arora and MD RIICO, Mr. Naveen Mahajan were also present.

SANTHANAM IS NEW CHAIRMAN OF CII-SOUTHERN REGION

Mr. B. Santhanam, Managing Director, Saint-Gobain Glass India Ltd, Chennai, has been elected as the Chairman of Confederation of Indian Industry–Southern Region for the year 2013 -14.

Mr. Santhanam has been closely associated with the CII and was the Deputy Chairman of CII–Southern Region for 2012 -13.

He has been closely involved in CII initiatives in the areas of human resource development, skill development and manufacturing.

He obtained his B.Tech from IIT, Madras and MBA from IIM, Ahmedabad. ■

(Glass News Source: World Wide Web)

GARWARE SUNCONTROL®
WINDOW FILM

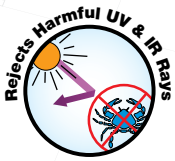
Garware Energy Saving Suncontrol Window Film

Garware Polyester Ltd. is the pioneer and leading manufacturer of Suncontrol Window Films for application in architectural segment. It takes pride in being amongst very few and only Indian manufacturer in the world to manufacture polyester film using a patented dye technology. The products are being exported to more than 50 countries including USA, UK, Australia & Japan.

Saves Energy

Garware Suncontrol film reduces air conditioning cost by rejecting upto 58% of total solar energy incident on the glass.It also reduces solar heat gain, cooling interiors and thus making you feel cool and comfortable. It also reduces electricity bill by 6% to 8%.

Garware manufactures variety of films for architectural applications. The nature of application varies from Suncontrol, Safety & Security to privacy & aesthetics purposes. Garware claims to have an ideal film for any glass trait. USP of these films is that they tend to give custom look to any glass surface. We are the experts in Architectural film segment. Garware Energy Saving Suncontrol Window films are widely used in Buildings and Safety applications. It has range of films catering to different requirements and segments which are widely used for Residential purpose, Corporate Offices, Banks, ATMs, Shopping Malls, IT Companies etc.



Garware brings 4 variants of Suncontrol Film for Architectural Structures.

Glass, these days is being prominently used in architectural projects. Garware Energy Saving Suncontrol Window films provide the versatile value added solutions on increasing usage of glasses in buildings. They control solar heat, reduces the glare, block harmful UV rays, ensure safety, privacy and enhance aesthetics. These films blocks 99% of harmful UV rays thereby reducing the chances of harmful skin diseases resulting from the emission of these UV rays. These films also mitigates or minimizes the risk associated with glass owing to its brittle nature by holding the glass together in case of an accident, thus preventing the splinters from flying around and causing damage.

Suncontrol film while economical than its conventional counterpart are available in different shades and in a range of light transmission levels thus enhancing the elegance and beauty of the room. These benefits make Garware Energy Saving Suncontrol Window films an ideal option to enhance safety and aesthetics in residential and commercial projects.

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India

3rd GLASSPEX INDIA 2013

the glass industry's meeting point on the Indian subcontinent

MORE THAN 180 EXHIBITORS FROM 22 COUNTRIES IN MUMBAI

GLASSPEX INDIA 2013 - International Exhibition for Glass - Production, Processing, Products – held at the Bombay Convention & Exhibition Centre, Mumbai for the third time from 20 to 22 March 2013, has become established as glass industry's leading trade fair for the Indian market. As in the case of previous two shows GLASSPEXINDIA 2013 was orgnaised by Messe Dusseldorf India, a 100% subsidiary of Messe Dusseldorf GmbH, Germany and supported by The All India Glass Manufacturers' Federation.

Despite the current difficult market environment more than 180 exhibitors from 22 countries presented latest products and innovations in the areas of glass production, processing and applications to 3,347 visitors from India and abroad.

Exhibitors included many from the industry's most established names, including, Adelio Lattuada, AGR, Arkema, BDF, Bottero, Bystronic glass, Car-Met, Ceracon, CGE Continental Glass Engineering, CNUD-EFCO, DSF Refractories, Dukhiram Maurya, Eirich, Electroglass, EME, Emhart Glass, Ammeti, Invesys Eurotherm, Ferlam, FIC, Fickert+Winterling, Fives Stein, Flammatec, Fond Metalli, Forehearth Services, Forma Glass, Forza G Italia, Fosbel, Futronic, Gedevelop, GIMAV, Glamaco, Glass Service (Czech Republic), Glass

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In his inaugural address, Mr. Werner M. Dornscheidt, President & CEO of Messe Düsseldorf GmbH, stated that Messe Dusseldorf attaches great importance to the Indian subcontinent as an event location: "The starting situation of the trade fair is optimal. India is one of the world's fastest-growing markets, and the glass industry is a highly attractive sector. A rise in living standards in India has led to increasing demands in the areas where glass is becoming more and more important as a material."

As the organiser of GLASSPEX INDIA, Messe Düsseldorf GmbH capitalises on the extensive know-how it has acquired with its own event glasstec – the world's leading trade fair for the glass sector that made it possible to access and enter into dialogue with further target groups of importance to the Indian

market. Furthermore, the Messe Düsseldorf GmbH has found strong cooperation partners in The All India Glass Manufacturers' Federation and VDMA e.V. (German Machinery and Plant Manufacturers' Association), which has supported the officially authorized participation of the Federal Republic of Germany.

Interacting with key members of the industry, Mr. S. C. Bansal, President of AIGMF, applauded resounding success of the exhibition and technical conference. He further stated that success of the event shows that GLASSPEX INDIA will continue to provide a platform to showcase new technology, innovation and excellence to promote trade and investment in India.

Mr. Sanjay Somany from Hindusthan National Glass & Industries Limited (HNG) said: "I have never been dragged to so many meetings ever in any show."


A79
A67
GLOBAL ENERGY TECHNOLOG
BUSINESS CENTER
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made in Germany
ZIPPE
Zippe Glass Industries India
GRENZEBACH

Hindusthan National Glass & Industries Limited (HNG) and Fosbel, US, have joined hands during GLASSPEX India 2013. Senior Global Business Unit Director with Fosbel Inc., Mr. Bob Chambers, underlines: "The goal of this partnership is prolong furnace operating campaigns through the most innovative repair solutions available on the market."

Good networking, promising new contacts and projects, is the conclusion of the VDMA: "Germany is one of the most important suppliers of glass engineering technology to India. The relations between the Indian and the German industry subsist since many years. Some German manufacturers of glass machinery and related technologies already produce locally in India."

The Director of Indotherm Furnace & Engineers, Mr. Jogender Singh explains: "The

organization of the exhibition was good. We made a good experience with by having large number of visitors. The ambiance and preparation of exhibitors were excellent."

Saint Gobain Accuramech found brief words of praise: "As for the first time exhibitor, we had a good experience. We received a large number of visitors."

Mr. Lim Wan Leong, Sales Engineering with Bystronic, sums up: "We participated in the GLASSPEX INDIA show to explore more business opportunities in India. The new established contacts will help in our future sales."

Mr. Nicolaus Sorg praised the event: "It was a great time here on the German booth. Like every time we are very satisfied with the organization of GLASSPEX INDIA. Everything was perfectly organized. Despite of the stagnant market situation of the Indian Glass Industry we see a great future for the glass producers."


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The 3rd Glass Performance Days India (GPD) rounded off the programme of side events. Here the focus was on such topics as glass architecture, flat glass and solar technology – specifically geared to the challenges of the Indian market – for two days. On both days organizers welcomed high-calibre national and international participants.

At the 10th Conference of the All India Glass Manufacturers' Federation (AIGMF), delegates addressed 'Managing Sustainable Growth' issues and opportunities to develop the Indian Glass market. Presentations included: Flat glass manufacturing and glass in green buildings (Asahi India Glass), Development of radiation burner for glass conditioning improvement (Horn), Defect/down time reduction (Lattimer), Reduce energy consumption, improving thermal homogeneity (Sorg),

Tangible and intangible benefits of good ware handling (Sheppee International), Plant-wide automation: A new concept for the glass industry (Siemens), Optimisation by automation (Bottero), Hot batch: The future of batch preparation (Zippe) and Managing sustainable growth & cost efficiency in the glass industry (Poona Cement).

The presentations can be downloaded from http://www.aigmf.com/past-events.php#17

As a part of cultural evening programme, Songs & Drama Division of Ministry of Information & Broadcasting depicted Folk Dances and Songs from Maharashtra and Gujarat.

The programme was appreciated by the audience. ■


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The next GLASSPEX INDIA will be held from 13 to 15 March 2015 in Mumbai.

Welcome its New Members

(April – June, 2013)

S. No.	Company Name and Address	Product/Services
	ORDINARY MEMBERS	
1.	Mr. Gaurav Singhal **Uma Glass Works** 22, Near Industrial Estate Firozabad - 283203, U.P., India Tel : +91 5612 230852 Fax : +91 5612 233087 E-mail : umaglassworksfzd@gmail.com gaurav@umaglassworks.com Mob :+91 9837301949 Website : www.umaglassworks.com	Tumbler and Tableware glass
	AFFILIATE MEMBERS	
2.	Mr. S.R. Maurya **Super Furnace Works (I) Pvt. Ltd.** G-7, Parmeshwar Kripa, Rawal Nagar, Cabin Road, Bhayandar (E), Thane, Mumbai - 401105, India Tel. : +91-22-28197688 Fax : +91-22-28197691 E-mail : srm@superfurnace.com	Furnace constructing
3.	Mr. A Joshi Vice President **Zippe Glass Industries India Pvt Ltd.** 1022B, SpazeItech Park, Sohna Road Gurgaon, HR, India Tel : 0124-4301838 Mob : +918744001830 E-mail : a.joshi@zippe.in	Batch Plant related items
4.	Mr. Hemant Panchal **Solar Entarprise** 78, B.E.I. Compound , Chhani Road, Vadodara, India Tel : 0265 2773040 E-mail : hsolarint@hotmail.com	Machinery, spares required by glass industry
5.	Mr. Manoj Kumar Modha Director **Millennium Multi Trade Pvt. Ltd.** Janak, Mahavir Society, Off Wadia Road, Behind Jethwa Rajput Hostel, Porbandar-360575 Gujarat, India Mob : 09825243130 E-mail : millenniumpbr@yahoo.com	Supplier of raw material

Membership of AIGMF

MEMBERSHIP

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.

The 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.:

- Western India Glass Manufacturers' Association
- Eastern India Glass Manufacturers' Association
- U.P. Glass Manufacturers' Syndicate
- Northern India Glass Manufacturers' Association and
- South India Glass Manufacturers' Association

ADMISSION FEE / ANNUAL SUBSCRIPTION ORDINARY MEMBERS:

Admission fee ₹ 550/-.

Annual subscription:

i. Single Unit: ₹ 13,600/-

ii. More than one Unit: ₹ 50,000/-

AFFILIATE MEMBERS:

The admission fee and annual subscription is ₹ 2,000/- and ₹ 5,400/- respectively.

Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 27,000/- (including admission fee).

AFFILIATE MEMBERS FROM COUNTRIES OTHER THAN INDIA

i. The admission fee and annual subscription is US $ 100/- and US $ 200/- respectively.

ii. Applicants for enrollment for a period of five years may pay a consolidated amount of US $ 1000/- (including admission fee). ■

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Cullet quality and furnace efficiency

Nearly all modern furnaces require cullet to function. Eric Gent* highlights how cullet is one of the most important ingredients in the batch, and how it can have a profound effect on glass production.

Many production lines rely on 'internal cullet' to provide this important glass content. On occasion if other sources cannot be found it may be necessary to deliberately over-produce containers to be used as internal cullet. In Europe it is common for glass manufactures to obtain 'external cullet' as a direct raw material replacement, that is, cullet sourced from government or industry administered Post Consumer recycling programmes. This post consumer glass packaging must then be rigorously processed and cleaned to be certified as suitable for use in container production.

Benefits

The main attraction of cullet for glass manufacturers is that its presence in the batch allows lower furnace operating temperatures, which in turn reduces energy consumption.

For example, increasing the use of cullet from 40% of batch to 70% could provide more than €200,000 of energy savings per year on a 300 tonne furnace. Other benefits include reduced use of raw materials, reduced NO_x and SO_x emissions, increased furnace capacity and extended furnace life.

The main factor effecting external cullet use in a furnace has traditionally been local availability. In recent years as glass manufactures have become more aware of the benefits of increasing cullet use, they have been casting further afield to source this material. Today, the biggest challenge is the quality of the available cullet. The benefits of cullet are clear, however there are also risks. The quality of so-called 'furnace ready' cullet varies from one supplier to the next. The negative impact of poor quality material cannot be underestimated: Damage to shear blades and former blockages due to ceramic, stones or glass ceramic contamination is a common complaint, not to mention inclusions in the product resulting in high return rates.

Therefore it is vital that any manufacturer planning to increase cullet usage sources high quality material from reliable glass processing facilities.

Quality

Many glass manufacturers obtain unprocessed post consumer bottles and jars and operate an internal processing facility in an attempt to control the cullet quality themselves. However, as the collection methods for municipal recycling programmes change, so the quality of the material they produce has decreased. It is now common for all collected recyclate to be mixed together, not separated at source. This resulting co-mingled stream of recyclable materials is transported to large Materials Recycling Facilities (MRF's) for separation. This method is popular as it saves money for Municipalities compared to collecting each material separately. Unfortunately the biggest loser in this development is the glass industry, because the recycled glass produced from this process contains high levels of contamination.

