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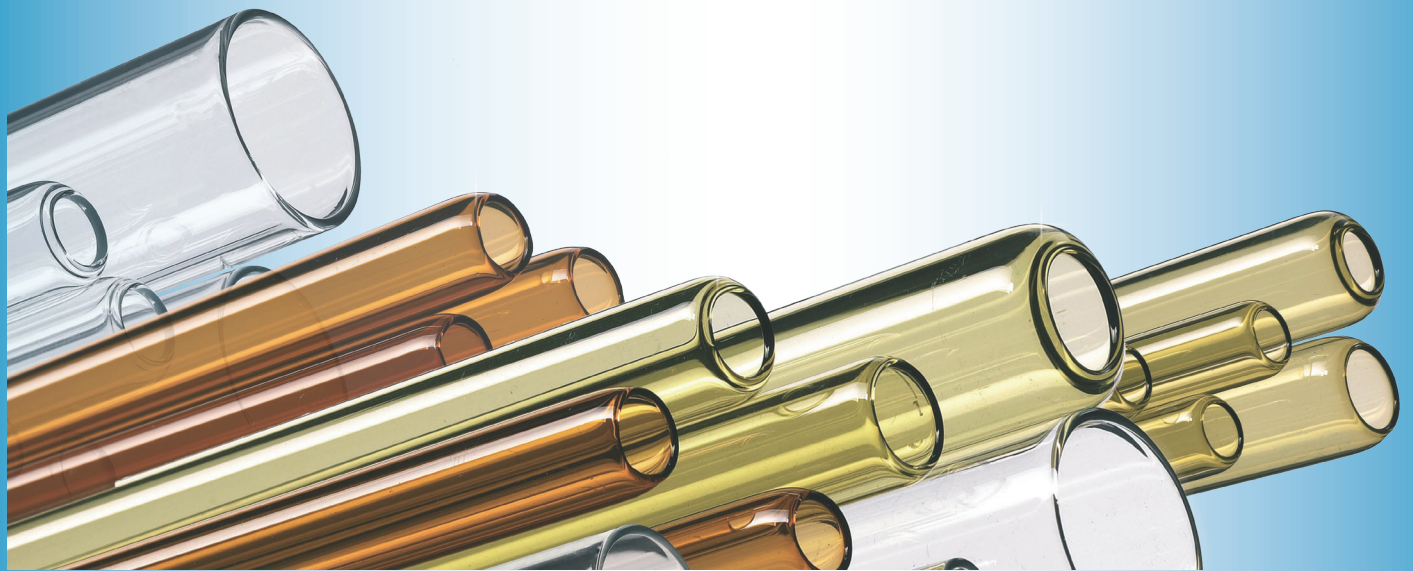


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From President's Desk

An interactive session with Honb'le Minister of Industry for Rajasthan, Mr. Gajendra Singh was organized at Jaipur on Dec 19th 2015, which provided an opportunity to debate on use of glass containers as responsible and safe packaging for clean India campaign and use of glass as eco-friendly building material for Smart Cities.



Mr. Singh applauded advanced production techniques used by the Industry to manufacture light weight glass bottles. He was of the view that bottled water be made available in glass bottles as also done in European and other countries as Glass being 100% recyclable, will unlikely pollute the environment or affect human health.

Mr. Singh emphasized use of more solar and flat glass for building Smart Cities. He appreciated Glass Industry's commitment towards 'Swachh Bharat Abhiyaan' & 'Smart Cities' and offered support to the Industry with regard to investments in State of Rajasthan.

Mr. C K Somany, Former AIGMF President / Former CAPEXIL Chairman and Chairman of HNG Group gifted 500 glass water bottles (specially manufactured by Hindustan National Glass and Industries Ltd.) to the Honb'le Minister for use in 'Sachivalaya' which carried a logo of Swachh Bharat Abhiyaan enabling people demand responsible and safe packaging.

While in Jaipur, AIGMF members visited select glass façade buildings to showcase its commitment for the uninterrupted supply of glass as a vital building material for Smart Cities.

As Corporate Social Responsibility, AIGMF gifted 200 glass water bottles to Jaipur Marriot Hotel and 50 bottles to lotus shaped glass façade building of Motisons Jewellers.

As a Supporting Association, AIGMF participated in IGBC's Green Building Congress 2015 at Mahatma Mandir, Gandhinagar, Gujarat from Nov 19-21, 2015 wherein Mr. Sourabh Kankar, Member, Architectural Glass Panel (AGP) / AIGMF and Manager - Architectural, Gujarat Guardian Ltd., gave a presentation on Principles of Glass Selection for Facades at the IGBC Conference.

AIGMF participated in the 6th edition of International Packaging Exhibition held on Oct 8-11, 2015 at Bombay Exhibition Centre, Mumbai. Ms. Harsimrat Kaur Badal, Hon. Minister of Food Processing Industries, Government of India, inaugurated the World Packaging Congress 2015, which was organised concurrently with the INDIAPACK 2015 by the Indian Institute of Packaging (IIP). Mr. K K Sharma, Plant Head, Neemrana, HNG & Inds. Ltd. gave a presentation on Glass: Delivering packaging solutions to the world at the Congress.

My best wishes to all readers for Happy & Prosperous New Year 2016 ■

Sanjay Ganjoo
President, AIGMF

and COO, Asahi India Glass Ltd., Taloja (Maharashtra)

Glass Industry Meets in Pink City to promote 'Smart Cities' and 'Swachh Bharat Abhiyaan'

(Jaipur, Dec 19, 2015)

The Executive Committee of The All India Glass Manufacturers' Federation (AIGMF) met at Jaipur Marriott Hotel. An interactive session with Honb'le

recyclable, will unlikely pollute the environment or affect human health. Mr. Singh emphasized use of more solar and flat glass for building Smart

support to the Industry with regard to investments in State of Rajasthan.

Mr. C K Somany, Former AIGMF President / Former CAPEXIL Chairman and Chairman of HNG Group gifted 500 glass water bottles (specially manufactured by Hindustan National Glass and Industries Ltd.) to the Honb'le Minister for use in 'Sachivalaya' which carried a logo of Swachh Bharat Abhiyaan enabling people demand responsible and safe packaging.

Mr. Sanjay Ganjoo, President, AIGMF stated that there is a spectacular rise in use of glass in buildings, as is evident from trend of glass buildings coming up in country as well as in Jaipur. Mr. Ganjoo said that use of glass in buildings will make Smart Cities look more elegant, beautiful and eye-catching. Glass application

Minister of Industry, Mr. Gajendra Singh was organized, which provided an opportunity to debate on use of glass containers as responsible and safe packaging for clean India campaign and use of glass as eco-friendly building material for Smart Cities.

Mr. Singh applauded advanced production techniques used by the Industry to manufacture light weight glass bottles and jars with no loss of safety or quality. This benefits not only consumers but also the environment. He was of the view that bottled water be made available in glass bottles as also done in European and other countries as Glass being 100%

Cities. He appreciated Glass Industry's commitment towards 'Swachh Bharat Abhiyaan' & 'Smart Cities' and offered





will not only help buildings lit with natural and solar light but will also lead to huge monetary and energy savings for the economy. He also stated that there is an urgent need for regulations on use of glass in buildings to ensure human and fire safety in tune with Smart Cities vision of the

Indian Government.

Mr. Ganjoo informed that in the present scenario, options for glazing in buildings are enormous such as curtain walling, structure glazing, bolt glazing or spider glazing, fin supported glazing, cable glazing, suspended glazing etc. To create confidence

and provide technical know how to ensure human and fire safety while using glass in buildings, AIGMF took the cognizance of the issue and sponsored project to Confederation of Construction Products and Services (CCPS), a not for profit organization in 2007 to bring out the Guidelines on Use of Glass in Buildings: Human Safety. As per the recommendations and norms of the CCPS guidelines, it is suggested how to regulate glass in relation to human safety either by restricting use of glass or specifying use of Safety Glass at critical locations where chances of injury due to glass breakage are high.

While in Jaipur, AIGMF members visited select glass façade buildings to showcase its commitment for the uninterrupted supply of glass as a vital building material for Smart Cities.

As Corporate Social Responsibility, Mr. Sanjay Ganjoo, President, AIGMF gifted 200 glass water bottles (specially manufactured by Hindustan National Glass and Industries Ltd.) to Jaipur Marriot Hotel and 50 bottles to lotus shaped glass façade building of Motisons Jewellers, which carried a logo of Swachh Bharat Abhiyaan enabling people demand responsible and safe packaging.

Mr. Arun Kumar Dukkipati, Sr. Vice President, AIGMF said, Glass is the trusted and proven packaging for health, taste and the environment. He assured uninterrupted supply of glass containers for packaging drug formulations, food products or beverages, which is directly linked to Swachh Bharat Abhiyaan. He shared some of the main characteristics of glass:

- Glass is 100% recyclable and can be recycled endlessly without loss in quality or purity
- Glass is nonporous and impermeable, so there are



for adopting use of glass bottles, which is a step forward towards clean environment.

Mr. Dukkipati mentioned that use of glass bottles supplements Prime Ministers' vision of Swachh Bharat Mission (*Clean India Campaign*) as waste from other packaging material are usually found in streets, drains, rivers, etc., with people having the tendency to litter anywhere. On the other hand, Glass being 100% recyclable mostly reaches junk seller for recycling and adds to clean environment.

The Executive Committee acknowledged the support of Mr. Nirmal Mundra of Nirmal Glasstech Industries, an Affiliate Member of AIGMF (who manufactures Spare Parts for I.S. 2008 Glass Container forming machines and associated equipments) for hosting Executive Committee Meeting at Jaipur Marriott, arranging site visits and dinner reception in honour of visiting delegates.

Select photographs of the event are available at <http://aigmf.com/past-events.php> ■

no interactions between glass packaging and products to affect the flavor of food and beverages. No nasty after taste - ever

- Glass has an almost zero rate of chemical interactions, ensuring that the products inside a glass bottle keep their strength, aroma,

and flavor

- When consumers choose foods or beverages that are packaged in glass, they avoid potential risks while enjoying a number of benefits

Mr. Dukkipati congratulated Jaipur Marriott Hotel and Motisons Jewellers



Lotus shaped glass façade building of Motisons Jewellers, Jaipur

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Representing the interests of India's glassmakers

Sanjay Ganjoo, Chief Operating Officer at Asahi India Glass Ltd took over as President of the All India Glass Manufacturers' Federation in 2014. Every major local producer of flat and hollow glass is now an AIGMF member, with the organisation successfully representing the interests of the industry and its products.



Sanjay Ganjoo is Chief Operating Officer at Asahi India Glass Ltd and President of the All India Glass Manufacturers' Federation.

Sanjay Ganjoo has spent his entire working life at Asahi India Glass Ltd, the largest integrated flat glass company in India, which produces some 1200 tonnes/day and consumes about 18,000 tonnes of glass/month. Having originally joined the company's automotive glass operation near New Delhi as an engineer in 1989, a series of promotions through the management structure led ultimately to Mr Ganjoo's appointment as Chief Operating Officer six years ago.

Mr Ganjoo was elected President of the All India Glass Manufacturers' Federation in September 2014 and is currently just over halfway through a two year term of office. It had been a key goal of the AIGMF and Mr Ganjoo personally to involve India's flat glass community within the previously largely hollow glass-focused organisation. Today, this goal has been realised, with a specialist Architectural Glass Panel having been created and every major flat glass manufacturer now a member. As a result, it has been possible to bring more flat glass issues to the AIGMF agenda, where they can now be taken up by the glass industry as a whole, instead of on a company-by-company basis.

"We are pushing forward with building regulations for India, codes that have to be properly defined" Sanjay Ganjoo explains. "So we are trying to bring in these rules and promote architectural glass by increasing awareness and knowledge among users." To support these efforts, the AIGMF organised a conference entitled 'Use of glass in buildings – Facades of the future and

the need for regulations relating to human impact, fire safety and energy' during GLASSPEX India 2015 exhibition in Mumbai last March. "India's architectural specifiers still have very limited knowledge about the use of glass as a facade... there are many concerns but we are seeking to bring clarity."

According to Mr Ganjoo, the Architectural Glass Panel is currently promoting flat glass for use as a partition walling material in competition with plywood, brick and plastic, as well as for firewall duties. "Glass can be a good replacement for these materials because it is 100% recyclable and has a lot of value in terms of saving resources."

As well as covering the interests of India's flat glass sector, of course, the AIGMF continues to represent the local hollow glass community, with the majority of Executive Committee members still coming from this part of the industry. "In the past, it was flat glass that was lacking but today, all parts of the glass industry are well represented" says the current AIGMF President.

Day-to-day activities at the federation's New Delhi offices are now in the capable hands of Vinit Kapur, Secretary, who is positioning the AIGMF for an even more proactive role in the future. Together with Sanjay Ganjoo and the Executive Committee, he is raising the organisation's profile with government departments, regulation authorities etc as the recognised voice for the Indian glass industry. As well as addressing issues whether glass can be used in specific architectural applications for example, Mr Ganjoo is keen for the industry to educate customers how to use glass materials.