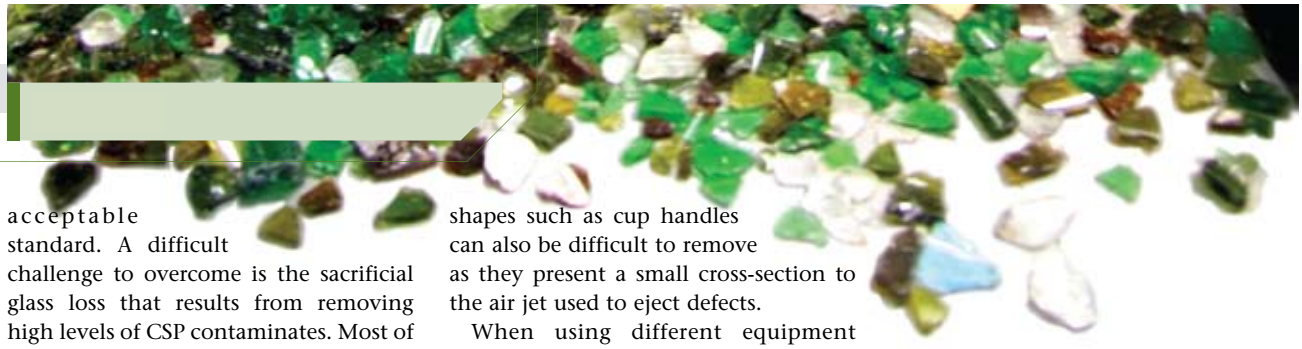
For example ceramic, stones and porcelain (CSP) levels are on average five times higher than normal.

This can have repercussions on the amount of traditional unprocessed glass available to feed Europe's processing facilities and furnaces.

The material cannot be processed to sufficient standards using traditional sorting methods and equipment. Any cullet user who relies on existing supply arrangements will be competing for an ever-decreasing pool of high quality unprocessed feedstock. This issue is common in the UK where the co-mingled collection system is prevalent, and which in the past has been a good supplier of unprocessed glass into other European countries.

Challenges

However that has given glass re-processors in the UK a head start in developing processes that can efficiently treat MRF derived material to an



acceptable standard. A difficult challenge to overcome is the sacrificial glass loss that results from removing high levels of CSP contaminates. Most of the available technology has been designed with a certain feedstock quality in mind. Attempting to force that equipment to handle unclean glass results in yields of usable clean cullet in the region of 30 - 40%. This is uneconomical for most of the existing 'bolt on' processing plants attached to the front end of furnaces across Europe.

Challenges

Recresco has overcome these issues by using a spread of different technologies from both traditional suppliers and other industries.

Another challenge is associated with the higher than normal quantities of mineral stones present. These contaminants are difficult to remove as most detection equipment uses a 'slider plate' arrangement to present the material to the detection and removal zone. However, stones are unstable when travelling along this plate and are often undetected. Even if they are identified, they can be subsequently missed by the removal system. Specific shapes such as cup handles can also be difficult to remove as they present a small cross-section to the air jet used to eject defects.

When using different equipment suppliers in this way it is difficult to obtain performance guarantees for the finished product, as each manufacturer will only certify their own technology. In this case it is necessary for an umbrella entity, for example the reprocessor, to take responsibility for the process from start to finish. This gives the cullet user the protection they require and recourse in the case of production problems caused by contamination in the furnace or hot end. By developing such a supply arrangement, more cullet can and will be made available to the market.

Conclusion

The demand for higher quality cullet coupled with a worsening standard of unprocessed glass, places pressure on the cullet supply model that has been popular for the last few decades. Sourcing sufficient quantities of raw material to ensure that this expensive process is financially viable often requires negotiating with government organisations to secure feedstock contracts - in itself a specialist activity.

To guarantee a reliable source of high quality cullet, manufactures need to partner with specialist re-processors who can then be held accountable for the quality and continuity of supply.

Another factor is that quality is linked to price. If high quality cullet is used, for example, less than 10g per tonne CSP, it is possible to use 80 or even 90% cullet in the batch. Under those circumstances the energy savings are sufficient to justify even a cullet price premium over and above what would normally be paid for raw materials.

The processing of glass is a complex business, perhaps overlooked due to the 'dirty' nature of the material, but the use of cullet can be enough to make or break a container production financial model. Being able to source top quality cullet in high quantities should be one of the main priorities when seeking to increase profit margins. ■

*Eric Gent, Director, Recresco, UK.
Website: www.recresco.com

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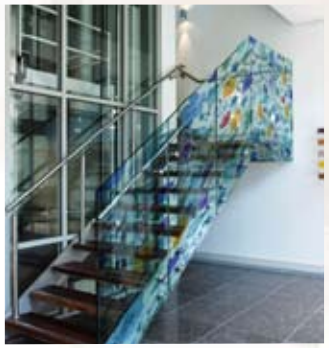

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HNG Float Glass Limited

Company Profile

Dr. A.K. Bandyopadhyay, Technology Consultant & Ex-Principal, Government College of Engineering & Ceramic Technology, West Bengal University of Technology, Kolkata and Member Editorial Board, AIGMF Quarterly Journal of Kanch, interviewed Mr. K.C. Jain, President, HNG Float Glass (HNGF) Limited at Glasspex-India at Mumbai on March 20, 2013 at HNG Float Stall to finalise the script for Company Profile of HNG Float Glass for publication in Kanch. Profile of the company prepared by Dr. Bandyopadhyay after the said interview is as under:

HNG Float Glass Ltd., was incorporated under the banner of the Mr. C.K Somany Group on July 29, 2006. The project started in January 2008 and installation of the Float Glass plant was completed in a record time of 22 months. Ground breaking ceremony took place on January 30, 2008 and furnace firing was done on November 30, 2009. The plant started commercial production in February, 2010, i.e. about 3 years ago.

The plant is located at Halol about 40 km from Baroda and 150 Km from Ahmedabad - largest city in Gujarat that is also the hub of major business activities in the region. Company's corporate vision is to become a leading international producer of float glass by employing advanced technology and innovative techniques.

Proximity to low cost Raw Material including Silica Sand, Dolomite, Soda Ash in Gujarat and Lime Stone and Feldspar in Rajasthan, growing market of Western India, the comfort of uninterrupted power supply in Gujarat, ample water from nearby canal and excellent infrastructure of Gujarat state were cited as main factors for choice of this location.

HNGF commissioned the first line with a capacity of 600 tonnes per day (TPD) in February, 2010, using state of the art in the world technology. Capital expenditures (CAPEX) of INR 5.5 bn, against the industry benchmark of INR 8 bn was achieved by extremely effective project management and high level of team work. This was followed by INR 500 mn into some strategic expansion in the last 3 years. For value added products like Mirror, Lacquered glass etc. HNGF has accomplished 100% capacity utilization in the very first year of operations. The Company strengthened its viability through timely cost-

Quality Control

effective installation: commissioning within 22 months against the industry benchmark of 36 months. Foresight and vision of company's management and a detailed Market Analysis followed by various R & D on value added product brought the company into successful market domain.

This has emerged as one of the best energy efficient plant – HNGFL reported revenues of ~**INR 231 mn** in 59 days of production FY 09-10. HNGF has been accorded ISO 9001, ISO 14001, OHSAS 18001 within the very first year of its operation.

The plant achieved the best industry productivity norms during FY11 in a short span. The company captured 27% market share in 6 months with a wide distribution network of 928 dealers spread across India. Now HNGF is the Market Leader in the Western India with 27% market share in clear glass .-

(L-R) Paramjeet Singh Taggar - West Zonal Head, Srinivas Sapher - North & East Zonal Head, K C Jain- President & K A S Menon - VP Sales & Marketing

Initially, the debt: equity ratio was 1.3:1 with 88% stock holding by the parent company and 12% by IFC (Washington, USA). Recently, as reported in last issue of Kanch a Turkish Co. (Trakya) acquired some stake in HNG Float that will change the holding pattern as 45% HNG, 45% Trakya and 10% IFC. This dilution of equity was based on a stronger footing of technological and commercial cooperation between the two companies with different markets

As per Mr. Jain, the market perceptions on both technological strategy and quality products were paying rich dividends in terms of sales turnover. The turnover was Rs. 2.88 bn in the first year (2010-11) itself. It can be safely said that the strategy of HNG Float is working well with a corresponding high rate of growth. In next 5 years, expected gross sales are likely to increase to about Rs. 30 bn by 2018. With an impressive line-up of an array of on-going and future diversification projects, this goal may appear to be ambitious but it looks like an achievable objective.

On the front of production volume, from the present level of 600 tons per day (TPD), an additional line of operation with 1000 TPD might hit the above mark. Mr. Jain was very optimistic that the company will hit this target in about 2.5 to 3 years. Then, of course, there might be a lean patch in the business which is quite normal life cycle of every business but the management is confident on capability improvement to sustain.

On the diversification spree, HNGF commissioned a 400 M^2/Hr Copper & Lead Free Silver Mirror Line in December, 2012. The Growth in the Mirror demand is about 8-10% Compound Annual Growth Rate (CAGR). Various products from mirror line will add INR 500 mn to the top line. HNG Float adopted an impressive strategy, spearheaded by Mr. Jain and his team to plunge into the relatively larger market of "mirrors" with present production touching about 500 tonnes per month (TPM). Then, a more brilliant step was taken on "Lacquered" glass with a current production of 50-100 TPM. That's all about the "portfolio of

products" and some more to be added soon that are presently at the drawing boards.

Mr. Jain stated that at the present level of 'all India' production of 4000 TPD, the growth rate of "float" glass will hover around 12-15% per annum.

On the "quality" front, HNG Float follows all norms of the day, whether it is systems standard like QMS, EMS OHSAS or product standard CE Marking that is in vogue in Europe. All HNGF products conform to the prevailing international specification, such as EN-572/2 for Float EN1036 for mirror. Mr. Jain stated that company is particular about respecting the quality norms. Apart from "quality circles", "quality improvement programmes", etc. Mr. Jain was so open about this quality issue that he gladly accepted the proposal for a future TTC (Take The Challenge) programme. Thus, it transpired that the single most important USP is company's utter seriousness on this quality movement.

HNGF believes in "First Time Right" and therefore, the 'Manufacturing Excellence Drive' was incorporated in all parts of Operation from the very 1st year with Full Time Consultancy of PWC. During 2014-15, HNGF plan for DEMING Award. HNGF has another remarkable achievement in the form of 1st Prize Winner of National Energy Conservation Award - 2011 which is unarguably the pioneering achievement in the Glass Segment. HNGF has a plan of incorporating ISO 50000 the Energy Standard in its system by 2014 which will be another leading initiative not only across the competitions but also the whole Glass Business in India.

On the export front, the situation appears quite interesting, although Mr. Jain was quick to add that many float glass plants in Europe and China have shut down in recent years, but some new plants have sprung up in the horizon, particularly in Middle East countries. A new plant has just come up in the Northern Iran with 1000 TPD with the hope of meeting domestic demand. Nevertheless, this new saga helps in restructuring or even reorienting the export market share. From the present volume of export of 500 TPM, the company has taken an ambitious step towards achieving 2000 TPM within 3-4 months. The countries presently covered are: Australia, New Zealand, Sri Lanka, Nigeria, South Africa, etc., and also a small part of Europe despite stiff competition.

To increase the overall market share, Company's strategy is to meticulously implement the 'diversification' plan, particularly on the value-added products like 'lacquered' plates and tiles

A inside view of the Plant

Area Sales Managers Meet

Mukul Somany
Vice Chairman & Managing Director

with some exotic colour combinations. For opening this costlier segment of the market further, some new usages have to be found in the existing market of 'interior decoration' for the corporate and hotel reception areas, new style of kitchen walls, drawing and dining rooms even in smaller apartments, and obviously for various newer applications in the high rises have to be vigorously pursued. At the same time, another profitable item like mirrors, the production is slated to increase as they fetch a price nearly double that of normal float glass. Last but not the least, the production of "frosted" and also "designer frosted" glasses has to be accelerated from the present level of 300-350 TPM, as the latter is gaining popularity in some of those newer application arena in the overall building market. This is clearly linked to the evolution of the "change in taste" of the present younger generation in India.

On employee's front, total number of employees will go up from the present level of 325 to about 400 with the increase of production in the new line of operation. The training systems of various employees are manifold: a) Manufacturing Excellence Programme (MEP) that started in 2011 with the help of PWC, b) In-House On the Job Programme (IOJP), and c) Multi-tasking Capability Build-up (MCB), etc. There is a continuous monitoring facility with quantitative evaluation on a monthly basis. Also, a "feedback" system is in constant practice. On the question of "employee empowerment", Mr. Jain was very categorical about two policies seriously followed by all the senior team members, namely (a) Freedom vis-à-vis Results and (b) Direct Communication.

In today's corporate world, there is a lot of talk on 'responsive corporate citizen' that is specially coined for social and cultural activities in and around a given corporate entity. As per Mr. Jain, HNG Float is not lagging behind in this front either. HNGF encourage a very good HR and Welfare initiative. They enjoy Annual Sports Day, Plant Visit of Family Members, and Award & Recognition on Operational Achievement as strong Motivational Boost, etc. At Chandrapura, HNGF sponsored Educational and Health promotion among the local villagers. In future, HNGF hopes to start a merit-cum-means scholarship for aspiring youth of this village for higher studies. ■

Is glass a packaging of the future?

It is not pure rhetoric to remind everyone that we are moving towards a society where pressures are dramatically growing to save resources and preserve the environment. There is no choice for any business but to go for a transition to a resource-efficient and ultimately regenerative circular economy. Because being a business for the future means reducing the impact on the environment by replacing virgin raw materials with recycled waste, getting more added value from the production process by improving it and taking advantage of new technologies and breakthroughs. This means that, in order to succeed, a business has to be able to decouple production from its impact on the environment through a systemic change, not only in minimising the use and optimising the recovery of resources but also by designing the business model for the future.

This vision also covers the packaging industry. To succeed, it is not enough to focus on the negative impacts. It is also key to look at improving positive ones. More than that, even if the importance of reducing the impact on the environment is an undeniable priority for the industry, this should never put at stake food safety. No less important in such a time of crisis, it should minimise food wastage, as this represents one of the major sources of resource wastage.

CONSUMER SUPPORT

Again, it is not pure rhetoric to say that the glass container industry has all the good cards to play a competitive game in the future. Recent polls (see InSites Survey 2010 at www.feve.org) demonstrate that glass can rely on overwhelming consumer confidence. Glass meets consumers' quest for a 100% secure packaging which does not compromise their health, which guarantees the preservation of food and drinks and which guards taste for longer. It is one of the least polluting and most resource-efficient materials because it is 100% infinitely recyclable and recycled in a circular economy. Furthermore, it is 100% reusable and refillable.

Facts prove that consumers are increasingly concerned about the ability of packaging materials to guarantee key functions in terms of health and environment. According to a consumer survey carried out at the end of 2012 by the Swedish firm Innventia in India, Sweden and the USA, when asked what types of packaging materials they avoid, 71% of consumers in India named plastic, while 22% said they avoided Styrofoam. In Sweden, most consumers avoid aluminium and plastic (both 24%) and Styrofoam (23%).

As part of the survey, consumers had to name the packaging material they thought was the least environmentally friendly. Swedish consumers overwhelmingly selected plastic (65%). In India, the figure for plastic was also the highest, with 61% selecting the material. In the USA, Styrofoam (57%) was seen as the least environmentally friendly, with plastic (48%) in second place. Glass and steel were seen to be the greenest packaging materials, with an average of just 13% of consumers in all three countries avoiding them.

Customers also prefer glass where they want to communicate quality and taste. They also like glass to help distinguish their products in a mass market and give their brand or product a high-end look and feel at competitive costs. Glass packaging reinforces a product's quality and ensures that drinks not only look good but also taste good. If the philosophy is to be true to consumers, glass is the choice as it has no tricks.

'RIGHTWEIGHT SOLUTION'

To be a packaging of the future, however, it is not enough to count on the inherent advantages of glass. The industry is moving in the right direction: One example above others is that producers are focusing on reducing the weight of their bottles. Glassmakers are working to make glass harder and lighter. Today, they are able to offer customers and consumers the 'rightweight' solution: Bottles are already 30% lighter than 20 years ago but they continue to guarantee key advantages in terms of inertness, no permeability to external agents, flavour preservation, longer shelf life and a premium appeal.

Among the different packaging materials, the lightest bottles or jars are not always the safest and most recyclable and it might be worth making a small effort to bring products home in glass and throw the used bottles in a bottle bank after use.

With glass, no matter how light it is, the DNA of the product quality is never threatened. Look at Champagne bottles: Their weight has been reduced from 900g to 835g, resulting in 20,000 tonnes less glass for a volume of almost 300 million bottles in Europe. But this has not required a single concession on the production methods of Champagne, a product rooted in the soil and the history of famous French vineyards. No material other than glass can both show off and resist the mechanical pressure resulting from the fermentation of wine that will become Champagne, Cava, Prosecco or any of the famous sparkling wines that find their way onto our tables. And not unimportantly, the recyclability and reusability of the bottles still remain the same.

Consumers can count on a 5000 year old material that will continue to be innovative in the future, without losing its unique selling points. ■

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देवेन्द्र कुमार
प्रोफेसर
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काँच उत्पादन में काँच गलन प्रोद्यौगिकी का बहुत ही महत्वपूर्ण स्थान है। काँच उद्योग में अधिकतम ऊर्जा की खपत काँच को गलाने में होती है। जब से काँच के सतत उत्पादन के लिये टैंक भट्टियों का प्रयोग प्रारम्भ हुआ है, तब से काँच गलन की जटिल प्रक्रियाओं के अध्ययन जनित ज्ञान के द्वारा कम से कम ऊर्जा में अधिक उत्तम गुणवत्ता के काँच के उत्पादन के प्रयास प्रारम्भ हो गये थे। वर्तमान समय में टैंक भठ्ठियों में प्रतिटन काँच उत्पादन में लगने वाले ईधन व ऊर्जा की खपत काफी कम हो गयी है तथा काँच उत्पादों की गुणवत्ता में भी काफी विकास हुआ है। काँच उत्पादों की संख्या व उनके उपयोग के अनेक नवीन आयाम देखने को मिलते हैं। काँच गलाने की प्रक्रिया में उपयोग में आने वाली ऊर्जा की खपत कम करने व उत्पादित काँच की गुणवत्ता बढ़ाने में जहाँ भठ्ठी की संरचना, ईधन के प्रकार, उनके जलने की क्षमताओं, ऊष्मा की रिकवरी इत्यादि के विकास का योगदान रहता है, वहीं काँच गलन प्रक्रियाओं के अध्ययन के फलस्वरूप उत्पन्न ज्ञान के द्वारा विभिन्न काँच गलन प्रक्रियाओं के नियमन का भी महत्त्वपूर्ण योगदान रहता है। ये काँच गलन प्रक्रियायें, काँच की गलन प्रोद्यौगिकी के नियामन व, उत्पादित काँच की गुणवत्ता व भठ्ठी की ईधन आवश्यकताओं को बहुत प्रभावित करती है।

काँच गलन प्रोद्यौगिकी को क्रमशः तीन स्तरों पर विभाजित किया जा सकता है:–

1. काँच का गलना (Melting Proper)
2. द्रव काँच की रिफाइनिंग व समांगीकरण (Refining and Homogenization)
3. द्रव काँच को समान रूप से ठण्डा करके कार्यानुरूप तैयार कना (Heat Conditioning)

मैल्टिंग प्रापर (Melting Proper) या काँच के अवयव पदार्थो को गलाने की प्रक्रिया द्विस्तरीय होती है। सर्वप्रथम काँच के बैच के सभी अवयव पदार्थ आपस में रसायनिक क्रिया करना आरम्भ करते हैं, तत्पश्चात उच्चताप पर गलने वाले पदार्थो जैसे SiO_2 या Al_2O_3 के रसायनिक क्रियाओं से शेष बचे हुए कण, द्रव काँच में घुलकर अदृश्य होते हैं। जितने समय बैच के अवयव पदार्थ क्रिया करके तथा घुलकर एक समांगी काँच द्रव बनाते हैं वह बैच फ्री टाइम (Batch free time) कहलाता है। काँच गलाने में होने वाली प्रत्येक रसायनिक क्रिया, अपने से आगे होने वाली प्रक्रिया को प्रभावित करती है। अतः काँच गलाने के प्रारम्भ से अन्त तक होने वाली सभी प्रक्रियाओं के सही प्रकार के समायोजन द्वारा उत्तम गुणवत्ता वाला, अधिक से अधिक द्रव काँच, कम से कम ईधन लागत से तैयार हो सकता है। इस लेख के माध्यम से हम काँच भठ्ठी में, काँच अवयवों के मध्य होने वाली रसायनिक क्रियाओं व उनके प्रभावों का अध्ययन व चर्चा करेगें।

काँच के बैच में कुछ मुख्य धटक पदार्थ होते है जो अधिक मात्रा में रहते हैं, जैसे सिलिका SiO_2, सोडा Na_2CO_3, लाइम, $CaCO_3$, वोरेक्स $Na_2B_4O_7$ लेडआक्साइड PbO इत्यादि। इसके अतिरिक्त थोड़ी मात्रा में काँच को गलाने, रिफाइनिंग, रंग प्रदान करने में सहायक तथा ऑक्सीकारक या अपचयी पदार्थ भी काँच के बैच में मिलाये जाते है। जैसे Na_2SO_4, NaCl, Sb_2O_3, As_2O_3, कार्बन व $NaNO_3$। काँच बैच को जब भठ्ठी में गिराया जाता है तब वह द्रव काँच से हल्का होने के कारण भठ्ठी की द्रव काँच सतह पर एक उष्म कुचालक कम्बल रूप में फैलकर आगे बढ़ता है। इस प्रकार वह तेजी से ऊपर व नीचे से गर्म होता है। गर्म होने पर कुछ अवयव जैसे– Na_2CO_3, $CaCO_3$ विघटित होने या गलने लगते हैं तथा कुछ अवयव आपस में क्रिया करने लगते है । अधिकतर रसायनिक क्रिया तथा विघटन क्रियायें साथ–साथ में होती है। ये क्रियायें विभिन्न अवयवों के कणों से स्तर

पर होती है; जिसमें कणों के सतहों का आपसी सम्पर्क रसायनिक क्रियाओं की गति प्रदान करने में महत्त्वपूर्ण योगदान करता है। बैच के अवयव कणों के आपसी सम्पर्क बढ़ाने के लिये इसमें आवश्यक मात्रा में पानी मिलाकर नम करने से रसायनिक क्रियाओं की गति कई प्रतिशत तक बढ़ जाती है। इसी प्रकार बैच के द्रवीभूत होते ही रसायनिक क्रियाओं की गति बढ़ जाती है। गलन व रसायनिक क्रियाओं की समानान्तर प्रगति में फ़ेज साम्यता (Phase Equilibrium) का भी महत्त्वपूर्ण योगदान रहता है जो तापक्रम व भठ्ठियों के वातावरण पर भी निर्भर करता है। रसायनिक क्रियाओं से मध्य के तथा अन्त के पदार्थो का बनना, पदार्थ विभाजित होने पर गैसों के उत्सर्जन होना तथा मिसिबल या अमिसिबल द्रव का बनना सभी फ़ेज साम्यता (Phase Equilibrium) पर निर्भर करता है। यहाँ पर उदाहरण के रुप मे सोडा–लाइम–सिलिका (Na_2O-CoO-SiO_2) काँच के बैच, जिसमें Na_2SO_4, As_2O_3, Sb_2O_3 जैसे रिफाइनिंग एजेन्ट तथा Fe_2O_3 इत्यादि रंगक पदार्थ मिले हों, में होनी वाली रसायनिक व भौतिक क्रियाओ का अध्ययन करेंगे। रसायनिक क्रियायें, उनकी क्रमबद्धता व गति काफी जटिल होती है। यह बैच के संघटन (Composition) तथा तापक्रम बढ़ने की दर पर निर्भर करती है, जिनका विशिष्ट रूप से प्रयोगों तथा गणितीय माडलों के द्वारा अध्ययन किया जा सकता है। सामान्य अध्ययन क्रमवार सरलीकृत माडलों के रूप में किया जाता है। यहाँ पर हम सोडा–लाइम–सिलिका काँच के बैच में होने वाली क्रियाओं का सरलीकृत माडलों के रूप में अध्ययन करेगें।

काँच बैच में सिलिका क्वार्ट्ज बालू के रूप में रहती है इसको गर्म करने पर कुछ परिवर्तन या इनवर्ज़न होते है जो काँच गलन में महत्त्वपूर्ण नहीं होते हैं। यह अपने आप 1726°C पर गलित होता है। काँच भठ्ठी में सिलिका स्वतः कभी गलित नहीं होता है, यह Na_2CO_3 व $CaCO_3$ से रसायनिक क्रिया करके सिलीकेट योगिक बनाता है जो बैच संघटन व फ्रेज इक्यूलिवियम डाइग्राम के अनुसार सिलीकेट द्रव बनाते है। $CaCO_3$, 600°C पर CaO तथा CO_2 में विघटन प्रारम्भ कर देता है। 898°C पर $CaCO_3$ का विघटन दाब वायुमण्डलीय दाब के बराबर हो जाता है। $CaCO_3$ के स्वतः विघटन की दर उसके कणों के माप पर निर्भर करती है। Na_2CO_3 852°C पर बिना विघटित हुए द्रव में परिवर्तित हो जाता है। इसका विघटन दाब 1750°C पर वायुमण्डलीय दाब के बराबर हो पाता है। अतः Na_2CO_3, $CaCO_3$ की तुलना में धीमी गति से विघटित होता है। इसी प्रकार Na_2SO_4 का गलनांक 884°C है तथा यह शुद्ध रूप में 1500°C से नीचे बहुत कम ही विघटित होता है। Na_2CO_3 तथा $CaCO_3$ ठोस अवस्था में ही 600°C से नीचे $Na_2Ca(CO_3)_2$ युग्मयोगिक बना सकते हैं जिसका गलनांक Na_2CO_3 के गंलनाक से कम 813°C है।

Na_2CO_3 या $CaCO_3$ सामान्यतः 630°C के ऊपर ठोस अवस्था में SiO_2 से रसायनिक क्रिया करके Na_2SiO_3 तथा Ca_2SiO_4 जैसे योगिक बनने लगते हैं। अतः यह कहा जा सकता है कि अधिकतर Na_2CO_3 इत्यादि का विघटन SiO_2 से रसायनिक क्रिया के माध्यम से होता है। Na_2CO_3 तथा SiO_2 में 630-730°C मध्य निम्न प्रकार से रसायनिक अभिक्रिया होती है।

$$Na_2CO_3 + 4SiO_2 = Na_2SiO_3 + 3SiO_2 + CO_2$$

इस अभिक्रिया में Na_2SiO_3 की एक परत SiO_2 के कणों (जो आकार में बड़े होते है) के ऊपर बन जाती है। इस परत के Na_2SiO_3 और SiO_2 के मध्य आने से अभिक्रिया दर घट जाती है। यह अभिक्रिया दर Na^+ तथा O^{2-} आयनों के Na_2SiO_3 के परत में संचरण पर निर्भर करती है। तापक्रम बढ़ने पर संचरण दर बढ़ती है। अधिक तापक्रम पर (700°C) पर $Na_2Si_2O_5$ बनता है।

$$Na_2SiO_3 + SiO_2 \rightarrow Na_2Si_2O_5$$

780°C पर सर्वप्रथम $Na_2Si_2O_5$–SiO_2 का यूटेक्टिक (Eutetic) द्रव बनता है जिसमें लगभग 73% SiO_2 होता है। इस द्रव के बनने से कणों का सम्पर्क बढ़ने के कारण क्रिया की दर बढ़ जाती है। क्रिया उत्पाद तो 1088°C के ऊपर ही द्रवीभूत होते हैं। इस तापक्रम के ऊपर द्रव से घिरे हुए SiO_2 के कण द्रव में धीरे–धीरे घुलते हैं तथा CO_2 का उत्सर्जन होता है। सिलिका के कणों के धुलने की दर काफी धीमी होती है। इस स्थिति तक काफी असमांगी द्रव बनते है। यह असमांगी द्रव धनत्व व श्यानता में काफी भिन्न हो सकते है जिसकी वजह से द्रवों में Segregation हो सकता है। वैसे CO_2 इत्यदि गैसों के उत्सर्जन से द्रव काँच में Convection के कारण Segregration की समस्या से काफी निजात मिलती है तब भी यह ख्याल रखना चहिये कि काँच अवयवों के मध्य प्रक्रियाओं के पश्चात द्रवों का संघटन लगभग एक समान हो। द्रव की विधुत बूस्टिग व बुलबुले छोडन से उसके संमागी करण में काफी सहायता प्राप्त होती है।