Tempering operation at Asahi Glass India Ltd.



Together with Sanjay Ganjoo and the Executive Committee, Vinit Kapur (right) is raising the AIGMF's profile with government departments, regulation authorities etc as the recognised voice for the Indian glass industry.



Mr Ganjoo is pleased to support *Glass Worldwide's* position as preferred journal of the AIGMF and a partner journal to *Kanch*.

"The Government has to bring in more regulations about how and where to use glass to make things simpler and easy" he contends. "The AIGMF is working on this and is making real progress."

CURRENT PERFORMANCE

Although flat glass consumption in India is growing at healthy rates of 8%-10% annually, the industry faces challenges to control both its manufacturing costs and levels of cheap imports from China and the Middle East. "It is tough to compete in terms of cost, which puts considerable pressure on prices" Sanjay Ganjoo confirms. For the past two years, the local industry has consolidated effectively, while



Asahi India Glass Ltd is the largest integrated flat glass company in India, producing some 1200 tonnes/day.

campaigning for the implementation of anti-dumping duties, working closely on demand-supply issues and improving awareness of glass usage.

The industry's long-term prospects remain positive, however. "Although the automotive sector has not performed well in recent times, it is now back on the right track" says the AIGMF President. "Government policies are becoming more investment-friendly, so while inflation has come down and interest rates are being reduced, affordability at consumer level improves sales in the automotive and housing sectors."

The local automotive industry is expected to grow by 10%-12% in the next year, a trend that will be reflected in glass usage. The national government wants to make India a hub for automotive exports, doubling current manufacturing capacity to

seven million cars within three years.

Similarly, the construction industry is expected to improve as the country grows, with greater investments in the development of commercial premises, for example. "Although it cannot be said that the sector has been thriving in recent times, the market size for the real estate sector is projected to reach US\$ 180 billion by 2020, which is positive for the growth of the glass industry."

Mr Ganjoo has been an avid reader of *Glass Worldwide* for the past decade and is pleased to support its position as preferred journal of the AIGMF and a partner journal to *Kanch*. "*Glass Worldwide* brings important knowledge to this part of the world, where we are trying to understand the global industry and are just starting to get into the science of manufacturing."

FUTURE OPPORTUNITIES

Over the years, the company has successfully developed and manufactured products to match customer requirements. "The core competence of our engineering is our strength and will be the subject of continued investment in the future, because it cannot be copied as easily as products" Mr Ganjoo confirms. "Our R&D will increase in the future to support these efforts."

Based on the government's ambitious plans for India's automotive industry, the company anticipates significant growth potential for its glassmaking and processing businesses. "Depending on what actually happens with the levels of automotive and construction growth in the future, there will be opportunities for new greenfield float glass plants to meet the growing demand" Sanjay Ganjoo concludes. ■



Mr Ganjoo was elected President of the All India Glass Manufacturers' Federation in September 2014.

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Glass, Smart City and Solar Installations – Part I

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Abstract:

Apart from safety and security of buildings in India that consume a large tonnage of float glass and other glass items, the energy efficiency or rather optimum energy consumption in each of these buildings assume special significance, particularly in the light of several 'Smart Cities' coming up. People often understand 'Smart Cities' by cleanliness and safety requirements, wherein glass has a role to play. The construction of 'Smart Cities' also require more energy, i.e. clean and smart energy. This brings us to the solar energy that is also renewable and is environment friendly. All these activities have a direct relation to the glass industry with the volume of sales of float glass increasing tremendously. To appreciate the level of such endeavours, some of these activities in other countries are highlighted in this article so that collaboration can be achieved between float glass manufacturers and solar energy producers in an effective manner.

INTRODUCTION

Smart City as a brief pathfinder has been explored in a previous article in Kanch [1], with the importance of the use of float glass in this sector. For many decades in India, for the 'building construction industry', glass has been increasingly used: first the flat products and then the more transparent float glass. This is not only of primary concern to the glass manufacturers, but also to the industry association like AIGMF. On this issue during the last few years, some articles have also been written in Kanch, as in Ref. [2] to [6]. With the start of more foreign direct investment (FDI), the investment in both public and private sectors will pick up after necessary restructuring of the banking sector for adequately capitalizing them. With

this surge of new investment scenario and many collaborative arrangements with foreign companies or countries will further push FDI both in the field of 'Smart City' and 'Solar Energy'. Both these activities are inter-related as well as have a strong relation with the total volume of sales of float glass (i.e. doors and window panels for buildings, and solar panels made of float glass sheets). This should obviously boost our glass industry, as it will also augment the usage of more and more of different types of 'contain glasses' (bottles, bowls, drinking glasses, laminated coloured glass plates for interiors, decorative pieces, etc.). Therefore, the activity of 'Smart City' has a special meaning for all of us in AIGMF. Since 2014, the Govt. of India has also been seriously

talking and implementing such projects involving 'Smart Cities'.

In the previous article [1] on "Smart City", the scenario of solar power sector in the USA was described vis-à-vis the Indian situation. As it is not possible to explore this scenario in details in each of the important countries in terms of all solar energy installations, a brief view is given in this article mainly on such installations of the top ten producing countries of solar power. While it is important for the glass industry to know and assess the total quantity of glass to be needed for both buildings and solar panels, it is equally important to know the total area to be covered by solar panels. The glass industry could then do the necessary impact analysis of the respective areas of building

construction (in terms of total millions of square feet of construction) vis-à-vis the number of solar panels in a given area to assess the need for float glass (in terms of either total square feet of glass or total tonnage). This will be separately discussed for project evaluation in a future article in Kanch. Let us give some data on solar power in different countries.

Top 10 Countries Using Solar Power

The latest data available till the end of 2014 for solar power for the Top ten countries are shown below along with those of 2010 (shown within the bracket) to be able to compare the tremendous amount of growth during this period. It is designed to show the current pulse of the global leaders in solar power and it also shows just how quickly the world is switching to affordable and clean solar energy. In order to gauge the mood of the solar power industry around the world for giving an insight to the producers of solar energy in India as well as construction giants for 'Smart City', the energy unit has been up-scaled from MW to GW to be able to accommodate this

rapid growth. The data given below indicate the "installed capacity" of photovoltaic (PV) solar energy plants. The order of countries also gives a fascinating insight on how fast things are happening in the world [7].

1. Germany: 35.5 GW (2010: 9.8 GW — 1st place)

Germany is clearly the world leader, as also in 2010, and has only continued the trend. Germany installed 3.8 GW of PV solar capacity in 2009 alone, and further added new solar capacity of at least 3.3 GW/year, and about 6 GW/year between 2010 and 2012. It has also introduced feed-in-tariff (FIT) scheme that is combined with a) good financing opportunities, b) a large availability of skilled PV companies, and c) a good public awareness of the PV technology, which mainly contributed to this success. By their approach and achievement, they got recognition from "European Photovoltaic Industry Association" (EPIA) [7].

Despite a slowdown in 2013, Germany is expected to remain at the top of solar market in Europe for the coming years, and still boasts a quarter of the world's installed PV capacity of

26%, compared to the 13% held by each of the next two countries on the Top 10 list, i.e. China and Italy.

2. China: 18.3 GW (2010: 305 MW — 8th Place)

China has an industrial culture of doing anything in a big way, and the solar energy is no exception. As China is the most populous nation in the world, and that also with the biggest carbon footprint, it is great news that China has made such a massive commitment to solar power. China has grown its solar capacity by an amazing 6,000% since 2009-10 — from less than 1/3rd of one GW of capacity to 18.3 GW today. China is also one of the largest manufacturers of solar panels that had helped a lot in augmenting their solar power capacity. A repeated upward revision of the "targets" on solar power had to be done by the Chinese Govt. to motivate both the producers and the users — from a plan of 20 GW by 2020 to 20-30 GW by 2020 to the current target of an incredibly high as 70 GW of solar power by 2017. This is astounding indeed. Due to severe climate change issue, the Govt. planners had to commit to cut its coal use drastically that also makes





Italy



Japan

the world's biggest carbon polluter soon to be the country powered with the maximum 'green energy'. This is a laudable achievement coupled with a large vision for solar energy.

**3. Italy: 17.6 GW
(2010: 1.2 GW — 5th Place)**

Not far behind China is Italy with a plenty of sun shine in the country, and it continued its leadership in solar power — rising from 5th place in 2010 to 3rd place at the end of 2013. Actually, it generates more of its energy from solar than any other nation, with 7.8% of its energy coming from solar, compared to 6.2% for Germany. Mixing net-metering and a well-segmented FIT, Italy has become a world leader in solar energy. Restructuring of the administrative procedures are needed that will drive the future growth prospect, which will be ultimately aided by an expected price decrease.

**4. Japan: 13.6 GW
(2010: 2.6 GW — 3rd Place)**

A reverse situation arises in case of Japan, wherein it dropped from the 3rd place in 2010 to 4th place in 2014, but it still remains an exemplary country, as during the past four years, Japan was able to grow its solar capacity by more than 500%. The reasons are: a) Govt. residential PV programs, b)

adoption of net-metering system, c) high national solar energy target to reach 28 GW by 2020 and 53 GW by 2030, and d) the support of local authorities and the private sector. These efforts eventually made Japan a world leader in this field. In the wake of the Fukushima Daiichi nuclear disaster, the country has renewed its dedication to solar power, particularly with the recent innovative announcement of the first of many "floating solar farms" off the coasts of this island nation.

**5. United States: 12.0 GW
(2010: 1.6 GW — 4th Place)**

USA is an example that just goes to show how quickly the field is changing, although it grew its solar capacity by 750% in four years, it could still have lost the ranking in the global solar boom. However, the USA have benefited as much as any other nation from: a) the steadily dropping price of solar energy, b) aided by smart financing, and c) some supportive state-

level policies -- to grow its domestic solar industry. With many large ground-mounted solar projects in the pipeline (as shown in the above picture), the US is expected to grow its installed capacity significantly in the next few years. Moreover, if the 'national legislation' for the promotion of solar energy comes through, the USA could significantly move forward. Further growth was promoted in this industry, as the cap on the federal "solar tax credit" was lifted in 2009,

**6. Spain: 5.6 GW
(2010: 3.4 GW — 2nd Place)**

In the newly installed PV solar capacity (2,605 MW) in 2008, Spain was the world leader due to the Govt.'s focus



United States



Spain



France

on creating a national solar energy industry, but since then it has dropped significantly — between 2010 and 2013. Despite planning, Spain could not even double its capacity mainly due to financial problem, while Germany nearly quadrupled its solar capacity. The reasons for this drop are also attributed to: a) complexity and delays related to a new government subsidy program and b) a decrease in energy demand due to the economic crisis. With expectations that both of these will improve in 2010, and considering its excellent sun irradiation and PV potential, Spain is expected to bump up its solar energy capacity again this year.

**7. France: 4.6 GW
(2010: 272 MW — 9th Place)**

France has benefited from a well-designed FIT for building-integrated photovoltaic (BIPV), and has continued to reap this benefit. However, due to a lack of political support for solar incentives, the solar growth in France has been slow. The EIPA in its 2014 report also attributed this slower growth to the adverse effects from the industries involving the nuclear and fossil fuels [7].

**8. Australia: 3.3 GW
(2010: 125 MW)**

In the list of the Top 10 countries using solar power, Australia enters

as a newcomer, as during the past 5 years, it has made the most of its sun-drenched status, although many raise question about its continued growth. This large continent-like country in 2009 only claimed 125 MW of solar capacity. However, it subsequently adopted the following smart policies: a) a FIT system, b) rebates, and c) a federal mandatory renewable energy “target”, which all led to a growth of 2600% by the end of 2013, reaching 3.3 GW. It is known that Australia boasts some of the greatest solar potential in the world. This fact coupled with steadily dropping solar prices give rise to the ‘solar power costs’ less than half what grid electricity



Australia



Belgium

United Kingdom



costs. As the Govt. is considering to reduce the federal 'renewable energy target', this might slow if not stop the country's upward movement in the 'top ten list' [7].

9. Belgium: 3.0 GW (2010: 363 MW — 7th Place)

The image above shows Belgian solar flowers. Belgium has been a surprising solar contender even since 2009. Belgium's success was from a well-designed "Green Certificates" scheme that actually works as: a) adoption of a FIT system, b) combining additional tax rebates, and c) electricity self-consumption. These policies, coupled with the steady drop in solar panel prices, have kept Belgium growing its solar market year-over-year since 2009 [7].

10. United Kingdom: 2.9 GW (2010: 27 MW)

For the global solar boom, another feather in the cap is the UK that was nearly a non-entity in 2009-10, as it did not make up in the Top 10 list -- with

just 27 MW of solar capacity. However, it has made quite fast recouping all the necessary resources since that period, and as EPIA reports in 2013, the UK nearly doubled its solar capacity [7], installing more than even Italy, which is in the 5th place in ranking.