काँच गलन की प्रक्रिया में अल्प मात्रा में मिश्रित अवयवों की भूमिका भी काफी अहम् होती है जो रिफाइनिंग, रंगक तथा अन्य कार्यो के लिये उपयुक्त किये जाते हैं। इनमें सबसे महत्व पूर्ण Na_2SO_4 है। यह सोडा–लाइम–सिलिका काँच

की रिफाइनिंग की गति को तेज करने के साथ काँच गलन प्रक्रिया में सहायता करता है। लेकिन इसका उपयोग बहुत ही सावधानी पूर्वक किया जाता है। इसकी प्रक्रियाओं पर द्रव व भठ्ठी की आक्सीकारक तथा अपचयी अवस्थाओं का भी काफी प्रभाव रहता है। यह 884°C पर गलता है व शुद्ध अवस्था में 1500°C तक काफी कम मात्रा में विद्यटित होता है। यह सिलिका से निम्न प्रकार से क्रिया करता है। Na_2CO_3 की तुलना में इसका SiO_2 के साथ क्रियाशील तापक्रम काफी अधिक (1200°C) होता है तथा क्रिया दर भी काफी कम होती है।

$$Na_2SO_4 + nSiO_2 = Na_2O.nSiO_2 + SO_2 + O_2$$

Na_2SO_4 विघटन का विरोधी है तथा सिलीकेट द्रवों में इसकी घुलन क्षमता भी काफी कम है। अतः इसकी उपस्थिति में बैच सघटन तथा तापक्रम की इस प्रकार आयोजना की जाती है कि Na_2SO_4 काँच द्रव में पूर्णरूपेण घुला रहे तथा रिफाइनिंग के समय विघटित हो।

Na_2SO_4 के काँच द्रवों में घुलना SO_3 के काँच द्रव में घ ुलने के समान है। द्रव काँच में घुली हुई $\%(SO_3)$ की मात्रा भठ्ठी में SO_2 तथा आक्सीजन के आंशिक दबावों P_{so_2}, P_{o_2} पर निर्भर करती है।

$$\%(SO_3) = \text{Const. } P_{so_2}. P_{o_2}^{½}$$

सल्फेट का द्रव काँच में अलग होना काँच के लिये हानिकारक हैं जो भी सल्फेट काँच में हो वह द्रव घुला होना चाहिये। अधिक मात्रा के सल्फेट को भठ्ठी के वातावरण को अपचयी बनाकर या द्रव काँच में अपचयी पदार्थ (कार्बन) मिलाकर निकाल दिया जाता है।

$$nSiO_2 + 2Na_2SO_4 + C = 2Na_2O.nSiO_2 + 2SO_2 + CO_2$$

यदि काँच को रंगीन बनाने के लिये या रिफाइनिंग के लिये बहुसयोजी आक्साइड का उपयोग किया जाता है तो यह बहुसयोजी आयन अपनी भिन्न–भिन्न अवस्थाओं में रहते है। जैसे Ti^{3+}/Ti^{4+}, Fe^{2+}/Fe^{3+}, Ce^{3+}/Ce^{4+}, Mn^{2+}/Mn^{4+}, Co^{2+}/Co^{3+}, As^{3+}/As^{5+}, Sb^{3+}/Sb^{5+}। इन आयनो की द्रव काँच में उपस्थिति निम्न रसायनिक अभिक्रिया से प्रकट की जा सकती है तथा जो आक्सीजन के आंशिक दबाव या काँच तथा भठ्ठी की ऑक्सीकारक अपचयी अवस्था व तापक्रम पर निर्भर करती है।

$$\frac{4}{n}M^{x+n} + 2O^{-} = \frac{4}{n}M^{x} + O_2$$

M^{x+n} तथा M^x, M की आक्सीकृत तथा अपचयी अवस्था है जिनके आवेश का अन्तर n है। अपचयी तथा आक्सीकृत आयनों का अनुपात काँच का संघटन (Composition), ताप व काँच तथा भठ्ठी–वायुमण्डल में ऑक्सीजन की एक्टीविटी पर निर्भर करती है। इसी आयनों के अनुपात से काँच का रंग निर्धारित होता है। इसी प्रकार जब दो या दो से अधिक बहुसंयोजी आक्साइड द्रव काँच में उपस्थित रहते है तब वे परस्पर आक्सी–अपचयी क्रिया करते हैं। यही सिद्धान्त काँच को रंगहीन बनाने के लिये भी उपयोगी होता है। जब काँच बैच में आयरन आक्साइड की मात्रा अधिक होती है तब MnO_2 को एक विरंजक के रूप में उपयोग किया जाता है। काँच के गलनाँक पर MnO_2, 90% रंगहीन Mn^{2+} तथा 10% बैगनी रंग वाला Mn^{3+} के रूप में उपस्थित रहता है। वही आयरन आक्साइड 99% Fe^{3+} (हल्का पीला–भूरा रंग) तथा 1% Fe^{2+} (गहरा नीला–हरा रंग) के रूप का रहता है। काँच को ठन्डा करने पर गहरे रंग देने वाले आयन Fe^{2+} तथा Mn^{3+} हल्के रंग देने वाले आयनों Fe^{3+} तथा Mn^{2+} में परिवर्तित हो जाते हैं तथा काँच रंगहीन हो जाता है।

$$Fe^{2+} + Mn^{3+} \overset{\text{ठण्डा होने पर}}{\leftrightarrow} Fe^{3+} + Mn^{2+}$$

इसी प्रकार द्रव काँच की रिफाइनिंग के लिये As_2O_3, Sb_2O_3, Na_2SO_4 तथा NaCl का प्रयोग किया जाता है, जो रिफानिंग के लिये निर्धारित तापक्रम कर निम्न क्रिया कर O_2 तथा SO_2 गैसों का द्रव काँच में स्वतः उत्सर्जन करने लगते हैं।

$As_2O_5 = As_2O_3 + O_2$
$Sb_2O_5 = Sb_2O_3 + O_2$
$Na_2SO_4 = Na_2O + SO_2 + O_2$
NaCl (Glass) = NaCl (वाष्प)

रिफाइनिंग कारकों से मुक्त द्रव काँच के बुलबुले केवल CO_2 के द्वारा बने होते है। रिफाइनिंग कारकों से उत्सर्जित O_2 तथा SO_2 गैस द्रव काँच में पहले से उपस्थित बुलबुलों में प्रवेश कर उनका आकार बढ़ा देते है, जिससे वह आसानी से काँच की सतह पर जाकर अदृश्य हो जाते हैं। इस प्रकार काँच रिफाइन होकर बुलबुलों से मुक्त हो जाता है।

इस प्रकार हम देखते हैं कि काँच के गलते समय काँच के अवयव पदार्थ विभिन्न प्रकार से परस्पर रसायनिक क्रिया करते हैं। इन रसायनिक क्रियायों के समायोजित संचालन से उच्चगुणवत्ता वाला द्रव काँच कम से कम ऊर्जा की खपत द्वारा बनाया जा सकता है। जब भी काँच के बैच में कोई परिवर्तन किया जाता है या नये काँच के लिये बैच बनाया जाता है तब काँच के घटक पदार्थो में होने वाली रसायनिक क्रियायों के विशेष अध्ययन की आवश्यकता पड़ती है। ■

Improve the wear resistance of plungers

Surfit® 53WHV is a new product from Höganäs that considerably improves sliding wear resistance to extend the service life of plungers in glass production. The product can be used in existing HVOF processes with no extra investment required to gain performance benefits.

THERMAL SURFACING AND THE GLASS MOULD INDUSTRY

Considerable wear is often involved in forms for moulds, plungers, bottom plates, rings, sealers, baffles, blow heads, guide rings, neck rings and holders. An effective way of protecting this investment is to apply an optimised coating to forms used in mass production lines. This reduces the downtime that stops production when worn forms must be repaired or replaced as the interval between is longer with better wear resistance.

Hollow glass manufacturing forms work under very severe conditions. Applying an optimised coating to a glass form provides protection against wear and corrosion in an aggressive, high-temperature production environment. Protective coating is a cost-effective procedure, as increased wear resistance boosts productivity by extending the form's operating life. Productivity is highly dependent on mould life and high-quality product finish depends on immediate replacement when signs of form wear are first detected.

Thermal surfacing plays an important role in the wear protection of moulds in the glass industry. However, each shape requires a unique form with specific requirements for an optimised protective surfacing. Mould coatings may require not only different powder consumables, but also different application techniques.

HÖGANÄS AND THERMAL SURFACING

Finding the optimum thermal spray solution can be a complex process, as many factors are involved. Höganäs works with customers in the hollow glass mould industry with services including metallographic analysis, extensive physical and chemical lab testing facilities, and on-site technical support to fine-tune powders and processes for excellent mould performance.

The company's range of high-quality thermal surfacing powder consumables, based on nickel, cobalt or iron, has grown to cover new and specialised requirements in thermal surfacing applications.

Höganäs has now applied its experience and expertise to provide glass mould producers with a new thermal surfacing powder that fulfils the higher sliding wear resistance requirements for plungers.

FOCUS ON PLUNGERS

Thermal spraying methods such as flame spraying and HVOF (High Velocity Oxy-Fuel) techniques are commonly used on plungers which all require hard and dense coatings.

HVOF is normally chosen to coat plungers, as it is the surfacing method of choice when extremely dense coatings are required. The technique uses a more concentrated particle stream than flame spraying, delivering powder particles at high speed to create high-density coatings (> 97%). Deposition rates are up to 9 kg/hour, and the surfacing thickness ranges from 1 mm to 1.5 mm. Narrow neck plungers usually require 0.5 mm to 0.6 mm coating thickness after machining to high finish. As HVOF is a process where the powder particles achieve a high velocity impact on the substrate, it offers a range of benefits to make

it an economical solution for coating plungers.

A NEW MATERIAL TO ENHANCE WEAR RESISTANCE

Höganäs has applied a wealth of expertise on particle size intervals, alloy selection and process parameters in the development of a new powder consumable for the three-stage HVOF process for plungers described above. The product development goal was to increase wear resistance through a new optimised powder composition.

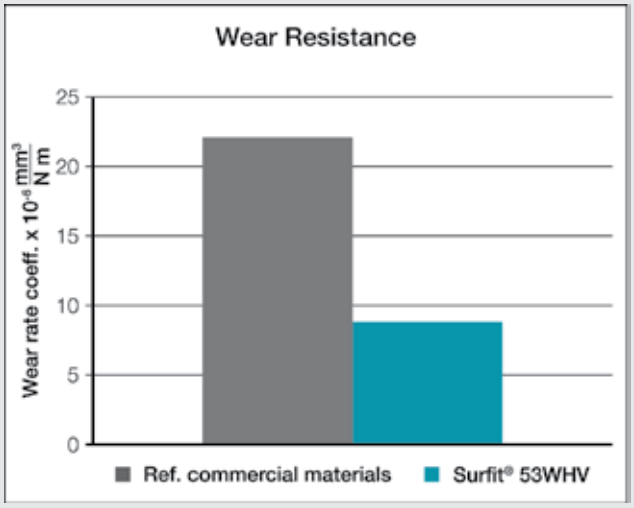
The new material underwent test procedures at Höganäs in a wear test to simulate the glass production environment at approx. 500°C. Comparison testing with currently used commercial materials under the same conditions revealed that the new Surfit® 53WHV material offers in the order of 50% higher resistance to sliding wear (see Table 1).

Metallography analysis confirms the target surface properties were achieved with excellent bond strength between the deposition and substrate (see Fig. 1). The expertise of Höganäs has been applied in the creation of an optimum interplay between the hard particles and the soft matrix, which is less sensitive to wear at high temperature.

The composition of Surfit® 53WHVfulfils the target of achieving substantial improvements in wear resistance for plungers. The benefits for producers are considerable as a longer operating life means longer intervals between plunger changes and results in increased productivity.