CONCLUSIONS

Looking at the above list of Top ten countries and also the pictures of different installations in these countries, one surely gets an impression that the roof-mounted to wall-hanging to ground-mounted systems of glass-panel arrays are all possible eventually to augment the capacity. The demand for float-glass panels in India will also go up tremendously with more such installations not just across the country, but also in the coming 'Smart Cities'. This is a typical situation of co-existence of 'Smart Cities' and 'glass-panels' for clean, environment-friendly and renewable solar energy in India.

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Smart City and Glass Science for Flat-Screen Products – Part I

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Abstract:

From the glass technologist viewpoint, with the advent of the new concept of designing and creating 'Smart Cities' in India, there is a huge demand coming up for float glass for windows and doors and also there is a new surge of activity to equip these cities with various types of gadgets – mainly electronics type that needs glass flat-screen products. These gadgets and various other types of devices that are necessary to make the smooth running of the general administration of different public utilities successful also need huge amount of displays of flat-screen variety made of glass.

To make these 'Smart Cities' energy efficient, there is also a great need of creating 'green energy' installations, as already pointed out in several articles of Kanch. In this article, the glass science behind making such flat-screen products is briefly elaborated. In a future article, different types of products in this segment along with various technologies involved in making such products will be described.

INTRODUCTION

The electronics industry involving new generations of wide-screen TV, Tablets and various sizes of Smartphone, etc. consist of a large part of our business world. For the glass industry, to get an idea of the market size for 'glass covers' worldwide, the shipments for these three items alone are expected to rise from 1.5 billion in 2013 to more than 2 billion pieces in 2015 and will touch about 2.5 billion in 2017. To get an idea on the Indian pace of development in Smartphone segment along: its growth has been phenomenal from 20 million in 2012 to about 45-50 million pieces in 2013 with a compounded annual growth rate of about 57% in the next five years, i.e. it will cross the 100 million

marks very soon.

The business in such electronics products is worth not just billions, but much more than one trillion of dollars around the world with participation of many large players in the USA, China, Japan, South Korea, Taiwan and lately in the Indian manufacturing sector. The size and the level of activity of such modern plants in some of the above countries are gigantic and mindboggling too. With the new "Skill India" movement, a cohesive strategy can be developed to correlate this activity to "Smart City" projects in India, as these new entities will be the largest consumer of such products not only by ordinary citizens, but also for running various organizations.

To note that in order to run these 'Smart Cities' effectively and also efficiently, we need more and more of such smart gadgets, particularly the products involving 'flat screen' with touch-screen facility in public utility or locations for letting people know different type of necessary information. So, there is no point of assessing the 'actual demand' of such products at this moment, as it will be continuously evolving, along with many other types of glasses, such as float glasses for windows, doors for shops and offices, E-glass for smart windows, and also a large segment of container glasses that are needed by domestic as well as commercial users. However, the important point to be mentioned here is that it is overall

good for the glass industry, and it is definitely of great concern to AIGMF. This has been mentioned in several recent articles of **Kanch** [1,2].

In our cricket or football season, we immediately understand that it is flat screen season, when the sales of flat-screen TVs soar to a high point and the marketers give also all sorts of incentives to keep the market hot. It augurs well for the glass industry serving this sector and other related industry, as just prior to such seasons, the glass producers in this segment also become very active. However, such glasses used for flat screen TV should not be considered as just a seasonal product, as we have many festivals round the year and TV sales also has certain buoyancy almost during the entire year in India. Moreover, the electronics industry is environment-friendly causing no carbon footprint and thereby attracts no adverse attention of the 'climate change' proponents.

It is thus appearing to be important to consider the science behind the LCD glass substrates of our flat screen TV to insist on the point that good science done well is essential to commercial success. Here, we need to emphasize that to design new oxide glasses for the next generation of Widescreens, Tablets and Smartphone, there is a clear need of tuning various properties simultaneously, such as viscosity, coefficient of thermal expansion, elastic moduli, chemical durability, etc. However, some of the most important properties to consider are "liquidus temperature" and "melt viscosity". This means that we strike a balance between thermodynamics and kinetics of the concerned system of glass.

LIQUIDUS TEMPERATURE

It is known that 'liquidus temperature' does matter a lot for commercial glass production. This needs some elaboration as the energy is of primary concern for the glass manufacturers, and hence we need to do "compositional engineering" to drive down the temperature of melting to save cost on furnace operation, although it is not always possible and/or advisable to do so. If by compositional engineering, one could lower the glass melting temperature, it will obviously need less energy. However, it cannot be done at all by compromising on glass quality.

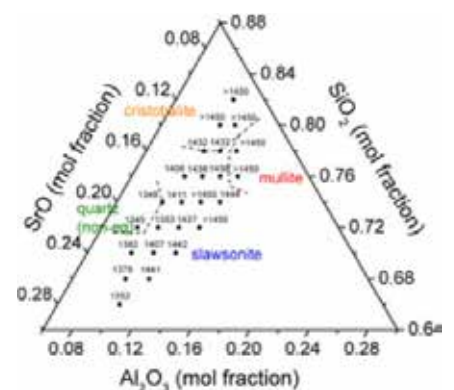
Glass is an amorphous material and it can only be formed by avoiding crystallization. So, the molten glass coming out of the glass tank furnace must be at a temperature above the liquidus temperature to prevent crystallization, i.e. the liquid has failed to become a homogeneous glass, and it also leads to significant problems in any glass manufacturing process. It should be noted that along with giving due importance to liquidus temperature, it needs to be considered that the "liquidus viscosity" is also more important. By 'liquidus viscosity' it is meant that the glass-forming liquid is at its 'liquidus temperature'.

It has also to be understood why it is so. As the glass is more fluid, i.e. less viscous, the constituent atoms are more mobile within the melt and then the glass can crystallize more easily. On the other hand, a high-viscosity melt presents a large kinetic barrier to crystallization, i.e. more congenial for glass formation. Hence a compositional engineering must consider this fact, i.e. how to strike a balance between liquidus temperature and liquidus viscosity. This was discussed in details in several

articles in **Kanch** (see for example Ref. [3]).

It has to be noted that by increasing the alumina content in a given glass composition, the melt temperature increases, although the glass could be mechanically stronger. So, for making mechanical shock-resistant glass, we must strike a balance with total alumina content in a silicate glass. Lime gives a high chemical resistance, but increasing its content in a silicate glass could pose problem with the viscosity, e.g. a proper viscosity of the melt is suitable for not only glass formation, but also for moulding it to different shapes and sizes, i.e. glass fabrication. However, replacing calcium by strontium oxide in an alumino-silicate glass gives rise to certain properties that are good for flat screen products.

This brings us to a new system of $\text{SrO-Al}_2\text{O}_3\text{-SiO}_2$ glass-forming composition, which has been recently reported by Corning Glass (USA) that now finds a place in the list of "Phase Equilibria Diagrams Database" of American Ceramics Society-National Institute of Science and Technology (ACS-NIST). This is a very important ternary system for the commercial manufacture of glass for LCD substrate, as SrO is a constituent in all LCD glass. The researchers at Corning focused their attention on commercially relevant areas of this ternary phase diagram and



determined liquidus temperatures and primary devitrification phases for 24 compositions with SiO₂ contents of 65–80 mol% and alumina contents of 10–15 mol%. This diagram is shown here for an understanding of such an interesting ternary system [4].

It was found that the liquidus temperature decreases as the SrO/Al₂O₃ ratio increases. A similar trend has been observed in the MgO–Al₂O₃–SiO₂ system for increasing MgO/Al₂O₃ and in the CaO–Al₂O₃–SiO₂ systems for increasing the ratio of CaO/Al₂O₃. The above ternary phase diagram provides information about the thermodynamic possibilities. Obviously, now the question comes as to whether the kinetics, or rather its barrier is also favourable. For glass manufacturers, the most important parameter is viscosity at the ‘liquidus temperature’. It is of particular interest to establish a correlation of viscosity with temperature and composition. Accurate prediction of the melt viscosity is important for processing but also challenging because it ranges over 12 orders of magnitude between melting and forming temperature regimes.

The multi-component oxide glasses can be modelled by “first principles” computation with a lot of difficulty, but with molecular dynamics simulation technique, some progress has been made by various workers to compute certain physical properties (see for example Ref. [5]). However, modelling by topological constraint theory (TCT) can also be applied to establish a ‘phenomenological model’ for viscosity based on just two parameters — glass transition temperature and liquid fragility, as done by Corning researchers [6].

In this theory, the model is based on ‘temperature-dependent constraint theory’, where the composition is

treated in terms of a network of bond constraints. This effort could be considered very significant as the Corning database was extensive indeed, e.g. the model was tested against 7,141 actual viscosity measurements for 760 silicate glass compositions with 3 to 11 oxide components. A plot of actual isokom (constant viscosity) temperature against predicted isokom temperature revealed a root mean square error of only 6.55K, effectively validating the topological model [6].

Liquidus Viscosity →

The viscosity is a measure of the resistance of a liquid (glass) to a shear deformation. In SI units, it is expressed as dynes-second/sq cm or Poise (P), taken as logarithmic numbers, as the values are very high up to 12 orders of magnitude. In the realm of non-Newtonian fluid, i.e. non-linear stress-strain behaviour, a plot of shear stress vs. shear rate shows different interesting aspects [7].

This involves Bingham Plastic (paints, slurries, etc.), Dilatent Flow (ceramic slips, corn starch, etc.), Thixotropic behaviour and finally Pseudo-plastic Flow exhibited by glass melts at very high shear rate. The latter has processing consequences, such as fibre-drawing, controlling “gob” behaviour, etc. There are a number of “reference points” in the viscosity-temperature curve (shown in the diagram).

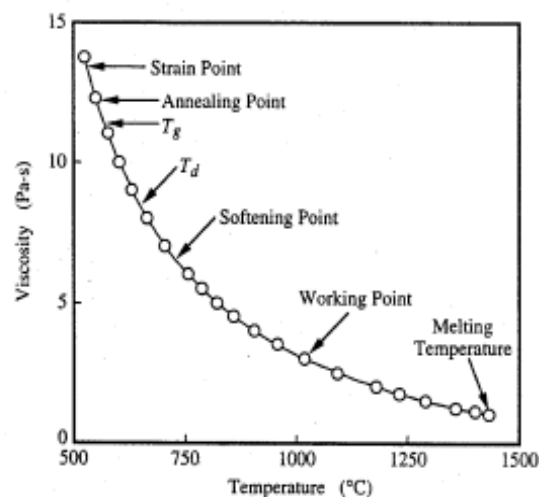
The important features for log viscosity are as follows [7]:

1. At a typical (practical) Melting Temperature:

(log viscosity is less than 1 Pa-sec). Here, the melt is fluid enough for fining/homogenization to occur in a ‘practical’, i.e. more reasonable amount of time. This is not the temperature of the melt associated with a crystal→liquid phase transition.

2. Working Point: (log viscosity= 3 Pa-sec). At this point, the temperature at which the molten glass can be

Name of reference temperature	Viscosity (Pa s)
Practical melting temperature	≈ 1–10
Working point	10 ³
Littleton softening point	10 ^{6.6}
Dilatometric softening temperature	10 ⁸ –10 ⁹
Glass transformation temperature	≈ 10 ^{11.3}
Annealing point	10 ¹² or 10 ^{12.4}
Strain point	10 ^{13.5}



formed/manipulated, i.e. the viscous gob deformed into final shape. The viscosity is low enough for some shear processing (pressing, blowing, etc.) but high enough to retain some shape after shear is removed.

3. Softening Point: (log viscosity = 6.6 Pa-sec), i.e. the temperature at which glass will deform under its own weight. The 'Littleton Softening Point' is a standard fiber elongation test (1mm/min).

Here, some notes are given on processing:

- a) Working Range: Temperature, where log viscosity is between 3 and 6.6 Pa-sec
- b) Wide Working Range (large difference in T): Long Glasses
- c) Narrow Working Range (small difference in T): Short Glasses
- d) Working Range at a higher temperature than SLS glass: Hard Glass
- e) Working Range at a lower temperature than SLS glass: Soft Glass

4. Annealing Point: (log viscosity = 12-12.4 Pa-sec), i.e. the temperature at which <stress is substantially relieved> in a few minutes. It is measured by a standard fiber elongation test.

5. Strain Point: (log viscosity = 13.5 Pa-sec), i.e. the temperature at

which <stress is substantially relieved> in several hours. At this point, the glass is essentially an elastic solid at temperature less than 'strain point' temperature. Also there are no significant structural rearrangements or no permanent flow.

The above is in every glassmaker's handbook, but it is reminder of the fact that the test should be rigorous for a better control of fabrication and eventual quality of the glasses that are very much needed in flat-screen glass products [3].

There are also other useful viscosity reference points. From a dilatometer measurement in terms of the curve of expansion vs. temperature, the following details are obtained: a) Glass Transformation Temperature (T_g) -- 11-12 Pa-sec. In many cases, these data are not precise depending on the type of dilatometer and heating rate, etc. b) Dilatometric Softening Point (T_d) -- 8-9 Pa-sec.