Importantly, these significant advantages can be gained relatively easily, as in most cases all that is required is the replacement of the current powder consumable by Surfit® 53WHV. The powder can be used in any existing HVOF process, so there is no need for extensive process changes or investment in new equipment to gain full productivity benefits. ■

Table 1 Sliding wear resistance comparison of Surfit® 53WHV vs. other commerical materials



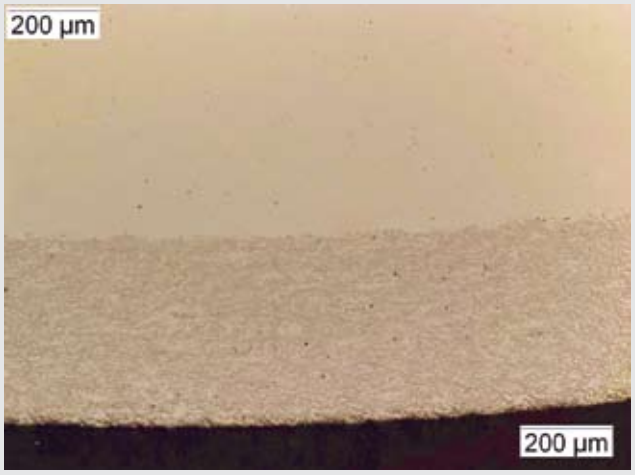


Fig. 1 Bonding zone between deposition and substrate

KEY BENEFITS OF SURFIT® 53WHV

- Increase sliding wear resistance of plungers by up to 50%
- Easy solution: no changes needed in process or equipment
- No investment needed to access full benefits
- Longer intervals between changing plungers means higher productivity

ABOUT HÖGANÄS

- Höganäs began producing iron powders nearly 100 years ago and has become one of the world's largest metal powder manufacturer
- The company is a long-established supplier of powder consumables for a wide range of industries
- Höganäs fully applies its core competence in metal powder technology in its thermal spray solutions
- Discover more about the Höganäs thermal surfacing offering for the glass mould industry at: www.hoganasthermalspray.com

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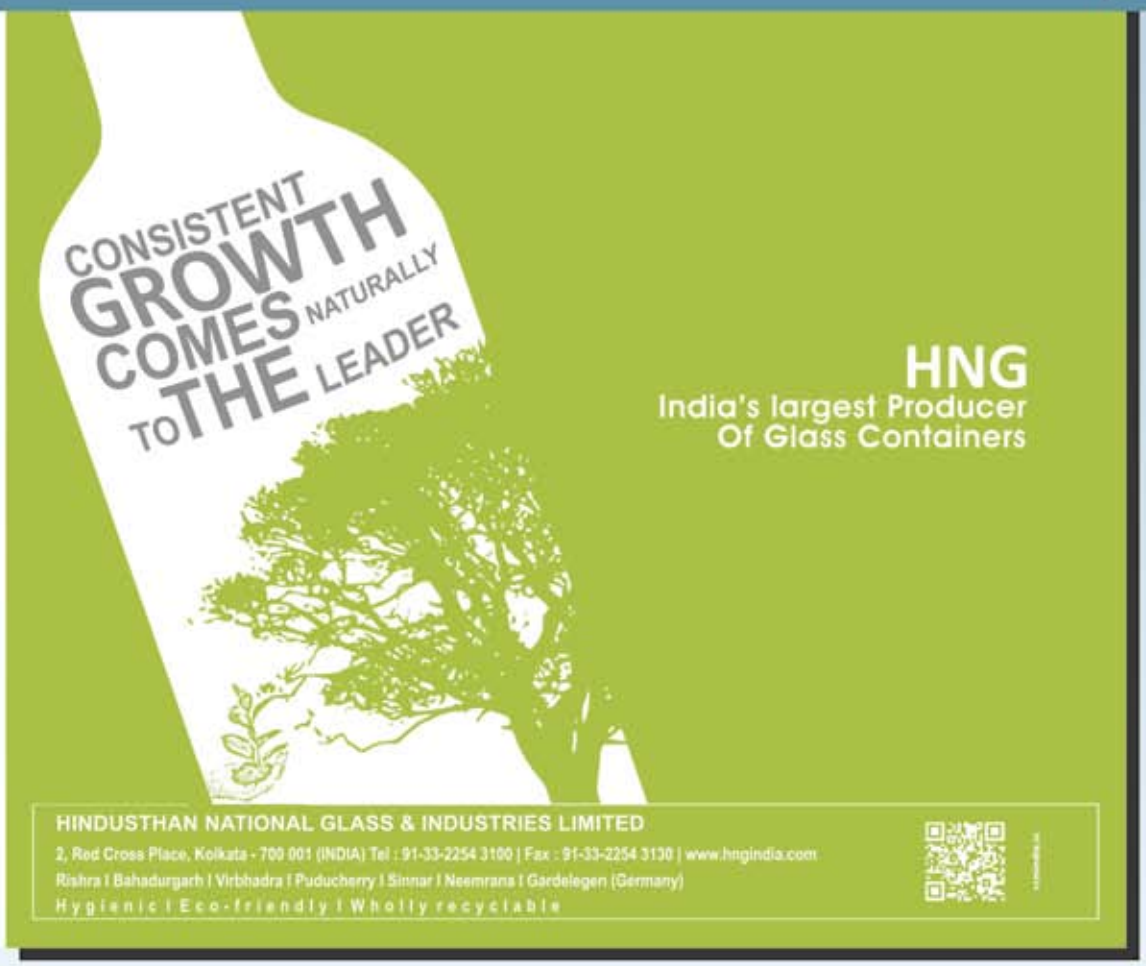

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Protective coating of float glass by liquid anti-corrosion systems

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Abstract

The surface of freshly produced float glass is very reactive. While storing or transporting the glass it can react with humidity which penetrates the space between the glass plates resulting in a strong adhering staining. Depending on the degree of the glass corrosion a further processing of the glass is impossible. The degree of corrosion depends on humidity, temperature, storage – and transport conditions and the glass quality. Initial stages of glass corrosion are often recognised not until the glass is further processed (e.g. by thin film coating, silvering, tempering).

Weathering tests were performed under laboratory and real storage conditions with glasses which were halfcoated on the airside with a liquid anti-stain product. Both test conditions produced no visible signs of corrosion. The glasses were then thin film coated and characterised by different physical methods. For the glasses treated in the climate change chamber the protected glass parts led to a standard quality coating whereas the nonprotected parts showed an increasing deviation from standard quality depending on the test duration. For the glasses stored under real conditions an influence of the anti-stain coating could be demonstrated under more critical test conditions.

1. INTRODUCTION

The common definition of corrosion describes the reaction of a metallic material with its surrounding leading to a perceptible modification of the material [1], e.g. the formation of rust on steel surfaces. A further definition describes corrosion as a qualities reducing modification of a material which is set off by its surface by an unintended chemical or electrochemical attack [1]. This definition can be applied on the reaction of the surrounding humidity with float glass while storing or transporting it which may lead to glass corrosion or staining.

The attack of water on glass surfaces is a combination of two processes which take place almost simultaneously: the ion exchange of H^+ ions from the water against Na^+ ions from the glass surface (initial step) and an alkaline attack of the remaining OH^- ions on the silicate network (corroding step) [2, 3]. In the initial step the silicate network remains unchanged and a silicate rich layer SiO_x with a low Na^+ content is build up. A steady refreshing of the adhering water layer (e.g. by rain) to a certain extend leads to a stabilization of the glass surface. If a thin water film is allowed to stay on the surface for a longer time the concentration of NaOH will increase and at a pH of 9 –10 the disintegration of the glass network will start. This process of corrosion is enhanced by high humidity accompanied by heavily changing temperatures (temperature falling under the dew-point). While the end stage of corrosion is clearly marked by multicolour or even white stains the initial stages of corrosion are invisible, nevertheless making a further processing of the glass (e.g. thin film coating, silvering, tempering) difficult if not impossible.

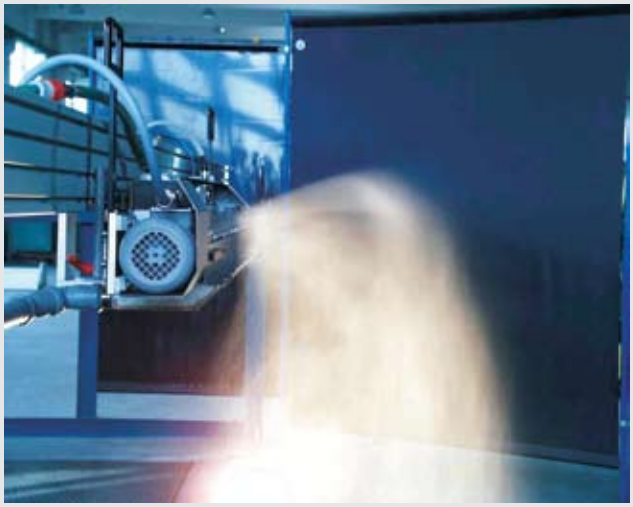
These initial states of corrosion result in a change of physical properties of the glass surface e.g. a change in thermal extension, refractive index and surface energy of the glass surface. Furthermore, existing micro-cracks are enhanced by corrosion

[4]. Physical methods like ellipsometry, IR, REM, AFM or contact angle measurement allow a sensitive detection of corrosion. As corrosion affects the growth of thin film layers as well as its ageing in this paper corrosion is demonstrated by its influence on the thin film coating process.

To prevent product loss due to corrosion several procedures are applied in glass industry [4], e.g.:

- only freshly produced float glass is used for further processing. This is only possible for float glass producers but even here problems exist (e.g. coating of thick glass).
- the glass is stored and transported under constant conditions regarding temperature and humidity. Due to the high capacity of float lines and the big jumbo sizes produced this solution is applicable only to a certain degree.
- the glass stacks are sealed up at the edges to prevent a penetration of humidity between the glass plates. This method is applied mainly for transporting thin film coated glass but not for unprocessed glass.
- the glass is polished before further processing. Suspensions of cerium oxide, aluminium oxide or other oxides are used to freshen up the glass surface before silvering or thin film coating. As the glass surface is very reactive after polishing the refinement step has to follow immediately.
- by using special acidic compounds the pH of the glass surface is buffered. Mixtures of adipic acid or boric acid in different amounts with the interleavant powder allow separating of the glass plates together with an anti-stain covering in a single step.

Recently, more and more attention was paid to liquid anti-stain systems because these systems allow the application of higher amounts of acid together with a better distribution on the glass surface. Already existing systems based on acetic acid, lactic acid or zinc ammonium chloride have been proved successfully but show disadvantages like strong/bad smell and tackiness or cause environmental problems. In this paper an improved non sticking formulation based on organic acids is presented. This formulation builds up a thin and even film on the glass surface providing it with an optimal anti-corrosive protection. It is easy to wash off and thus does not influence the subsequent thin film coating process.



Picture 1 : Grafotec Liquid Applicator

Picture 1 shows the Grafotec Liquid Applicator which allows an easy and uniform coating of the glass surface with anti-corrosive liquids.

2. EXPERIMENTAL

2.1 Sample preparation

Anti-stain solution: 44ml of the anti-stain concentrate (AC Resistain TC, Aachener Chemische Werke, Germany) were mixed with 1000 ml deion. water. The pH of the solution was 2.4.

Glass preparation: Each one half of a freshly produced float glass plate (6 mm, 40 x 60 cm) was coated on the airside with the anti-stain solution by help of a spray gun. The amount of anti-stain solution was 200 mg/m².

120 mg/m² of an interleavant PMMA powder (AC Separol F, Aachener Chemische Werke, Germany) were applied on each glass plate using a Grafotec powder applicator. 4 plates were put together airside – tinside. These 4 plates were cramped together with an additional non-treated plate building a test sandwich.

2.2 Simulation of glass corrosion

2.2.1 Simulation under praxis conditions

Four sandwiches were stored vertically each 4, 8, 12 and 16 weeks in a storehouse in Würselen, Germany (March – June).

2.2.2 Enforced simulation of glass corrosion

Another four sandwiches were stored vertically each 1, 2, 3 and 4 days in a Heraeus climate change

chamber SB 11/160/40 (0,15m³, corrosion medium: deion. water).

The weathering conditions for a daily cycle were as follows:

Start: T = 45°C, humidity = 98 % RH (kept for the whole test)

1. Raise T within 60 min. to T = 55°C
2. Reduce T within 60 min. to T = 45°C
3. Repeat cycle 11 times
4. Reduce T within 30 min. to T = 25°C
5. Keep T for 1 h
6. Raise T within 30 min. to T = 45°C.

2.3 Thin film coating

All glass plates were washed before coating on an automatic glass washing machine (Benteler) with deion. water at 40 °C.

The dry glass plates were immediately coated on a Leybold coater type A/3210 with a HR + Low e 1,3 (warehouse storage) respectively ++ Low e 1,1 coating (climate change chamber).

2.4. Inspection of the coated glasses

2.4.1 Transmission and colour measurement

Perkin Elmer UV/VIS Spectrometer Lambda 900, 5 x 5 cm pieces were measured between 380 and 780 nm with λ max = ca. 570 nm.

2.4.2 Acidic corrosion test

glass pieces of 5 x 10 cm were cut and dipped for 13 min. in 0,01 n HCl and 0,1 n HCl resp. at 30°C. They were washed with deion. water before measuring.

2.4.3 Emissivity measurement

Perkin Elmer FTIR Spectrometer Paragon 1000 PC, 5 x 5 cm pieces were measured at wave number 1250 cm^{-1}.

3. RESULTS

3.1 Visible inspection of the glasses after weathering before thin film coating

After treatment in the climate change chamber, respectively after storing in the warehouse none of the glasses showed visible signs of corrosion (see picture 2). Considering only the visible aspect these glasses promised a good coating quality.

Picture 2: glass sample before thin film coating after 4 days in the climate change chamber

3.2 Transmission and colour test after coating

3.2.1 Glasses treated in the climate change chamber

To proof the influence of corrosion on the visible aspect of the coating the glasses were examined by UV/VIS inspection (see table 1). Of interest were the maximum transmission at λ max and the so called b* factor which gives information about the colour of the coated glass. While protected glasses showed standard values untreated glasses showed a decrease in transmission (82,7 – 75,2%) and a b* factor increase towards yellow (4,77 – 6,90).

3.2.2 Glasses stored in the warehouse

The influence of corrosion on the visible aspect of the coating was not demonstrated clearly by UV/VIS inspection (see table 2). All glasses except unprotected glass after 4 month storage showed standard values. Here, the b* factor showed a slight deviation (2,84) .

3.3 Emissivity measurement after HCl corrosion test

3.3.1 Glasses treated in the climate change chamber

Emissivity measurement after HCl corrosion is a standard EN test applied by many suppliers of insulating glass units. It allows information on the chemical resistance of the coating regarding its thermal properties. Measured is the IR reflection R which is connected to the emissivity E_v by $E_v \sim 1/R$.. To proof the influence of glass corrosion

Table 1: UV/VIS measurement (after climate change test)

test duration	glass without corrosion protection			glass with corrosion protection		
1 day	**glass side reflection**	**coating side reflection**	**transm.**	**glass side reflection**	**coating side reflection**	**transm.**
Transmission TL			82,7 %			85,5%
L*	39,01	30,24	91,95	38,19	31,07	92,83
a*	-2,66	-0,28	-1,95	-0,17	-1,46	-2,50
b*	-11,83	-13,34	4,77	-12,55	-14,53	3,96
2 days						
Transmission TL			81,2 %			84,3%
L*	41	32,4	90,1	40,1	32,2	92
a*	-2,7	-0,2	-1,6	-0,1	-1,2	-2,3
b*	-12,6	-13,8	4,90	-12,1	-14,2	3,90
3 days						
Transmission TL			80,0 %			84,5%
L*	40,2	29,4	91,9	41,0	32,0	92
a*	-2,5	-0,36	-2,0	-0,2	-0,3	-2,5
b*	-11,9	-14,2	5,70	-12,5	-14,6	3,95
4 days						
Transmission TL			75,2%			84,1%
L*	42,6	32,0	92,5	41,5	32,2	92,2
a*	-2,8	-1,2	-2,2	-0,3	-0,2	-2,4
b*	-12,4	-14,8	6,9	-12,8	-14,4	3,90

Table 2: UV/VIS measurement (praxis test)

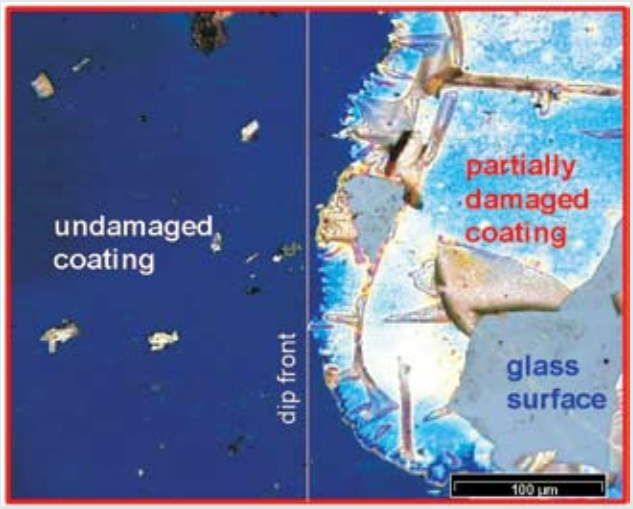
test duration	glass without corrosion protection			glass with corrosion protection		
1 month	**glass**	**coating**	**transm.**	**glass**	**coat**	**transm.**
Transmission TL			85,1%			84,8%
L*	34,80	28,17	92,73	33,59	28,18	92,60
a*	-2,07	-1,07	-1,92	-1,40	-1,27	-1,81
b*	-13,38	-13,10	2,48	-14,41	-12,90	2,43
2 month						
Transmission TL			85,6%			85,6%
L*	34,11	29,08	92,93	34,55	29,46	92,94
a*	-1,80	-2,51	-1,75	-1,61	-1,73	-1,70
b*	-14,16	-12,96	2,66	-13,17	-12,34	2,70
3 month						
Transmission TL			85,5%			85,9%
L*	33,60	28,30	92,90	32,52	28,49	93,06
a*	-1,27	-1,18	-1,89	-0,49	-0,58	-2,00
b*	-14,81	-13,37	2,62	-14,83	-12,43	2,62
4 month						
Transmission TL			86,2%			85,0%
L*	33,03	28,42	93,19	32,04	27,92	92,67
a*	-1,04	-1,19	-1,76	-0,72	-0,64	-1,91
b*	-14,79	-13,08	2,84	-14,69	-12,89	2,41

on the chemical resistance and the function of the coating the coating was partially corroded by HCl and then examined by IR inspection (see table 3). While the protected glasses showed standard values untreated glasses showed a decrease in IR reflection (89 – 16,4 %).

Table 3: IR measurement (after climate change test and HCl corrosion)

test duration	glass without corrosion protection	glass with corrosion protection
1 day	**IR reflection [%]**	**IR reflection [%]**
before HCl test	94,7	94,6
after HCl test	89	93,5
	2 days	
before HCl test	95,1	95,4
after HCl test	84,2	94,1
	3 days	
before HCl test	95,3	95,1
after HCl test	77	94,2
	4 days	
before HCl test	95,6	95,2
after HCl test	16,4	92,5

Microscopic inspection of the unprotected glasses after HCl treatment showed dissolution of the coating partially up to the glass surface (see picture 3).



Picture 3: Microscopic photography of unprotected glass after 4 days climate change test and thin film coating dipped into HCl (13 min., 30 °C, 0,01 n HCl)

3.3.2 Glasses stored in the warehouse

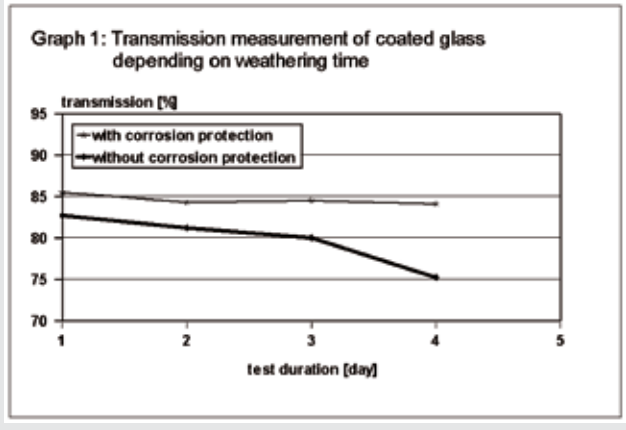
As the colour measurement of these glasses did not show a significant decrease in glass coating quality even after several month of storage a more critical HCl corrosion test (0,1 n HCl instead of 0,01 n HCl) was applied to demonstrate the influence of the anti-stain coating. Under these conditions the protected glass parts showed higher IR reflection compared to the unprotected glass parts (see table 4).

Table 4: IR measurement (after storage in the warehouse and 0,1n HCl corrosion)

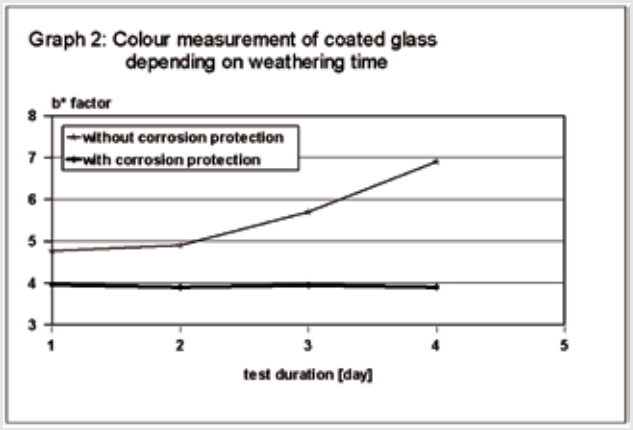
test duration	glass without corrosion protection	glass with corrosion protection
	IR reflection [%]	**IR reflection [%]**
	1 month	
before HCl test	91,1	89,9
after HCl test	78,2	84,9
	2 month	
before HCl test	91,5	90,8
after HCl test	59,7	77,5
	3 month	
before HCl test	90,9	91,0
after HCl test	65,9	68
	4 month	
before HCl test	91,9	90,9
after HCl test	55,5	68,6

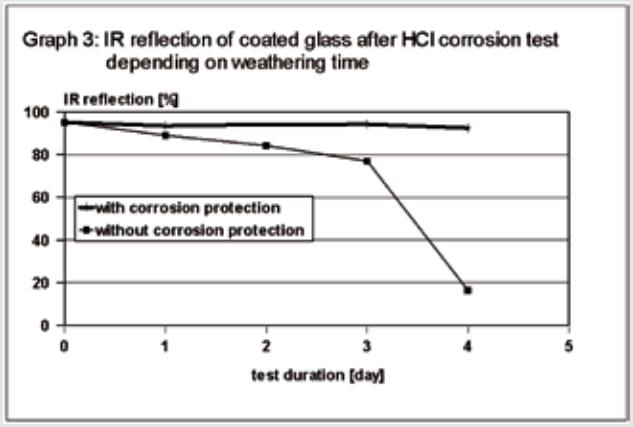
4. CONCLUSIONS

The positive influence of the anti-stain coating on the thin film coating quality of glasses treated in a weathering chamber was clearly demonstrated: whereas the coating of unprotected glasses showed a loss in transmission (see graph 1), a change



in colour towards yellow (see graph 2), and a decreasing resistance towards chemical attack (see graph 3) the coating of anti-stain treated glasses showed values within the standard range.

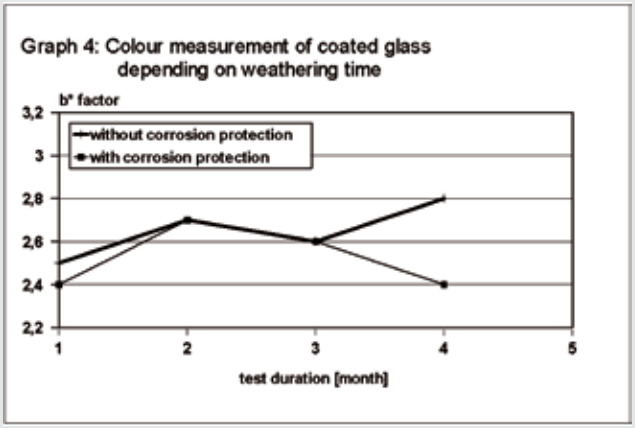




The change in colour is probably due to an enhanced oxidation/migration of silver (Ag -Ag^+) within the layer system. This enhancement is caused by the influence of water and O_2. Corrosion of the glass surface in turn favours the attack of water/oxygen on the silver. Once the process of corrosion is started dissolution of the glass surface will follow which produces more and larger micro-cracks making the surface better susceptible for all kinds of pollution. At the same time the roughness of the glass surface will increase making an even coating impossible.

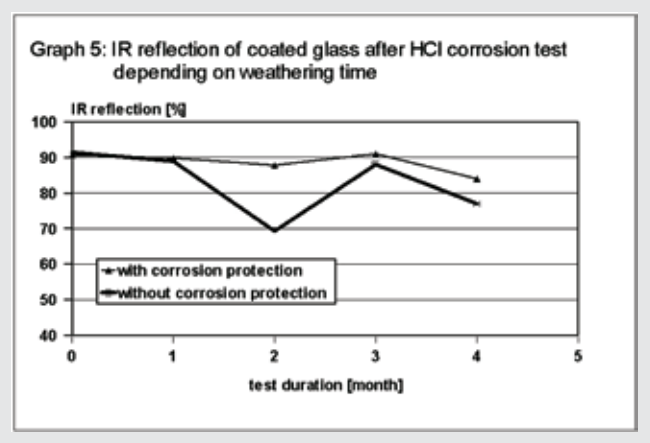
As a consequence the coating itself might show cracks which can serve as a starting point for a corrosive attack on the coating. This mechanism could serve as an explanation for the results of the IR-measurement after HCl corrosion.

The colour measurement of the glass plates stored under praxis conditions did not show differences between protected and unprotected glasses although a slight deviation of the b* factor after 4 month was observed: all glasses showed data within the standard range (see graph 4). While a prolongation of the test duration might be of help praxis tests have one drawback compared to laboratory tests: whereas here test conditions are reproducible and constant praxis tests suffer from inconstant conditions. Corrosion will not develop spread over the whole surface but maybe in single spots which are hard to detect. Nevertheless, future work should focus on the problem how to correlate data received in a weathering chamber test with corrosion data of float glass in praxis but then standardisation of weathering tests should be the first step.



To prove that the anti-stain protection also influenced the chemical resistance of the coating of the glasses stored under praxis conditions samples were treated with 0,1 n HCl instead of 0,01 n HCl. When measuring the IR-reflection now a difference between protected and unprotected glasses was found. The protected glasses always exhibited higher IR-reflection values indicating a better shielding compared to the unprotected glasses (see graph 5). The IR values for the unprotected glasses however were not falling steadily indicating that corrosion under practice conditions develops differently compared to laboratory conditions.

Together with the data received for glasses treated under laboratory conditions this indicates that a liquid anti-stain protection is very helpful in preventing corrosive attack on glass surfaces. Furthermore, the fact that all anti-stain protected glasses showed standard values in the quality tests applied proves that this liquid anti-stain



protection does not have any undesired influence on the thin film coating process itself.

Therefore the authors think that using a liquid anti-stain protection is a good choice when it comes to the protection of valuable glass products.

ACKNOWLEDGEMENTS

The authors wish to thank Mrs. P. Grünberg of ACW Laboratories in Frankfurt, Germany for carrying out the corrosion tests in the climate change chamber and Mr. J. Ferrjit of Scheuten Glasgroep in Venlo, The Netherlands for the physical data measurement.

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Introduction of Company Profile in Kanch

A special feature – Company Profile has been introduced in Kanch. This will contain interview of Managing Director/Proprietor of the company or their nominee by an expert and will be published in KANCH along with photograph of the person interviewed as also the factory.

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Never mind the question - Here's the answer!

Information Officer, Theresa Green shares some personal experiences of working in 'information' at British Glass for over 30 years. On occasion, it has been a little like Alice's time in Wonderland – "Why, sometimes I've believed as many as six impossible things before breakfast."

Theresa Green.