CONCLUSIONS

The significance of a 'Smart City' has already been described. The involvement of glass industry in terms of a specific, but significant, demand of flat-screen glass products for the purpose of display as well as for consumer items is also described. In

the present article, the glass science behind making such flat-screen glasses is elucidated to highlight on the importance of liquidus temperature and liquidus viscosity. This has been discussed for relevant temperature range, where both glass formation and glass fabrication are considered important.

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ON THE SPOT... Arun Kumar Dukkupati

Arun Kumar Dukkupati is Vice President of the All India Glass Manufacturers' Federation (AIGMF) and President of the Packaging Products Division of HSIL Ltd.

GW: In general, how healthy is the glass container sector in India?

Very significant capacity was added to the glass container segment in a short space of time, resulting in the recent overcapacity and a setback for the industry. In the next couple of years, the new capacities will start to be utilised and the industry will be in a better position, so prospects are still positive. These problems happen in many countries once in a while but we are confident that it is a passing phase.

GW: What position does AGI glaspac (a strategic business unit of HSIL Ltd) hold in the Indian glass industry?

With two state-of-the-art manufacturing facilities, AGI is one of the country's leading glass container manufacturers and the largest in south India. We employ approximately 2000 people and manufacture high quality glass containers to meet the stringent and demanding quality standards for the packaging needs of food, pharmaceuticals, soft drinks, spirits, beer, wine and other industries.

Our first plant in Hyderabad started in 1972 and following several phases of significant investment since 2000, is now a modern plant with a capacity of about 600 tonnes/day. A second plant about 45km away in Bhongir was opened in 2009 with a capacity of 500 tonnes/day and a new furnace was commissioned in 2013 with a capacity for a further 500 tonnes/day.

GW: What is your role with AGI glaspac?

I have been with the company since 1990, first as Vice President and then as President of the packaging product division. Glass packaging accounts for approximately 50% of our company's business. Within this division, other activities include businesses for PET containers and caps.



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



The AIGMF conference on 'Cost Effective Technology in Container Glass for Tomorrow', staged during GLASSPEX India 2015 was very interesting and beneficial according to Arun Kumar Dukkupati.

GW: Are any further major plant investments/upgrades planned?

Yes, we definitely plan to expand further. It could be another greenfield plant but no firm plans can be announced yet. We certainly want to continue to grow our overall business in the packaging product division.

GW: Where is AGI's core client base and how does the company differentiate its products from the competition?

Our product range covers flint, amber and green containers used in all market segments. Some 90% of customers are in India, with the

remainder of production exported to East Africa, Europe and South East Asia. Our domestic and international customers include well-known brands that are very vigorous in their selection criteria and only choose the best.

A core strength of AGI is rapid product development. We are renowned for producing new products in four-six weeks but sometimes, it can even be within two weeks! We also



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AGI glaspac www.agi-glaspac.com. The All India Glass Manufacturers' Federation www.aigmf.com

boast ISO quality management certification and comply with all social requirements. We are really customer-focused and our company motto is 'To take care of the customer'.

GW: How have technology partners contributed to the modernisation in Hyderabad and the new factory in Bhongir?

Critical equipment is supplied by technology manufacturers but for non-critical equipment, we tend to get the specifications and drawings from the original manufacturers and build the machines in India ourselves to help reduce costs and avoid importation. This approach has been very successful. We also have a philosophy to make 60% of moulds and accessories within our company, with Strada and Toyo Glass counted among the suppliers of the remainder.

All of our bottle making machines are state-of-the-art technology from Bucher Emhart Glass, from whom we also source quality control machines, along with IRIS Inspection machines, AGR and Heye International. Our furnaces are supplied by SORG, who we find very efficient and convenient to work with.

We are always very keen to import the latest advanced technologies. For example, other leading suppliers used include ZIPPE for batch plant, Teka for batch preparation, Sheppee for hot end handling, Zecchetti for cold end handling and Pennekamp and Antonini for lehrs.

GW: Is the company taking any specific measures to control energy, raw materials and other production costs?

Yes, energy efficiency is definitely a priority for us. For example, we work on different combinations of forehearth set-ups. Every year, we target a 4%-5% reduction and are usually very successful in achieving this.



Arun Kumar Dukkipati with AIGMF Secretary, Vinit Kapur (centre) at GLASSPEX India 2015.

GW: How does AGI glaspac co-operate with Wiegand Glas, one of the top four glass container manufacturers in Germany?

It's a formal co-operation on an ongoing basis that works very well. It involves sharing information on the best operating practices, narrow neck press and blow (NNPB) technology, mould management and machine maintenance and operation. Our employees visit Wiegand Glas to learn new technologies and we also invite their technicians to our factories. It's a very successful relationship that works both ways and will continue.

GW: What is your personal involvement with the AIGMF?

Having been involved with the AIGMF for over 10 years and an executive committee member for six years, I am currently Vice President. We have a responsibility to take care of the industry's best interests and a priority is to make representation where necessary to the Indian government and other governing bodies. We have recently been involved in influencing such matters as anti-dumping duty on soda ash and raw materials exports, for example.

An advantage of being Vice President is that I can have influence and help protect the glass industry.

GW: With Sanjay Ganjoo from Asahi Glass India serving as President, is it beneficial to the AIGMF to now have representation on the executive committee from both the flat and container glass sectors?



Arun Kumar Dukkipati with Glass Worldwide's Dave Fordham.

It's good that the AIGMF has increased flat glass representation because it's an important segment that was not previously covered comprehensively by the federation. The major flat glass players are now involved, giving more strength to the AIGMF as a body. Our activities in the glass container sector remain just as important but as a body, we should not focus on one segment alone; it is also possible to represent specialty glass, tableware and other segments of the Indian glass industry.

GW: How successful was the AIGMF conference on 'Cost Effective Technology in Container Glass for Tomorrow', staged during GLASSPEX India 2015 last March?

Including educational presentations from such leading players as EME, Fosbel, HORN, IRIS, Tiama and ZIPPE, the conference was very interesting and beneficial to an impressive number of delegates. The conference added extra value to GLASSPEX India, which was a very useful event for all those wishing to learn more about modern technology.

GW: Glass Worldwide is exclusive preferred international journal of the AIGMF. How does this benefit the Indian glass industry?

Glass Worldwide is the global industry's best magazine and is the most informative and useful for me and for my colleagues at AGI glaspac. Since the start of the relationship, the quality of *Kanch* magazine has further improved and the longer the co-operation between AIGMF and *Glass Worldwide*, the better! ■

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AGI glaspac www.agi-glaspac.com. The All India Glass Manufacturers' Federation www.aigmf.com

Personality Profile:

Dr. Manoj Choudhary



Dr. Manoj Choudhary assumed the Presidency of the International Commission on Glass (ICG) at the Annual Meeting of ICG held in Bangkok, Thailand during September 20-23, 2015.

ICG (www.icglass.org) is a non-profit international Society of national scientific and technical organizations with particular interests in glass science and technology. It was founded in 1933 and has grown to become the recognized world-wide organization in the field of glass with presently 37 member organizations bringing together the world's most respected universities, scientific institutions, companies of the glass industry and allied organizations. The aim of ICG is to promote and stimulate understanding and cooperation between glass experts in the fields of science and technology as well as art, history and education.

Dr. Choudhary is the first person of Indian origin and only the 5th American to hold the presidency of this 82-years old, prestigious global organization dedicated to glass science and technology.

Dr. Choudhary hails from Darbhanga, Bihar and was educated in Kolkata and

at IIT, Kharagpur prior to coming to US in 1974 as a graduate student. He received B. Tech. (Hons.) in Chemical Engineering from IIT, Kharagpur, M.S. in Chemical Engineering from SUNY Buffalo and Sc.D. in Materials Science and Engineering from Massachusetts Institute of Technology. The many awards he received during his educational years include Professor S. K. Nandi Gold Medal for being the best all-rounder Chemical Engineering Graduate, Institute Silver Medal for securing the first rank in Chemical Engineering (both while at IIT, Kharagpur) and Falih N. Darmara Award for excellence in academic performance, research, and extracurricular activities from the Department of Materials Science and Engineering at MIT.

Dr. Choudhary is a member of Senior Technical Staff at Owens Corning's Science & Technology Center in Granville, Ohio. His professional interests include development of innovative glass and polymer processes and products through the application of computational fluid dynamics (CFD), engineering fundamentals, physics, chemistry, and materials science. Dr. Choudhary's contributions have been at the core of some of the most significant process and product developments in Owens Corning during the past 30 years. He has received Owens Corning's highest technical achievement awards multiple times.

Dr. Choudhary is also a recipient of several awards and honors from outside of Owens Corning,

including the Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture Award from the National Institute of Ceramic Engineers, the Glass Service Modeling Award, and a Best Paper Award from the Glass Industry Committee of IEEE Industry Application Society. He is a Fellow of the British Society of Glass Technology, and a Fellow of the American Ceramic Society. He has presided over several professional organizations including the Industry-University Center for Glass Research at Alfred University, the Glass and Optical Materials Division of the American Ceramic Society, and the Glass Manufacturing Industry Council. He is a Specially-appointed Professor of China State Key Laboratory of Advanced Technology for Float Glass, and a registered Professional Engineer.

In his inaugural address, Dr. Choudhary outlined the following five key areas for ICG to focus on.

- Enhance engagement with membership
- Attract and retain younger colleagues
- Seek strategic roles for the Coordinating Technical Committee and the Technical Committees
- Extend ICG's global outreach through educational programs / trainings and professional alliances
- Explore additional financial resources in support of ICG's activities

As communicated by Dr. Choudhary

in his New Year's Greetings to ICG members, he and his fellow ICG officers have initiated action in these areas.

It may be of special interest to the readers of KANCH and the Indian glass community to note that in the recent years, ICG has made a very concerted effort to enhance its engagement with Asia. Some of the most visible aspects of ICG's recent focus on Asia are listed below:

- The 2011 ICG Annual Meeting was held in Shenzhen, China during March 31-April 2.
- ICG President Dr. Fabiano Nicoletti and Executive Secretary, Dr. Peter Simurka participated in the meeting of the Council of Materials Research Society of India, held in Bhopal on February 16, 2011.
- Professor Shou Peng, Chairman of China Triumph International Engineering Co., Ltd became ICG president in 2012.

- ICG held its Steering Committee Meeting at the Central Glass and Ceramic Research Institute, Kolkata in December 2013 in conjunction with the Asia-Pacific Meeting of Glass and Allied Industries.
- The 2015 Annual Meeting of the ICG was held in Bangkok, Thailand during September 20-23.
- The XXIV International Congress on Glass, the largest gathering of glass science and technology professionals will be held in Shanghai, China during April 7-11, 2016.
- The 2018 Annual Meeting of the ICG will be held in Japan.
- Iran has recently become a member of ICG.
- AIGMF, Borosil, Viglacera (Vietnam), PT Timur Makmur Abadi (Indonesia) and several Chinese glass companies are Associate Members of ICG.

Along with his ICG colleagues, Dr. Choudhary is committed to building

upon the already strong engagement of ICG with Asia in general and India in particular. He has visited CGCRI in 2013, 2014, and 2015 to encourage and enhance India's engagement with ICG. While ICG has demonstrated its continuing very strong commitment to Asian glass community, it is imperative that the Asian members of ICG also come forward with their suggestions and recommendations. ICG provides an excellent platform for serving the global glass community. But it is a volunteers' organization and it is absolutely critical for its members to engage ICG resources including its most valuable asset, namely, its Technical Committees. In case of India, he requests entities such as CGCRI, AIGMF, and Borosil to look beyond just being a member of ICG to enhance their presence in ICG through active participation in its program and through identifying opportunities to leverage ICG. He and his colleagues are hopeful that this will happen ■

FROM ARCHIVES



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

Dr. Manoj Chaudhary gave an overview of the ICG and US Glass Industry. He said that the first ICG Congress on Glass was held at Venice in September 1933; 200 participants from 8 countries participated and 42 papers were published. The ICG constitution was finalized at this event. The ICG has four objectives: (i) Cooperation/Participation (ii) Clearing house for technical and



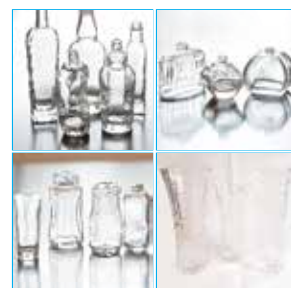
scientific works for future congresses (iii) Receipt/transmission of topics of international interest on physics, Chemistry and Technology of glass and finally, (iv) Assistance to those countries that still do not have glass related societies. He said that most of the work of the ICG was carried out by its Technical Committees (TCs), which are the "backbone" of international cooperation clusters. The TCs are organized into groups according to their R&D activity fields and include: Basics, Glass Production, Surfaces & Interfaces, New Applications and information, Communication, Education, History. He then presented details about the TCs.

Presentations given during the programme can be downloaded from <http://aigmf.com/past-events.php>



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From Niche to Mainstream: Photovoltaics make Inroads into Architecture

Abstract:

High costs, a lack of integration possibilities and interest on the part of architects – solar modules for building skin integration are still niche products. But this could soon change. Thanks to more efficient solar cells and new dimensions, shapes and transparency levels, modules are becoming cheaper and more versatile. This might make them a standard feature in new buildings.

Good news for the suppliers of solar modules that are suited for integration: more and more companies are managing to convince architects of the benefits of their products, said Judit Kimpian of the renowned Royal Institute of British Architects at this year's conference of the European Photovoltaic Technology Platform (EUPVTP) addressing the BIP theme

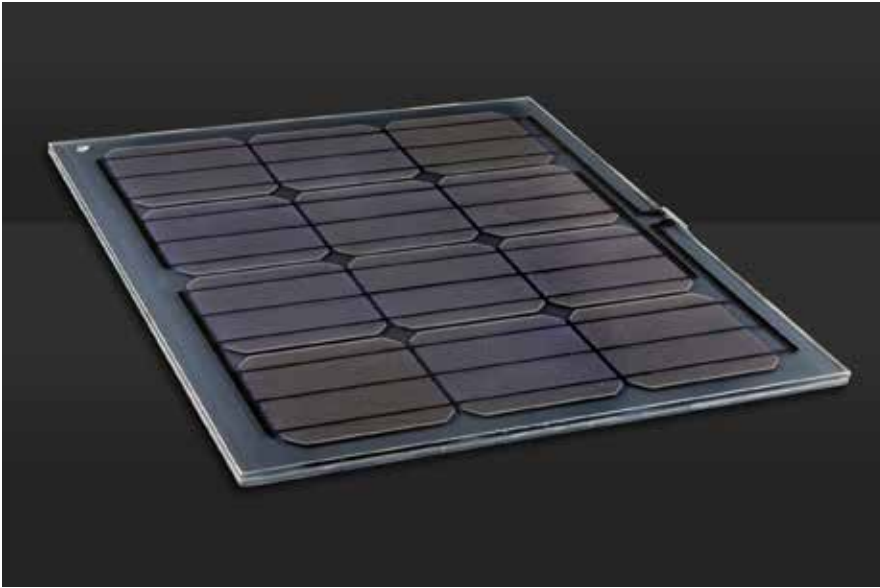
in London. She added that this development was particularly positive because buildings equipped with solar technology emitted less detrimental carbon dioxide and could therefore actively contribute to climate protection.

However, BIPV (Building-Integrated Photovoltaics) is still a niche application of negligible importance measured by

total PV installations worldwide. "It is a side line of the PV industry," explains Gaëtan Masson, Vice President of EUPVTP. Of the just under 40 Gigawatt solar power output newly installed in 2014 worldwide, only about one Gigawatt was accounted for by BIPV – this means the market share of BIPV is as low as 2.5%. One obstacle to market success are the



Showcase project: The main façade of “E+ Kita Marburg” consists of special solar modules in black laminated safety glass which perfectly blends in with the overall architectural look and feel. Photo: ertex solartechnik



Efficiency miracle: Mono-crystalline silicon solar cells are not only highly efficient but also very flexible in terms of colour. Photo: ertex solartechnik

relatively high costs: building laws and technical requirements vary widely from country to country and among regions. This is why modules are customised in relatively small lots locally for local architects, Masson explained. And this used to make the production of higher quantities and economies of scale difficult.

The BIPV industry would have to focus more on competitive market segments, he felt, in order to profit from economies of scale like conventional PV. “Then companies could start production of pre-fabricated BIPV elements.” The EUPVTP also feels that the political framework has to improve in order to help this industry take off. At present, however, countries are rather “back-peddalling” when it comes to state aid for solar installations. In France, for example, one of the few countries with special subsidies for BIPV, the additional support for in-roof systems is scheduled to end in late 2015.

BIPV would help countries to achieve the set climate protection targets more safely; after all, EU member states have undertaken to bring down greenhouse gas emissions by a

minimum of 20% against 1990 levels by 2020, to increase energy efficiency by 20% and to achieve a 20% share of renewable energies in total energy consumption. In this context buildings play a pivotal role: new buildings should require next to no energy for heating, hot water, air handling and conditioning from 2020 and cover the remaining energy needs themselves. BIPV would be the solution: wherever modules cannot be installed on the roof they could be integrated into the building skin.

Even though the circumstances for BIPV are difficult – on-going innovations raise hopes for an imminent breakthrough of this technology. Modules are becoming more efficient and available in ever more designs. Architects appreciate this newly gained scope for design. “We feel that business is picking up,” says Bernd Sprecher, General Manager of Manz CIGS Technology. This company develops production lines for thin-film modules based on copper, indium, gallium and selenium. Manz manufactures BIPV modules in various, freely selectable dimensions and shapes in the Southern German town of Schwäbisch Hall. Here a sheer,

photo-active CIGS layer is vapour-deposited on float glass – a process that by Sprecher’s accounts permits variable module sizes and custom shapes.

The pluses of thin-film technology include not just diversity but also improved efficiency. So far these panels were in low demand because they only converted light into electricity with an efficiency rate of 10%. This has now changed thanks to optimised manufacturing processes. Manz’ CIGS modules achieve nearly 15% efficiency and in the long run as much as 20% is possible, Sprecher explains. “Such values have already been achieved in the lab.” This means that thin-film technology achieves efficiency levels so far restricted to classic silicon modules.

For the time being, however, the classic option is still unrivalled in terms of efficiency rates – top modules from mono-crystalline silicon already achieve over 20%. This high degree of efficiency is also a key reason why BIPV specialist ertex solartechnik, a subsidiary of glass producer ertl glas from the Austrian town of Amstetten, predominantly uses silicon cells for its modules. In order to meet the architects’ high demands, ertex solartechnik has joined forces with specialists from the architecture, glass and PV industries to develop modules that are novel in terms of their looks. “Now architects and façade planners have a photovoltaic module at their disposal that fulfils the highest demands in terms of appealing looks and design freedom – like conventional façade elements – but forms a symbiosis with solar power generation,” explains Dieter Moor, Marketing and Sales Manager at ertex solartechnik.

According to Moor, the different options result from the possibility of patterning



Dual benefit: In railway stations BIPV panels are seen ever more often. They serve as sun screens while supplying clocks and display panels with power at the same time. Photo: ertex solartechnik

and colouring each layer of the module – from the front glass surface to the back sheet. In this way laminated safety front glass can be designed with various patterns and degrees of transparency, printed glass backs, coloured front glass and encapsulation films, patterned glass fronts, coloured and semi-transparent solar cells as well as coloured solder connectors. “This ensures solar cell structure is next to invisible,” Moor explains.

Architects used a child day-care centre complying with PlusEnergy house standards in the Hessian town of Marburg to demonstrate what is already feasible using state-of-the-art BIPV panels. In order to “envelop” the complex building with fitting modules, they took to triangular elements with high-performance mono-crystalline silicon cells made by ertex. The Austrian-made modules are also characterised by their uni-coloured appearance. To produce this effect the otherwise silver-coloured busbars and highly reflective solder connectors between the individual cells were printed black. As a result,

the surface is uniformly black and the elements do not look like highly efficient power generators.

Thanks to new semi-conductors architects can look forward to even more freedom to design with solar technology. Dresden-based company Heliatek and Belgian flat glass producer AGC Glass Europe are working on BIPV elements that incorporate organic photovoltaic films of different dimensions, colour graduations and levels of transparency in construction glass. Heliatek spokeswoman Kathleen Walter says that these films make elements easier to handle and also suitable for use in irregularly shaped façades. Furthermore, solar films in organic material promise to keep production costs low since there are sufficient amounts of tiny photoactive molecules (oligomers) available and can be precipitated onto the film using an efficient role-to-role process. This is far less labour-intensive than the production of crystalline silicon cells whose “blanks” – the wafers – must first be diced out of a solid block before being processed further into cells.

These solar “light-weights” obviously go down very well in the construction industry. “We are virtually flooded with enquiries for pilot projects. This technology definitely promises to trigger a boom,” remarks Walter.



Thin, lightweight and bendable: Solar films from organic semi-conductors are easy to manufacture and suited for nearly any application thanks to their product properties. Photo: Tim Deussen, Berlin



Major project: Transparent films can also be laminated between window panes. The result is tinted glass panes that provide shade and generate green electricity at the same time. Photo: AGC Glass Europe, Louvain-la-Neuve

But Heliatek has not solved all critical points in the process yet. Films from the pilot production currently achieve an efficiency rate of seven to eight percent. In the glass sector Heliatek has already realised a number of pilot installations and been capturing data since. A façade installation in Dresden achieved an additional yield of 23% over conventional silicon after just one year. In the joint-venture development with AGC the next step is product certification. Currently, all BIPV elements are undergoing final tests.

Now Heliatek is looking for investors for a large-scale production site with an output of one million square metres of solar film annually instead of the 50,000 square metres so far. There Heliatek also intends to manufacture wider webs of one metre or 1.20m. Today, the pilot line only produces webs that are 30 centimeters wide. "This would substantially reduce installation expenses," adds Walter, and the efficiency rate is also expected to go up. In lab tests Heliatek's oligomer cells already achieved 12% efficiency. The company now wants to transfer this value to large scale production.

Solar researchers have other cards

up their sleeve for BIPV: cells in perovskite. This mineral is just easy to process and just as economical as oligomers but comes with greater efficiency potential. American scientists proved almost 20% efficiency in lab tests and they produced a perovskite layer as thin as one millimeter by vapour-depositing organic molecules and lead crystals on glass. The cell produced as much electrical energy as the silicon-based cell that is 150-times thicker. If the industry succeeded in manufacturing perovskite cells for BIPV, the technical and commercial obstacles would be overcome.

This is why the EU is promoting the further development of this technology with an investment of some Euro 3 million as part its "Horizont 2020" programme. The concrete objective of Got Solar (as the research project was dubbed), which involves cell developer Dyesol as well as six European research institutes, is the development of a cell-sealing technology fit for industrial production. After all, perovskite suffers from the same restrictions as Heliatek's oligomers: it is extremely sensitive and must be protected especially well against outside influences. Dyesol

spokeswoman Eva Reuter explains: "It's all about increasing their stability." The company wants to start mass-producing perovskite cells in 2018. To this end a new factory with 600 megawatt annual capacity is planned in Turkey.

At **glasstec 2016**, the world's biggest and most international trade fair in the glass sector, companies coming to Düsseldorf from 20 to 23 September 2016 will be given the opportunity to exchange ideas about innovations and pave the way for new collaborations. Experts from the solar and glass industries will get together to network about progress made in solar glass and module manufacturing as well as in materials and costs. The Special Show "glass technology live" targets this interface between solar technology and glass. Here the latest developments in façade and energy will be presented, including innovations in PV and solar thermal systems. Interesting insights are also guaranteed by the international "architectural congress". Speakers from renowned architects' offices will present their visions with glass here and BIPV is also expected to play a crucial role in these visions ■

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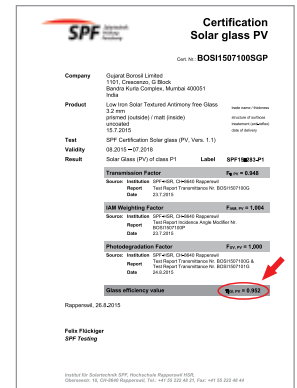


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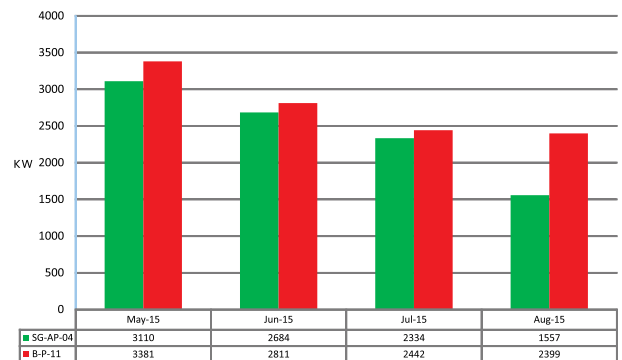
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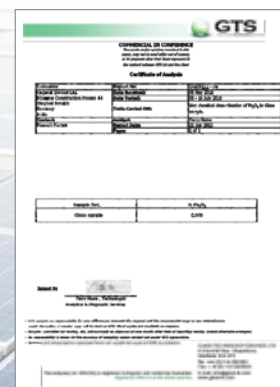


Laboratory results have been proved in actual field trials over several months. A cluster of 96 modules made with Alberino P from Saint Gobain (containing Antimony) and another cluster made with Antimony free glass, both clusters placed side by side on our rooftop R & D installation has yielded the results shown alongside. All the modules have been made by the same manufacturer, viz. Emmvee Photovoltaic Power Ltd, Bangalore, using exactly the same components except for the glass. The performance of this installation is automatically posted on-line, and the results are in the public domain:

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About The All India Glass Manufacturers' Federation

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

- Eastern India Glass Manufacturers' Association (EIGMA)-Kolkata
- Northern India Glass Manufacturers' Association (NIGMA)-Haryana
- South India Glass Manufacturers' Association (SIGMA)-Hyderabad
- Uttar Pradesh Glass Manufacturers' Syndicate (UPGMS)-Firozabad and
- Western India Glass Manufacturers' Association (WIGMA)-Mumbai

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

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

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

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

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



Membership of the Federation

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

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

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

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

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

ADMISSION FEE / ANNUAL SUBSCRIPTION

Ordinary Members:

- Admission fee ₹ 5000/-
- Annual subscription: Single Unit: ₹ 25,000 + Service Tax as applicable
- More than one Unit: ₹ 1,00,000 + Service Tax as applicable

Affiliate Members:

- Admission fee ₹ 5000/-
- Annual subscription: ₹ 10,000 + Service Tax as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of ₹ 45,000 (including admission fee) + Service Tax as applicable

Affiliate Members from countries other than India:

- Admission fee US \$ 200
- Annual subscription: US \$ 400 + Service Tax as applicable
- Applicants for enrollment for a period of five years may pay a consolidated amount of US \$ 1500 (including admission fee) + Service Tax as applicable ■

Rooftop Solar Power Generation by CPWD

Dr. K M Soni / Mrs. Usha Batra
CHIEF ENGINEER, WESTERN ZONE - I / ADDL DG, WESTERN REGION
CENTRAL PUBLIC WORKS DEPARTMENT, MUMBAI
dr.kmsoni@gmail.com / srarch2@yahoo.co.in

Abstract

Coal being the major source of electricity production in India is also responsible for emissions of greenhouse gases due to carbon dioxide and thus for climate change also. Renewable energy like solar and wind energy are thus the necessity to control emission of greenhouse gases and climate change.