The next time that irrepressible urge is felt to find out how many parts per million of neodymium it takes to send a light bulb pink, pick up the phone and call the Information Department at British Glass. Not simply a trade federation, British Glass' prestigious foundations lay in decades of research. Its existence was founded by Emeritus Professor W E S Turner and other renowned glass technologists who formed a glass research department within Sheffield University nearly 100 years ago. Over the following decades, the department built upon its success and eventually became a commercial entity, culminating with the opening of purpose-built premises in 1959, when the British Glass Industry Research Association (BGIRA) was born. Subsequently, BGIRA merged with the Glass Manufacturers Federation (GMF) in 1988 and became the British Glass Manufacturers' Confederation (BGMC), taking on the role of trade association for the UK glass sector, while also retaining its research arm in the form of Glass Technology Services (GTS).

From a personal perspective, life in this particular Wonderland began in 1981. Until then I, like most of the UK population, was oblivious to this substance we take for granted - glass. Like most people, glass meant a few bottles of beer down the local pub, the latest jam jar designed to look like a teddy bear or the lovely new double glazed windows at home!

It was only after I began working in the Information Department at BGIRA that I gave this marvellous material a second glance – and wow, were my eyes opened! Since then, I have dedicated my entire working life to exploring this material, not only from a scientific perspective but also for consumers, who struggle to find links into the glass manufacturing sector – until they call British Glass, that is!

COUNSELLING SERVICE

Readers of this article are likely to be associated with the glass industry and therefore in a good position to find what they are looking for. But pity the poor consumer. Imagine looking for something other than glazing and consult the local *Yellow Pages*… it will not be much help! The internet is even more confusing!

I receive many calls every day from people who have been ringing around the UK, trying to locate a glassmaker and can feel the relief from them as they exclaim "at last, someone who understands!" It is like a counselling service; at least it was for the gentleman who asked if I could recommend a company who could remove a deep scratch from his television screen. He went on to ask if I knew a glassmaker who could repair a crystal vase. Sensing his anxiety, I discreetly asked if there was a connection… the poor fellow told me his wife had thrown the vase at him, missed and caught the TV!

SATISFYING DIVERSE NEEDS

Today's glass industry has never been so diverse. Glass is making headlines throughout the world with innovative products, developments and applications. However, many companies and individuals struggle to identify the right manufacturer for their product, whether it is because of shape, size, quantity etc. This is where Information Services plays a positive role. Every day, calls and emails come into 'Information' and yours truly does her best to team up these enquiries to a British Glass members. It is a successful recipe, as our members' will confirm.

However, not every enquirer is looking for 10 million bottles or jars. Many enquiries come from the 'little' people, the one man bands or the householder looking for just one or two items, or a prototype. Some items are required for research purposes but many are simply looking for a repair, to match up a piece of crystal or more recently, new mothers looking for glass baby feeding bottles, not to mention other everyday items. Some requests are a little more unusual, however, including the following selected examples, which give a taste of the industry's and British Glass's incredible diversity.

I may not field questions that test my ability like "Why don't they make the whole plane from that black-box stuff" but I was asked recently who could make a replica of an Ambrosia dish. This was nothing to do with rice puddings but an ancient asymmetrically-shaped dish in the form of an oval bowl with an irregularly lobed rim and a small curling handle with a stemmed foot, first made around 1730. The same day, there was also a question about who could decorate glass articles by the Zwischengoldglas method. A quick visit to our in-depth library and archives confirmed that this is a gold leaf decoration process and the query was passed on to British Glass members who could help.

There was an enquiry for a glass toilet with matching 'designer' glass bath and sink and an email from a television company filming a production of 'Cinderella' and needing a glass slipper (within 24 hours, of course). Also, the 60ft x 30ft glass 'bottle' required to house a restaurant and the person wanting me to recommend a bottle wholesaler in Dallas, USA. Then there was the glass grand piano for >

a luxury liner, not forgetting the 10ft glass bird required for decoration. Although I attempt to help every caller, the request for plastic glasses was taking matters a little too far!

MADE TO ORDER

As many readers will know, the glass industry has the weirdest glossary of technical terms, with many strange and odd-sounding words. A lady writing a book about Prince Rupert wanted to know where she could obtain a 'Prince Rupert's Drop'. This curious tadpole-shaped hollow glass object is not affected if struck with a hard blow on the bulbous end but if the tailpiece is broken, the entire item explodes into fine powder (due to different internal stresses).

As explained earlier, no one leaves Information Services disappointed; having spoken to some obliging glass technologists (courtesy of GTS), to the caller's delight a 'Prince Rupert's Drop' was made for her.

MEMBERSHIP FOCUS

Besides looking after consumer interests, the main priority is that of our membership, comprising a diversity of glass manufacturers across all sectors including the container, flat, scientific and domestic glass industries. There are many benefits to being a member of a trade federation, such as assistance and help regarding legislative issues, standards, guidelines etc. However, this particular trade federation offers many hidden benefits in the form of a wealth of in-depth knowledge, based on its vast library and archives (incidentally, all available for members' use).

British Glass has the only dedicated library of glass and glass technology in the UK, holding important pieces of work and research gathered over the last 100 years. The library subscribes to most international journals covering glass and glass technology. Every day, abstracts are created for an in-house database – currently numbering nearly 30,000 abstracts – all of which are fully searchable by keyword. Members' queries can be easily searched and solutions found in a matter of moments. In addition, the archives contain approximately 10,000 technical translations and research reports of major glass topics, not forgetting a worldwide standards archive that members can search and loan on request. ■

British Glass has the only dedicated library of glass and glass technology in the UK.

British Glass, Sheffield, UK tel: +44 114 290 1850 email: info@britglass.co.uk web: www.britglass.org.uk

Making CE marking of glass crystal clear

To support the glass industry, Glass for Europe has launched a practical guide to CE marking.

The countdown to 1 July 2013 has begun. That is the date by which the provisions of Regulation (EU) 305/2011, more commonly referred to as the Construction Products Regulation (CPR), must be implemented.

So what should be done with a declaration of performance? Where do companies affix the CE marking? Is there derogation from CE marking? What about national marks?

As glass manufacturers and processors, these questions will no doubt already be familiar to readers. Now that the legislation underpinning the related rules and procedures has changed, Glass for Europe aims to help readers find glass-specific answers to their questions. The trade association for Europe's manufacturers of building, automotive and solar energy glass has published a timely Q&A guide to provide the glass industry with answers to these questions. Glass for Europe's experts have analysed the legislation, using examples to explain how the law translates into manufacturing reality. "All in all, the CPR is an improvement because it clarifies and defines the roles and obligations of each stakeholder and simplifies procedures, reducing the expenses related to tests" says Anne Minne, Chairwoman of Glass for Europe's Standardisation Committee. "But some issues still need clarification because of the specificity of the glass sector. The merit of the Glass for Europe guide is that it provides practical examples."

The latest harmonised regulation means that the same rules will be applied in all 27 EU member states. The benefits are clear: The removal of trade barriers, as well as the obligation for companies to prove conformity in individual countries. Understanding how the legislative changes affect a business is critical, as the pared down CPR procedures should bring down business costs, particularly for SMEs. The meanings of concepts have also been made clearer, making the level playing field easier terrain for the industry's players.

"We realise that picking out what industry wants to know and needs to apply from a very general piece of EU legislation is not necessarily easy" explains Bertrand Cazes, Secretary General of Glass for Europe. "The guide aims to bridge the gap from legislative theory to real industrial practice because we feel that it is part of Glass for Europe's mission to give meaningful support to the glass industry."

This practical guide on the Construction Products Regulation can be consulted online on the Glass for Europe website (www.glassforeurope.com). ■

Glass for Europe, Brussels, Belgium email: info@glassforeurope.com web: www.glassforeurope.com

Originally published in Glass Worldwide, preferred international journal of AIGMF

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World Soda Ash Business Outlook

(September 30–October 1st 2013)
Budapest, Hungary

In June 2012, IHS Chemical hosted a very successful two day soda ash conference in Istanbul, Turkey which attracted 250 delegates from across the world. Following on this success IHS Chemical will host a one day conference, the World Soda Ash Business Outlook, in Budapest, Hungary on October 1st, 2013. In conjunction with the World Soda Ash Business Outlook, IHS Chemical is introducing a new soda ash training workshop (September 30th, Budapest) designed for professionals requiring a broad understanding of soda ash technologies and their commercial impact on the global soda ash industry.

The theme of the conference on October 1st is 'Managing Supply/Demand and Cost Volatility'. There have been a number of developments in recent years that have altered the landscape of the soda ash industry. The global recession of 2009 had a devastating impact on demand and in turn prompted some adjustments across the industry. Since then soda ash demand in developed markets has struggled to recover. The global economic outlook remains delicate; and is one of the biggest threats for the industry. Glass is the main end-use for soda ash with flat glass the single biggest driver for soda ash demand. Thus a healthy economy is imperative for driving soda ash demand.

During recent years there have been big changes in energy prices globally; and more importantly in relative energy costs. Crude oil prices began a sharp ascent during mid the last decade. Then from 2009 natural gas prices in the U.S. fell sharply. As a result the gap between natural soda ash production costs in the U.S. and synthetic production costs has widened considerably. Allied with these energy changes soda ash production costs have appreciated in China. With over-capacity and high costs many Chinese soda ash producers are operating at a loss. Synthetic soda ash producers in other parts of the world are also under considerable pressure. Penrice is to permanently close its synthetic soda ash plant in Australia in June 2013. In addition, Solvay has announced that it plans to close soda ash capacity in the Mediterranean during mid 2013; details have yet to be confirmed.

Meanwhile, the existence of natural soda ash reserves in Turkey have been known for decades, and in 2009 one million metric tons of trona based capacity finally came on-stream at Beypazari, Turkey. Further low cost capacity additions are scheduled for Turkey.

The soda ash industry faces challenging years ahead. These challenges will be discussedat the World Soda Ash Business Outlook to be held in Budapest later this year.

If you would like further information or have any questions about this conference, please contact:

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Scraping conveyors for the glass industry

Horst Moser* describes the role scraping conveyors play in removing hot and cold glass waste and explains why they are an important tool in glass factories.



▲ (L) Five scraping conveyors working in a container glass factory operating five large furnaces. (R) Inclined discharge section of scraping conveyor.

The production of glass articles is always accompanied by the occurrence of hot and cold glass waste.

Although the quantity of that waste has gradually reduced due to advanced production technologies, it cannot be avoided completely.

At the end of the day considerable amounts of waste have to be removed. Therefore reliable working recycling systems need to be installed for continuous discharge.

The target is to transform that waste into a cullet material, suitable for being recharged in the melting loop.

Furthermore, it is compulsory to have clean basements under the forming machines and the cold end area.

Hazardous glass waste has to be carefully collected and efficiently reused.

Important material

Cullet is an important 'secondary' raw material for glass production.

It is a source for regaining raw materials and energy. Each 10% of cullet addition to batch reduces the melting energy by up to 3%.

Each tonne of reused cullet replaces 700kg sand, 190kg soda ash, 80kg dolomite and 50kg feldspare. It avoids production of more than 300kg CO_2, which is harmful to the environment.

The most critical and difficult appearance of waste glass is the hot or liquid one arriving in the basement in stream or gob form. It needs skilled high-tech equipment to transform the waste into a cullet material ready for melting.

Without doubt, a scraping conveyor is the equipment for this task and suitable for collecting, cooling, granulating and transporting hot glass continuously for 24-hours a day without any human interference.

Blessing in disguise

Scraping conveyors can be considered a blessing in disguise compared to the former methods of collecting hot waste glass gobs.

These include water-filled containers that are placed under the gob falling opening in the basement ceiling, and the difficult and dangerous continuous container removal by forklift out of steam-filled and dark cellar environments, burdened by high risk of accidents.

In addition, the cooled glass in containers forms large solid blocks, which have to be crushed elaborately with high costs.

The amount of hot waste glass to be handled and the amount of time it occurs influences the design and length of scraping conveyors.

It is important to achieve a sufficient long dwell time of the glass in water to make sure a beneficial granulation will be given and at the end of the conveyor cullet will arrive with a suitable temperature to make a trouble-free transport by belt conveyors possible.

Scraping conveyors are available in normal or stainless steel design, with various floor wear linings, with or without double floor and in single (mono-chain) or double chain execution.

They can be located on the basement floor or in covered floor trenches to allow forklift traffic passage.

Hazardous steam occurring during glass cooling can be collected by covering the conveyor tanks and by installing efficient steam aspirators leading it to the outside.

Scraping conveyors form the key components for personnel-independent factory glass recycling systems in modern glass factories of all branches as well as in refurbished older plants. ■

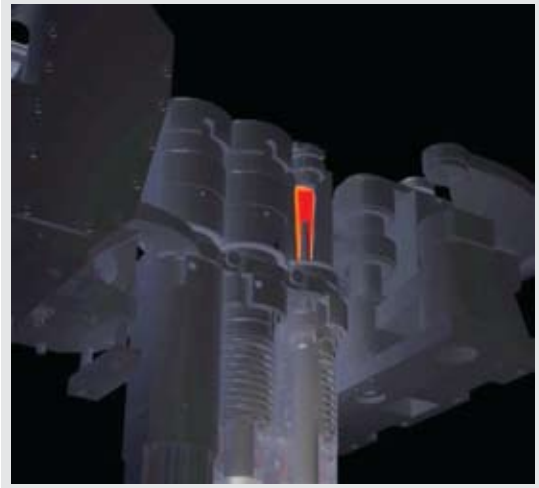
*Horst Moser, Marketing Director, Zippe Industrieanlagen, Gemany.
Website: www.zippe.de

This article was Originally published in **Glass International** April 2013 | www.glass-international.com

Glass News Worldwide

HEYE STARTS NNPB PROJECT IN CHINA

In cooperation with a reputable container glass manufacturer, Heye is happy to be starting a project for the implementation of NNPB lightweight production in China. Start of production is scheduled for autumn this year.



The Heye NNPB-process makes containers thinner and even stronger. Weight is reduced and, as a consequence, energy and raw material consumption also fall.

DATES SET FOR GLASSTEC 2014

The dates for glasstec 2014 are set: the event will be held at the Düsseldorf Exhibition Centre from 21 to 24 October 2014.