Government of India has already started its mission to produce solar energy. Abiding with the directions of the government, CPWD has also started contributing in this endeavour by providing rooftop solar PV panels, which is discussed in the paper.

Electricity is the main source of energy required in almost all the processes nowadays thus green energy produced from renewable sources is being given priority by Government of India. Central Public Works Department (CPWD) has not only decided to install solar power on rooftops of new buildings but also on existing buildings, a brief of which is given in the paper.

INTRODUCTION

In India, the utility electricity sector has an installed capacity of 281.423 GW as of 30 November 2015 in which renewable power plants constitute 28% of total installed capacity and non-renewable power plants the remaining 72%. The gross electricity generated by utilities is 1,106 TWh (1,106,000 GWh) and 166 TWh by captive power plants during 2014–15. During the year 2014-15, per capita electricity generation in India was 1,010 kWh with total electricity consumption of both utilities and non utilities as 938.823 billion or 746 kWh

per capita electricity consumption. In order to address the shortage of adequate electricity, Government of India has launched a scheme called “Power for all”.

In India, installed capacity as on 31.03.2015 is 2,71,722 MW in which contribution of thermal power is 1,88,898 MW and of renewable 77,044 MW. Thermal power generated from coal accounts for 1,69,118 MW, from gas 23,062 MW and from diesel 1,200 MW. Hydel power accounts as a major constituent being 41,267 MW, nuclear 5,780 MW and other renewable sources as 35,777 MW. The breakup of other renewable sources is as micro/small hydro (4,055.36 MW), wind (23,444.00 MW), biomass power/ cogeneration (1,410.20 MW), bagasse cogeneration (3,008.35 MW), waste to power (115.08 MW) and solar power (3,743.97 MW). Thus the contribution of solar power generation in India is too low and needs to be increased in which glass is going to play a major role.



SOURCES OF ELECTRICITY IN INDIA INCLUDING RENEWABLE ENERGY

From Fig. 1, it may be observed that coal is the major source of generation of electricity which is used in thermal power plants. Thermal power plants also convert energy from other fuels such as natural gas, petroleum products, agricultural waste, domestic trash/waste, etc. into electricity. But

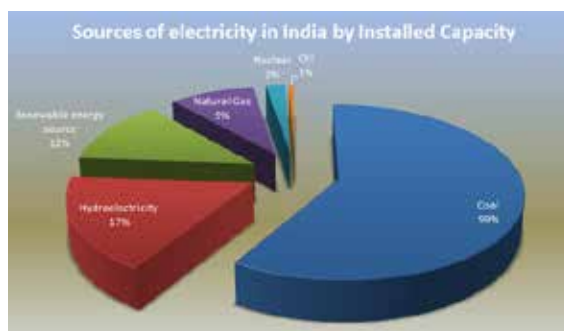


Fig. 1: Sources of electricity by installed capacity in India

the thermal power plant's potential emissions. Since issue of climate change is further being raised globally and reduction of carbon emissions has become a necessity, generation from coal thermal plants is going to be reduced gradually.

GW capacity launched but possible radiation due to leakage and availability of radioactive materials for running nuclear reactors also pose a problem. Therefore, non conventional or renewable sources are safer solutions to generate electricity. Renewable energy by installed capacity in India is shown in Fig. 2.

a large part of Indian coal is of low calorific value and of high ash content. Since the carbon content is low in coal, the natural fuel value of Indian coal is poor. As coal and lignite accounted for about 60% of India's total installed capacity, India's electricity sector consumes about 72% of the coal produced in the country. The high ash content in India's coal affects

Dams require large areas of submergence and relocation of habitats. They also generally destroy forests causing environmental problems hence are being opposed by the environmentalists and locals. India has the nuclear power also. In nuclear power sector, as per 2011 data, India had 18 pressurised heavy water reactors in operation, with another four projects of 2.8

Energy from renewable sources is green and thus world over green

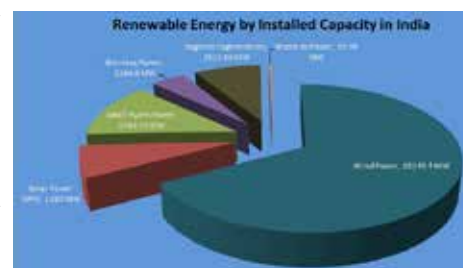


Fig. 2: Renewable energy by installed capacity in India

Table 1: Solar Power Installed by CPWD on Roofs of Existing Buildings as on 25.10.2015

S.No.	Name of the Building	Capacity in Kwp	Date of Completion of work	Date of Power Generation	Remarks
A. In Delhi					
1	Pushpa Bhawan, New Delhi	500	25.10.2015	31.10.2015	Work Completed and Plant Commissioned
2	Nirman Bhawan, New Delhi	200	23.10.2015	31.10.2015	Work completed
3	Shastri Bhawan, New Delhi	250	31.10.2015	07.11.2015	100 KWp Plant Commissioned
4	East Block, New Delhi	250	07.10.2015	15.10.2015	Work completed & power generation started
5	Sewa Bhawan, New Delhi	100	07.10.2015	15.10.2015	Work completed & power generation started
6	C.G.O. Complex, New Delhi	150	30.10.2015	07.11.2015	Work in progress almost 80% work completed
7	Transport Bhawan	100	15.12.2015	27.12.2015	Work yet to be started
B. Outside Delhi					
1	GPOA Complex, Shastri Bhavan, Chennai	100	17.01.2015	14.08.2015	Plant Commissioned and power generation started
2	GPOA, Rajaji Bhawan, Chennai	100	07.01.2015	25.09.2015	Plant Commissioned and power generation started
3	Boys and Girls Hostel in NIFT, Taranani, Chennai	22	09.01.2015	30.11.2015	Work in Progress
4	O/o Principal CCT, Income Tax Department, Chennai.	200	05.08.2015	31.12.2015	Work in Progress

energy is being given priority. In India, both wind and sun are available in abundance and if targeted properly, energy generated from such sources can solve the demand of the country and can contribute to the green development of the country. McKinsey claims that India's demand for electricity may cross 300 GW, earlier than most estimates due to four reasons as given in the following:

- India's manufacturing sector is likely to grow faster than in the past
- Domestic demand will increase more rapidly as the quality of life for more Indians improve
- About 125,000 villages are likely to get connected to India's electricity grid
- Blackouts and load shedding artificially suppresses demand; this demand will be sought as revenue potential by power distribution companies

A demand of 300 GW will require about 400 GW of installed capacity to account for plant availability, infrastructure maintenance, spinning reserve and losses. This gap if filled up from renewable sector will be a welcome step due to green energy in which glass is going to contribute most. Renewable energy sector in India is still in its infancy. India's electricity installed capacity in India is only 37815.88 MW as on 31st July 2015 hence there is a large scope of its expansion of solar power.

SOLAR POWER AND CPWD CONTRIBUTION

India is endowed with vast solar energy. The solar radiation of about 5,000 trillion kWh per year is incident over its land mass with average daily solar potential of 0.25 kWh per m² of used land area with the available commercially proven

technologies. As of 13 July 2015, the installed capacity is merely 4,097 MW. India expects to install an additional 10,000 MW by 2017 and a total of 100,000 MW by 2022. Thus the Government of India has now given a great emphasis on solar energy.

CPWD constructs and maintains central government buildings all over India. CPWD has decided to install

rooftop solar power particularly on flat surfaces having an area of 1500 sq.m. or more. In this direction, CPWD has already completed instalment and started electricity generation in many buildings in Delhi and even outside Delhi (Fig. 3 to 7). This has been done through MoUs signed by CPWD under power purchase agreements with RESCO (Renewable Energy Service Companies) companies and



Fig. 3: 500 KWp Grid Interactive Roof Top Solar Power Plant at Pushpa Bhawan New Delhi



Fig. 4: 250 KWp Grid Interactive Roof Top Solar Power Plant at East Block R.K. Puram, New Delhi



Fig. 5: 100 KWp Grid Interactive Roof Top Solar Power Plant at Sewa Bhawan, R.K.Puram, New Delhi



Fig. 6: Solar Rooftop Panels in Indira Paryavaran Bhawan, New Delhi installed during construction



Fig. 7: 110 kWp Solar Plant installed at General Pool Office Building at Chennai

under CAPEX (Capital Expenditure) model. Some of the buildings where such installations have been completed or are in progress are given in the Table I.

CONCLUSIONS

Solar power is available in India in abundance and is a green energy. This source is to be tapped on large scale. The Government of India has already given emphasis on production of solar energy in large scale both on new buildings and existing buildings on their rooftop. CPWD has already started implementing the policy and installed rooftop solar power on existing buildings though on new buildings such installation was being taken up earlier as the part of green energy concept.

It is expected that solar rooftop power system will be installed on all government buildings, both of central government and state governments which would become an inspiring step for private buildings also leading to green energy production. **Thus, glass is going to be environmental friendly material in producing such green energy.**

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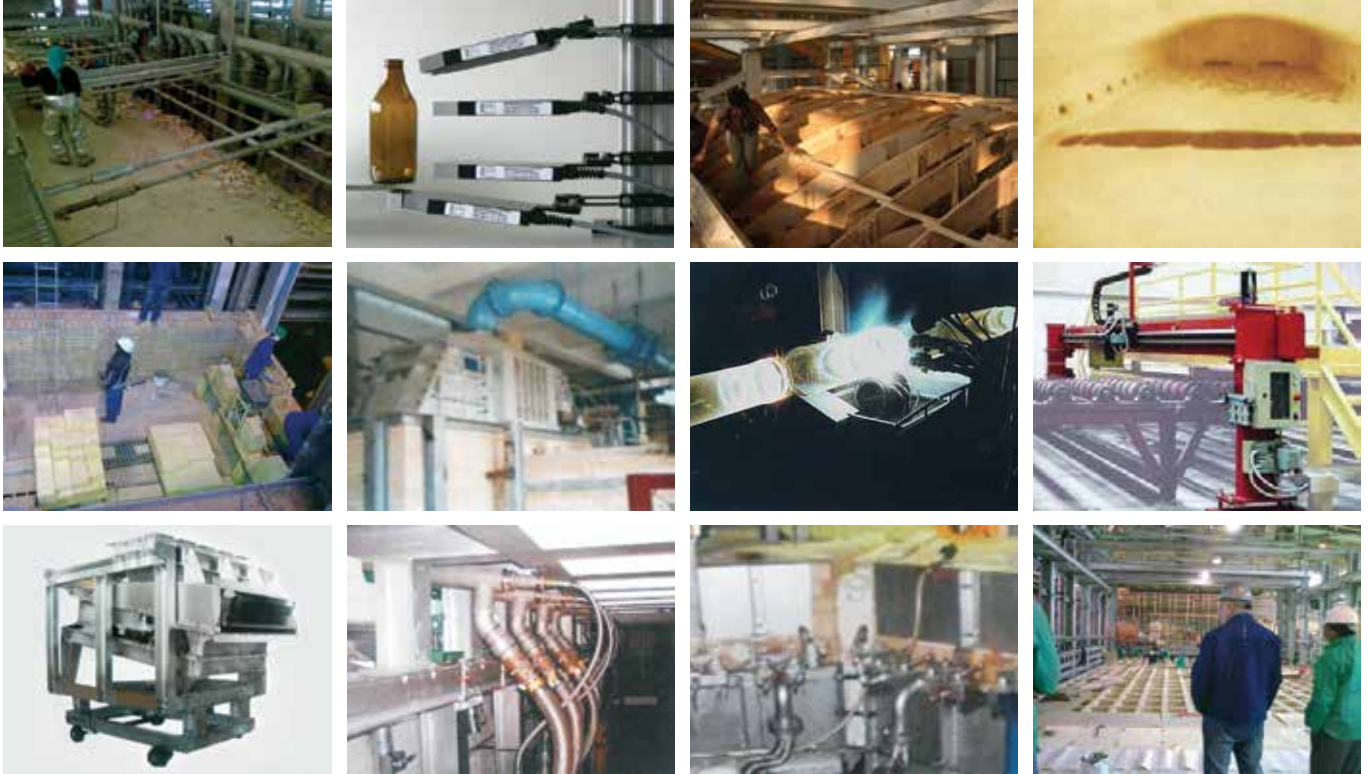
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Goods and Service Tax Law - The New Challenges and Strategies Ahead



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Mr. Paramjit Khanna is a practising Chartered Accountant and partner with M/s P N Khanna & Company, New Delhi for the last several decades. He did graduation in B.Com (Hons) from Shri Ram College of Commerce in 1976 and also acquired his LLB degree in 1982. Mr. Khanna has been a visiting faculty for teaching CA final students with ICAI, New Delhi and also takes lectures at workshops organized by CBSE, CAG and similar government departments. He is also empanelled with All India Radio and regular commentator on tax related issues from time to time.

INTRODUCTION

The passage of GST Law has seen many a sunrise and sunset through almost for a decade. The empowered committees appointed from time to time have tried to address several issues of jurisdictions, state harmony, constitutional status, revenue neutral rate and many other vexatious issues from time to time.

CONCEPT

“Goods and Service Tax (GST) is a comprehensive tax levy on manufacture, sale and consumption of goods and service at a national level under which no distinction is made between goods and services for levying of tax. It will mostly substitute all indirect taxes levied on goods and services by the Central and State governments in India.

GST is a tax on goods and services under which every person is liable to pay tax on his output and is entitled to get input tax credit (ITC) on the tax paid on its inputs (therefore **a tax on value addition only**) and ultimately the final consumer shall bear the tax”.

NEED FOR GST

One of the main objective of Goods and Service Tax (GST) would be to eliminate the doubly taxation i.e. cascading effects of taxes on production and distribution cost of goods and services. The exclusion of cascading effects i.e. tax on tax till the level of final consumers will significantly improve the competitiveness of original goods and services in market which leads to beneficial impact to the GDP growth of the country. Introduction of a GST to replace the existing multiple tax

structures of Centre and State taxes is not only desirable but imperative. Integration of various taxes into a GST system would make it possible to give full credit for inputs taxes collected. GST, being a destination-based consumption tax based on VAT principle.

CREATION OF NETWORK

Goods and services tax network (GSTN) is a section 25 (not for profit), non-government, private limited company. The company has been set up primarily to provide IT infrastructure and services to the Central and State government, tax payers and other stakeholders for implementation of the goods and services tax (GST).

GLOBAL GST RATES

France was the **first country** to

introduce **GST in 1954. Worldwide**, Almost 150 countries have introduced GST in one or the other form since now. Most of the countries have a unified GST system. Brazil and Canada follow a dual system vis-à-vis India is going to introduce. In China, GST applies only to goods and the provision of repairs, replacement and processing services. GST rates of some countries are given below:-

Country	Rate of GST
Australia	10%
France	19.6%
Canada	5%
Germany	19%
Japan	5%
Singapore	7%
New Zealand	15%

PROPOSED STRUCTURE FOR INDIA

The GST shall have **two components**: one levied by the Centre (referred to as Central GST or **CGST**), and the other levied by the States (referred to as State GST or **SGST**). **Rates** for Central GST and State GST would be **approved appropriately**, reflecting revenue considerations and acceptability.

The CGST and the SGST would be **applicable to all transactions of goods and services** made for a consideration **except** the exempted goods and services.

Cross utilization of ITC both in case of Inputs and capital goods between the CGST and the SGST would not be permitted except in the case of inter-State supply of goods and services (i.e. IGST)

The Centre and the States would have **concurrent jurisdiction** for the entire value chain and for all taxpayers on the basis of thresholds for goods and services prescribed for the States and the Centre.

DIFFERENTIAL TREATMENT

It is proposed that a dual rate structure could be adopted –a lower rate of necessary items and items of basic essential nature and a standard rate for goods in general. In this connection the Arvind Subramanian committee has suggested the standard rate of GST at 17-18% in its recent report. This is well above the global average rate of 16.4% for similar taxes.

IMPACT OF GST AND EXISTING RATES COMPARED

Certain calculations have been made out for all the tax payers and shown under Annexure A for ready reference to demonstrate the impact of GST.

RATIONALISATION OF EXISTING RATES

Indirect taxes that will be included under GST:

State taxes which will be subsumed in SGST

- VAT/Sales Tax
- Entertainment Tax (unless it is levied by local bodies)
- Luxury Tax
- Taxes on lottery, betting and gambling
- State cess and surcharges to the extent related to supply of goods and services
- Entry tax not on in lieu of octroi

Central Taxes which will be subsumed in CGST

- Central Excise Duty
- Additional Excise Duty
- The Excise Duty levied under the medical and Toiletries Preparation Act
- Service Tax
- Additional Customs Duty, commonly known as countervailing Duty (CVD)

- Special Additional duty of customs (SAD)
- Education Cess
- Surcharges

Taxes that may or may not be subsumed due to no consensus between the Central and State Governments and various other reasons:

- Stamp Duty
- Vehicle Tax
- Electricity Duty
- Other Entry taxes and Octroi
- Entertainment Tax (levied by local bodies)
- Basic customs duty and safeguard duties on import of goods into India

BENEFITS OF GST TAX REGIME

- **Reduces transaction costs and unnecessary wastages:** A **single registration and a single compliance** will suffice for both SGST and CGST provided government produces effective IT infrastructure and integration of states level with the union.
- **Eliminates the multiplicity of taxation:** The reduction in the number of taxation applicable in a chain of transaction will help to reduce the paper work and clean up the current mess that is brought by existing indirect taxation laws.
- **One Point Single Tax:** They would be focus on business rather than worrying about their taxation that may crop at later stages. This will help the business community to decide their supply chain, pricing modalities and in the long run helps the consumers being goods competitive as price will no longer be the function of

tax components but function of sheer business intelligence and innovation.

- **Reduces average tax burdens:-** The cost of tax that consumers have to bear will be certain and it is expected that GST would reduce the average tax burdens on the consumers.
- **Reduces the corruption:-**As the no. of taxes reduces so does the **no of visits to multiple department reduces** and hence the reduction in corruption.
- **In all cases except a few products and states, there would be uniformity of tax rates across the states.**

STRATEGY FOR GLASS INDUSTRY

It would be imperative to understand that the input tax credit available for all the raw material inputs would be strategised to reduce manufacturing cost of glass industry.

The challenges of the industry could arise due to the following factors:

- Segment wise tax rates could be different
- State wise taxes not subsumed into the GST rate
- Differential pricing in case of imports if applicable

CONCLUSION

The anticipated benefits and opportunities can be derived from a flaw less GST model in developing economic environment enjoying a unified legislative mandate across the country. The introduction of the GST tax regime is a healthy step in this direction ■

ANNEXURE- A IMPACT OF GST DEMONSTRATED

Comparison between Multiple Indirect tax laws and proposed one law		
Particulars	Without GST	With GST
	(Rs.)	
Manufacture to Wholesaler		
Cost of Production	5,000.00	5,000.00
Add: Profit Margin	2,000.00	2,000.00
Manufacturer Price	7,000.00	7,000.00
%Add: Excise Duty @ 12	840.00	–
Total Value(a)	7,840.00	7,000.00
%Add: VAT @ 12.5	980.00	–
%Add: CGST @ 12	–	840.00
%Add: SGST @ 12	–	840.00
Invoice Value	8,820.00	8,680.00
Wholesaler to Retailer		
COG to Wholesaler(a)	7,840.00	7,000.00
%Add: Profit Margin@10	784.00	700.00
Total Value(b)	8,624.00	7,700.00
%Add: VAT @ 12.5	1,078.00	–
%Add: CGST @ 12	–	924.00
%Add: SGST @ 12	–	924.00
Invoice Value	9,702.00	9,548.00
Retailer to Consumer:		
COG to Retailer (b)	8,624.00	7,700.00
Add: Profit Margin	862.40	770.00
Total Value(c)	9,486.40	8,470.00
%Add: VAT @ 12.5	1,185.80	–
%Add: CGST @ 12	–	1,016.40
%Add: SGST @ 12	–	1,016.40
Total Price to the Final consumer	10,672.20	10,502.80
Cost saving to consumer	–	169.40
% Cost Saving	–	1.59

Notes: Input tax credit available to wholesaler is Rs.980 and Rs. 1,680 in case of without GST and with GST respectively.



Mr. M.D. Farooq
(Founder)

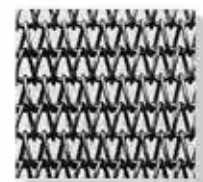
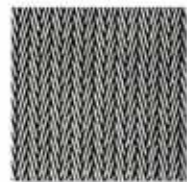
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Mr. M.D. Farooq, the founder of Umda Engineering, brings to the table more than 35 years of expertise in the manufacturing industry. Starting from humble beginnings, today more than 350 of Mr. Farooq's Lehr machines are successfully installed around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

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

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समाचार

सीपीडब्ल्यूडी द्वारा चेन्नई में सौर विद्युत संयंत्र की स्थापना

केंद्रीय लोक निर्माण विभाग (सीपीडब्ल्यूडी) ने चेन्नई के शास्त्री भवन में 100 कि. वॉट पीक ग्रिड अंतः क्रियात्मक रूफटॉप सौर विद्युत संयंत्र कमिशन किया है। एक आधिकारिक विज्ञप्ति में कहा गया है कि 100 कि. वॉट पीक सौर संयंत्र से प्रति वर्ष 1.45 लाख यूनिट बिजली उत्पन्न होने



की आशा है और इसमें शास्त्री भवन में स्थित सीपीडब्ल्यूडी के सभी इकाई कार्यालयों की बिजली की जरूरत पूरी की जाएगी। इस संयंत्र की पेबैक अवधि लगभग पांच वर्ष है और संयंत्र की अपेक्षित जीवन अवधि लगभग 25-30 वर्ष है। यह संयंत्र 200 कि. मी. प्रति घण्टा की गति से पवन गति सहन करने के लिए डिजाइन किया गया है। इससे सौर विद्युत उत्पादन के आगे विस्तार की गुंजाइश है। शास्त्री भवन में स्थित अन्य कार्यालयों के लाभ हेतु, छत के उपलब्ध स्थान को शास्त्री भवन के शेष कार्यालयों के लाभ के लिए सौर विद्युत उत्पादन में इस्तेमाल किया जाएगा।

दिल्ली सचिवालय को रोशन करने के लिए सौर ऊर्जा

दिल्ली सचिवालय देश का ऐसा पहला कार्यालय होगा जिसे सौर तथा अक्षय ऊर्जा द्वारा बिजली प्रदान की जाएगी। दिल्ली सरकार ने कहा कि यह नवीन और नवीकरणीय ऊर्जा मंत्रालय के सहयोग से इंद्रप्रस्थ विद्युत संयंत्र में 3 मेगावॉट भूमि पर स्थित सौर विद्युत संयंत्र स्थापित करेगा। एक अधिकारी ने यह बताया कि “सौर विद्युत संयंत्र अगले 25 वर्षों तक दिल्ली सचिवालय को प्रत्यक्ष रूप से बिजली की आपूर्ति करेगा और यह राज्य सचिवालय देश का ऐसा पहला कार्यालय है जो पूरी तरह अक्षय ऊर्जा तथा हरित ऊर्जा पर चलाया जाएगा। यह पूरी तरह पर्यावरण अनुकूल हरित भवन होगा और स्थल पर कार्य आरंभ किया जा चुका है।

सोलर सिटी द्वारा दुनिया का सर्वाधिक दक्ष रूफटॉप सौर पैनल

सोलर सिटी ने 22 प्रतिशत से अधिक मॉड्यूल दक्षता के साथ दुनिया के सर्वाधिक दक्ष रूफटॉप सोलर पैनल का निर्माण किया है। इस नए सौर सिटी पैनल से प्रति वर्ग फुट अधिक विद्युत उत्पन्न होती है और इससे अन्य किसी रूफटॉप पैनल की तुलना में प्रतिवर्ष उत्पादन अधिक होता है और यह पश्चिमी गोलाद्ध में निर्मित सबसे अधिक संख्या में सोलर पैनल होंगे। सोलर सिटी जल्दी ही कम मात्रा में अपने पहले मॉड्यूल का उत्पादन शुरू करेगा, जो इसकी 100 मेगावॉट की प्रायोगिक सुविधा में बनाए जाएंगे, किंतु अधिकांश नए सोलर पैनल

सोलर सिटी की 1 गीगावॉट सुविधा में निर्मित किए जाएंगे जो बफैलो, न्यूयॉर्क में स्थित है। सोलर सिटी से बफैलो स्थित कारखाने की पूर्ण क्षमता पहुँचने पर प्रतिदिन 9,000-10,000 सोलर पैनल के बीच उत्पादन होने की आशा है, जिनकी क्षमता समान होगी।

सोलर सिटी के पैनल रिन्यूएबल एनर्जी टेस्ट सेंटर द्वारा 22.04 प्रतिशत मॉड्यूल स्तर की दक्षता के साथ मापे गए, जो प्रकाश वोल्टीय और अक्षय ऊर्जा उत्पादों के लिए तृतीय पक्ष प्रमाणन परीक्षा प्रदाता है। सोलर सिटी के नए पैनल एक विशेष प्रक्रिया द्वारा बनाए गए, जिसमें विनिर्माण लागत सापेक्ष रूप से अन्य उच्च दक्षता तकनीकों से काफी कम हो जाती है और सोलर पैनल की मानक दक्षता तथा आकार समान होता है, किंतु इससे 30-40 प्रतिशत अधिक बिजली का उत्पादन होता है। सोलर सिटी के पैनल उच्च तापमान पर अन्य मॉड्यूलों की तुलना में बेहतर निष्पादन करते हैं जिससे तुलनात्मक आकार के सोलर पैनल के साथ वार्षिक आधार पर अधिक ऊर्जा का उत्पादन होता है ■

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



Small series success in India and Oman

With manufacturing facilities in India and Oman, Pragati Glass provides a valuable service for the small series production of glass containers, especially for international customers in the perfumery, cosmetics and food sectors. Over the past two decades, this majority family-owned business has raised its standards and methods of production to bring its products to international levels.