At the first Advisory Board meeting for the forthcoming trade fair a number of key decisions were made charting the course for the future. For instance, the official opening will be brought forward from the first day of the trade fair to its eve with a view to providing more time for an in-depth exchange between the top decision-makers invited from the international glass sector. Furthermore, this allows visitors and exhibitors to make even more efficient use of the first exhibition day. The opening event will be held off the trade fair grounds and will include a high-calibre supporting programme.

In addition to this, solarpeq – International Trade Fair for Solar Production Equipment, will be completely integrated into glasstec in 2014. In future, it will enhance the ranges of the world's largest glass trade fair and feature manufacturing technology for crystalline and thin-film photovoltaics as a special themed area. glasstec stands out with its unique array of different ranges across all stages of the value chain as well as its versatile special themes and conferences.

glasstec 2012 made a clear statement in an economically ambivalent environment – was the general opinion of a clear majority of the around 43,000 trade visitors. Visitors from the sectors of mechanical engineering, industry, skilled trades, architects/(façade) planners as well as solar systems gave glasstec 2012 good scores and high satisfaction ratings. ■

(Glass News Source: World Wide Web)

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Life Cycle Approaches: Creating Business Value through Sustainability Strategies

About FICCI Quality Forum

FICCI Quality Forum (FQF) is a specialized division of FICCI that provides a wide range of services in quality management systems to industry and government.

FQF has been proactive in providing business solutions to address Climate Change, GHG mitigation and Sustainable Development using Life Cycle Approaches.

In response to the need for arresting negative impacts of economic activities on human and ecosystem health, willingness to implement sustainable development strategies is steadily growing. Life Cycle Approaches are being seen as a way to understand and control such negative impacts from a holistic perspective. Life Cycle Assessment (LCA) is a systematic compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle.

Widely used in Europe, LCA is now becoming visible in public policies and business decisions in many parts of the world. With the growing robustness of LCA techniques, their relevance to developing countries is also gaining ground. As a decision support tool, LCA can play an instrumental role in supporting Governments to define sustainable public policy and in guiding business decisions by industry. MSMEs, NGOs and individual customers can also use the information provided by LCA to make better choices and purchase decisions.

Federation of Indian Chambers of Commerce and Industry (FICCI) has partnered with United Nations Environment Programme (UNEP) to facilitate Indian organizations in taking up LCA/LCM pilot projects and support them in creating more sustainable production and consumption patterns.

Indian Life Cycle Assessment and Management Conference (ILCM) is a flagship event of FICCI which aims to enhance understanding

ILCM 2012 Inaugural session

of Life Cycle Thinking (LCT) in India. It brings together Indian and international LCA/LCM experts from Government, Academics and Industry to develop and imbibe LCT in decision making process. Launched in 2012, the first edition of ILCM was held in New Delhi and attracted around 80 delegates across 7 countries from diverse sectors.

The second edition of ILCM is scheduled from September 25-27, 2013 at Hotel Atria in Bengaluru. The call for abstracts for ILCM 2013 has received an overwhelming response from Indian and international participants. Over 150 delegates from 10 countries working in the areas of Life Cycle Assessment, Carbon and Water Footprint, Environmental Impact Assessment, Life Cycle Sustainability Assessment, Life Cycle Costing, Extended Producers Responsibility, etc., will be coming together for this Conference. Three key areas to be discussed in ILCM 2013 are:

- Life Cycle Approaches: Local vs. global perspectives
- Life Cycle Approaches: Business opportunities and challenges in using LCA
- Life Cycle Approaches: Social LCA for developing the institutional framework in India

Early registration for ILCM 2013 is open till August 31, 2013 with provision for early bird and student discounts. A special discount is also available to delegates from low and middle-income countries as per World Bank categories. ■

Contribution: Ms. Archana Datta / Ms. Sohini Gupta, FICCI

More information is available at http://www.indialca.com and ILCM 2013 organizers can be contacted at Tel: +91 (11) 23487211 or via email: ilcm@ficci.com

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Environment

HIGH-RISES TO TURN OVER GREEN LEAF, GET ENERGY-EFFICIENT

High-rises in the Capital are all set to become greener. It may soon become mandatory for high-rises in Delhi to use 'energy-efficient glass' on their exterior that allow ample sunlight in but keep the heat out, cutting down on use of lights and air-conditioning.

The Delhi Urban Art Commission (DUAC) has sent this proposal, among others, to the Urban Development Ministry for approval. "This is a part of the proposal on simplified building bylaws for Delhi," said a senior official.

DUAC Chairman Mr. Raj Rewal said the plan for any building will have to ensure use of energy-efficient glass, apart from other measures. DUAC had also recommended extra floor area ration for green buildings as an incentive.

The NCR is also going green. In fact, Gurgaon is way ahead of the Capital with 15 such buildings. Five of them have the highest 'platinum' certification of the US Green Building Council's Leadership in Energy and Environmental Design (LEED).

One of these, the headquarters of the Institute of Rural Research and Development (IRRAD) is built as green as possible. The building has 7,000 litre storage tanks to save rainwater and solar panels that produce 35KW of electricity per annum, enough to take care of the building's needs.

But some experts feel that just using energy-efficient glass won't make a building 'green'. "Eighty per cent façade of most buildings is enveloped by glass, which lets in a lot of heat. We need design interventions," said Mrs. Anumita Roy Chowdhury, Executive Director, Centre for Science and Environment.

POLYTHENE BAN: PUNJAB TO STUDY HIMACHAL MODEL

Keen on complete ban on the use of plastic and polythene bags, the Punjab government has decided to study how Himachal Pradesh implemented it the best in the country.

"Himachal Pradesh won the Prime Minister's Award for Excellence in Public Administration for mass awareness about the ban in the year 2009-10," said the PPCB Chairman. "Since Punjab is also contemplating implementing the ban, study of the hill-state model will help us a lot," he added.

The first state to impose complete ban on the use of plastic bags in 2009, Himachal Pradesh has become a model for not only Punjab but also the entire country that's keen to get rid of all the problems that plastic waste creates.

In August 2011, the Punjab government decided to implement The Punjab Plastic Bags (manufacture, usage and disposal) Control Act more seriously, prohibiting the manufacture, disposal and usage of virgin-plastic bags of thickness not less than 30 microns, size not less than 8x12 inches, and colours other than specified. The use of plastic carry bags, however, is open and rampant, and now a source of big problem for urban local bodies that are getting their sewers choked with this non-biodegradable waste.

The animal husbandry department had warned of stray cattle dying of consuming waste polythene, less than 30-micron thick, from the dumping pits. Scientists observed polythene also destroying the fertility of soil. "Himachal (Pradesh) has implemented the ban without any uproar from consumers and manufactures," said Mr. Babu Ram, Member Secretary of the PPCB. "It will be interesting to study how it made it a people's movement."

The collection, recycling and end-use of waste polythene in road construction is going a long way in saving the environment of the hill state. The Himachal Pradesh government mobilised citizens, tourists and traders to switch to shopping bags made of jute, paper and cotton. A series of public campaigns made it work.

PLASTIC WASTE TIME BOMB TICKING FOR INDIA, SC SAYS

"We are sitting on a plastic time bomb," the Supreme Court said after the Central Pollution Control Board (CPCB) informed it that India generates 56 lakh tonnes of plastic waste annually, with Delhi accounting for a staggering 689.5 tonnes a day.

"Total plastic waste which is collected and recycled in the country is estimated to be 9,205 tonnes per day (approximately 60% of total plastic waste) and 6,137 tonnes remain uncollected and littered," the CPCB said.

The four metros are major culprits in generating such waste, with Delhi producing 689.5 tonnes a day, followed by Chennai (429.4 tonnes), Kolkata (425.7 tonnes) and Mumbai (408.3 tonnes). The figures only serve to confirm the common sight of mounds of plastic in industrial, residential and slum areas of Indian cities and towns.

A shocked court asked civic authorities of five cities —Delhi, Agra, Jaipur, Faridabad and Bangalore to submit reports on the steps taken to contain dumping of plastic waste and implementing the ban on gutka.

As 40% of plastic waste is not recycled, the daily addition to untreated plastic in Delhi is estimated at 275.6 tonnes, followed by Chennai (171.6 tonnes), Kolkata (170 tonnes) and Mumbai (163.2 tonnes). This waste is a source of continuing pollution as plastic is not bio-degradable and poisons the environment for decades.

The CPCB said a survey conducted in 60 major cities found that 15,342.46 tonnes of plastic waste was generated every day, amounting to 56 lakh tonnes a year.

While Additional Solicitor General Mohan Jain presented a worrying report on plastic waste management, another Additional Solicitor General, Indira Jaising, painted an equally grim health scenario by informing that the ban on 'gutka' and 'pan masala' laced with tobacco had not been effective due to manufacturers playing truant with the law while a lethargic state machinery compounded matters.

Responding to the situation, the bench of Justices G S Singhvi and Kurian Joseph felt non-implementation of law due to abject "failure of governance at the grass-root level" could be countered by adopting a two-pronged strategy for effective implementation of plastic waste management and ban on gutka and pan masala mixed with chewing tobacco and nicotine.

Taking a cue from CPCB's survey, it chose Delhi, Bangalore, Agra, Faridabad and Jaipur and asked the commissioners of civic bodies to file affidavits within four weeks detailing steps taken under the Municipal Solid Waste (Management and Handling) Rules, 2000 and the Plastic Waste (Management and Handling) Rules, 2011 to dispose of the waste responsibly.

"We have a habit of collecting garbage from cities and dumping them in villages. Representatives of villagers have stopped being abreast with the problems arising from such dumping," the bench said.

It also asked state pollution control boards and the CPCB to furnish the reports they have been mandated under law to prepare as supervisors of plastic waste disposal by municipal bodies.

On the implementation of the ban on gutka and pan masala in 23 states and five Union Territories, the bench asked the Health Secretaries concerned to file their response in four weeks to Jaising's allegation that the manufacturers had stepped around the ban on their sale. The court also asked the other states and UTs why such a legislative initiative had not been taken by them and whether they were contemplating it. ■

(Glass News Source: World Wide Web)

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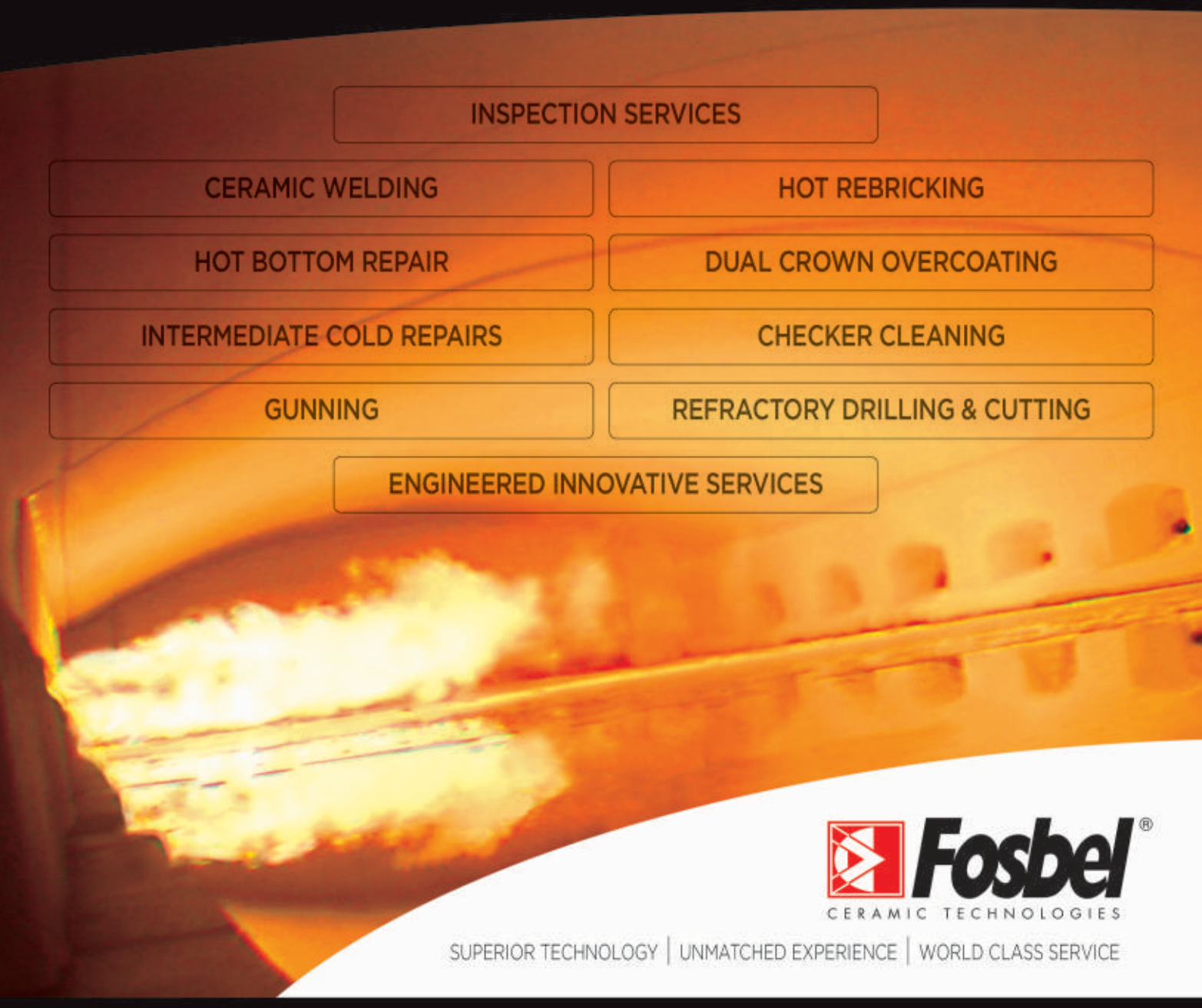

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