Pragati Glass PVT Ltd was established in 1982 and became a central part of the Gupta family business a decade later. Subsequently, Dinesh Kumar Gupta, Managing Director, has emerged as a figurehead for the organisation and plays a motivational role for the workforce. He takes a keen interest in the day-to-day running of the company and in developing business plans for its long-term future.

The original manufacturing operation is located at Kossmba, near Surat, some 300km north west of Mumbai. Under the guidance of experienced Works Director, Rajesh Shah and Ashish Mittal, this factory now houses two melting furnaces (80 and 90 tonnes/day capacity) to make clear glass bottles in a wide range of capacities from 10ml and 1.5 litres. A diversity of production equipment is employed to make this extensive portfolio on 10 production lines, featuring a combination of



Pragati Glass operates facilities north west of Mumbai and in Oman.

single, double and triple gob IS machines, as well as semi-automatic GE equipment.

Dedicated primarily to the needs of customers in the international perfumery and cosmetics industry, the factory

also houses a specialist decoration facility, featuring an automated acid etching capability, one and two colour screen and pad printing machines and a coating unit with the capacity to process up to 100,000 bottles every day. "Essentially, these services help to make Pragati Glass a one-stop-shop for buyers of perfume and cosmetics packaging" explains Pragati Glass Gulf LLC Marketing Manager, Ashish Gupta, who is responsible for export initiatives from the sister Oman operation. "So if a customer is looking for bottles, decoration services, caps, pumps or mono cartons, we have everything in-house to make a product from scratch."

Furthermore, the glassworks can accommodate the needs of large and small customers alike, with the flexibility to undertake production runs as small as 5000 pieces and in millions. "Our minimum order quantity is our strength."

Counted among the factory's local clients are Hertz Perfumes,



Glass bottles are produced in a wide range of capacities from 10ml and 1.5 litres.

Freedom Frangance, Camlin Kyuoko, Bajaj Corp, Emami Ltd, Midas Care, MCNROE products and Maja Healthcare, while export customers include Swiss Perfumes, Sterling Perfumes, EPW, Lab Prady and Royal Sanders UK.

The Indian glass factory is considered very environmentally-friendly, with emissions measured regularly and in accordance with government regulations. In addition, a water treatment plant is installed at the site.

Melting and annealing technology has been sourced from China's Chongqing Life Furnace Co, while specialist ware handling equipment was purchased from SJ Machinery China. Process control systems were acquired from Shandong Jiafeng Co Ltd and decorative printing machinery came from Shenfa.

According to Ashish Gupta, the current unavailability of consistent fuel supplies represents one of the Indian glassmaker's greatest challenges, the plant's gas supplies having been cut off in recent times.



There are six production lines at Nizwa in the Sultanate of Oman.

OMAN FACILITY

Established at Nizwa in the Sultanate of Oman in 2009, Pragati Gulf Glass LLC has been created to take advantage of the company's proven ability in India to satisfy small

run orders effectively, in this instance from local and international customers in the food and beverage sectors, as well as perfumes. The factory is 75%-owned by the Indian shareholders of Pragati Glass and 25%-owned by Managing Director, Nitin Chaudhary. Manufacturing capacity at the site comprises 135 tonnes/day from a single furnace and six production lines. In the future, it is planned to increase the site's melting capacity to 180 tonnes/day.

Key customers include Sterling Perfumes, Gulf Processing Industries, MVP group International USA, London Distillers Kenya and Riyadh Food industries.

The vision of Pragati Glass Group Managing Director, Dinesh Gupta, the Oman operation has been created to complement the group's existing glassmaking business in India, specialising in short run orders. The latest computerised manufacturing technology is employed to make a diverse range of products, employing a combination of 6- and 8-section single and double gob IS machines, automated inspection and palletising equipment.

Since production in Oman was started in 2010, the factory has gradually developed a strong customer base, offering more than 500 designs to customers in Europe, Africa, North America and the Gulf region. Now the parent Pragati Glass Group is considering the next phase of expansion opportunities. This includes a joint venture project in India to make aluminium mono block cans for the perfumes and pharmaceutical sectors and the possibility of building a glass packaging plant to serve the emerging African market. ■



Pragati Glass provides a valuable service for the small series production of glass containers.

FURTHER INFORMATION:

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IGBC's Green Building Congress 2015



participated in Green Building Congress 2015 as one of the Supporting Associations

(Nov 19-21, 2015)



Indian Green Building Council (IGBC), part of CII and The Gujarat Institute of Housing & Estate Developers (GIHED) pledged to promote Green Buildings in Gujarat at the inaugural session of the 13th Edition of IGBC International Green Building Conference & Exhibition in Gandhinagar, Gujarat.

Addressing at the inaugural session on November 19, **Mr. Punamchand Parmar, IAS**, Principal Secretary, Forest & Environment Department, Government of Gujarat, said that, with rapid urbanization, there is increased stress on resources. We should be more sensitive to our fellow citizens and work together to create designs that in a way contribute towards creating a Green City. Green is about improving the quality of life”, he underlined.

Ms. D Thara, IAS, Municipal Commissioner, Ahmedabad Municipal Corporation said “Ahmedabad is one of the few cities that abide by a master plan. The city has opted for more vertical and very little horizontal space. AMC is working towards

having a sustainable & efficient power and water management system without compromising on city’s growth. The implementation of proper plan-

ning leads to the development of a smart green city, she added.

Mr. Hari Sankaran, Vice Chairman & MD, IL&FS, highlighted that a





Green city has to a Smart City. The need of the hour is to focus on various aspects of green and in the process address ecological issues & concerns, he added.

of the event are available at <http://www.aigmf.com/past-events.php>

In his keynote speech, **Dr. Prem C Jain**, Chairman, IGBC underlined that “IGBC envisions to facilitate 10 Billion



Green Cities will offer new employment opportunities and enable employees appreciate the value of finite resources, he said. He added that GIFT City will create about 80,000 direct employment opportunities and similar number of indirect employment opportunities.

Mr. Sourabh Kankar, Member, Architectural Glass Panel (AGP) / AIGMF and Manager- Architectural, Gujarat Guardian Ltd., gave a presentation on Principles of Glass Selection for Facades at the IGBC Conference.

Presentation and select photographs

sq.ft. of registered green building footprint by the year 2022. Green Building Movement has achieved significant milestone. With 3400 projects, amounting to registered green building footprint of over 3.14 Billion sq.ft, today, India is the second country in the world with largest registered green building footprint, he highlighted. “We have 19 local chapters to

promote Green Building concepts all over India”, he informed.

Mr. Sameer Sinha, Chairman, IGBC Ahmedabad Chapter, underlined Green Building Congress Conference is one of the key initiative of IGBC to promote sustainable best practice and infrastructure development in the country and in the process facilitate India emerge as one of the global leaders in green buildings.”

“The State of Gujarat, with over 60 million sq.ft. of green building footprint is doing well in the Green Building movement and in days to come will witness more green buildings and green cities. IGBC Ahmedabad Chapter will work closely with the stakeholders in taking forward the green building movement in the State, he added”.

Mr. Jayesh Hariyani, Co-Chair, IGBC Ahmedabad Chapter, said that IGBC would work closely with all the stakeholders in facilitating India emerge as one of the global leaders in green buildings.

Green Building Congress 2015 provided a knowledge sharing platform about optimal utilization of smart building strategies to encourage reduced environmental impact, ensuring occupant satisfaction, and driving better business outcome and maximize asset value.

The event was also marked by inaugural of international exhibition, where over 100 innovative & futuristic



Green technologies were displayed.

3rd day of International Green Building Congress 2015 focused on the need and importance of inspiring and encouraging young minds to go the green way. Awards were presented to school & architectural students from different parts of the country for showcasing their green & futuristic innovations.

IGBC in its efforts to reach young minds would work closely with the stakeholders in facilitating 1,000 green schools by 2017 under IGBC green schools rating system. Green Schools not only saves energy & water but will also sensitise children to be environmentally responsible and become sensitive to Planet Earth.

Dr. K U Mistry, Chairman, Gujarat Pollution Control Board (GPCB) highlighted that; Government of Gujarat will extend all the support to the promotion of green buildings. GPCB office in Gandhinagar runs on 100% solar power and is IGBC gold rated green building, he added.

Dr Mistry also called on the need to focus more on safety aspects of the buildings and also on the welfare of the construction workforce. Safety and health aspects should also be considered when designing green buildings, he added.

Dr. Prem C Jain, Chairman, IGBC said, "As we grow as a nation, one of our primary objectives is to protect our Mother Earth and also ensure affordable & green housing for the cross section of the society and in the process make the Green Building movement all-inclusive. In days to come, whatever India builds will be a Green building, he highlighted.

Mr. Sameer Sinha, Chairman, IGBC – Ahmedabad Chapter highlighted that as a result of concerted efforts, IGBC could create demand for green buildings. In days to come, the demand for green buildings will be manifold. This indeed is a step in the right direction, he added.

While thanking all the stakeholders for the successful conclusion of Green

Building Congress 2015, Mr. Sinha underlined that various Departments of the Government have extended excellent support & cooperation and thanked them. He also appreciated the active role played by the student community in the event.

The three-day International Conference on Green Building & Built Environment by IGBC saw active participation of various national and international stakeholders including – policy makers, green building developers, academicians, consultants, engineers and designers. The sessions helped in creating greater awareness about green buildings and their advantages and its positive impact on the environment.

It also was an opportunity to understand from other countries about their approach to sustainable living through green building and also to strategize on collaborating for further development of green buildings ■

SOMANY CONFERENCE HALL

at **AIGMF** office

"Somany Conference Hall" can accommodate 18-20 people.

Hall is equipped with 43" Smart Wi-Fi TV, Computer work station and other basic facilities.

AIGMF members can avail Hall for business meetings (at no charge) which could be planned between 10 am to 5 pm, Monday to Friday and 10 am to 2 pm on Saturdays.

Booking is however subject to its availability on a working day.

Request for booking may be sent at info@aigmf.com

INDIAPACK 2015

(October 8-11, 2015)

The 6th International Packaging Exhibition was organised by The Indian Institute of Packaging (IIP) from October 8-11, 2015 at Bombay Exhibition Centre, Mumbai.

HIGHLIGHTS

301 Leading Exhibitors	25 Countries Represented	16,597 Footfalls	11,000 Gross Exhibition Area	1200 Congress Delegates and Invitees
Countries represented	Australia, Austria, Bahrain, Canada, China, Egypt, Finland, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, Poland, Saudi Arabia, Singapore, Switzerland, Taiwan, Thailand, The Netherlands, UK, USA, Vietnam			

The INDIAPACK 2015 was inaugurated by Mr. Rajani Ranjan Rashmi, IAS, Additional Secretary, Ministry of Commerce and Industry on October 8 with the traditional lighting of the lamp. The other dignitaries present were Mr. Thomas Schneider, President, World Packaging Organisation; Ms. Ariana Susanti, President, Asian Packaging Federation along with other WPO board members; Prof. (Dr.) N.C. Saha, Director, Indian Institute of Packaging; Mr. R.V.S. Ramakrishna, Chairman Indian Institute of Packaging; Mr. Subodh Gupta, Chairman – Exhibition Committee, INDIAPACK 2015 and Mr. I.P. Wadhwa, Managing Worker, TAFCON Group.



In his opening remarks, Mr. Rashmi said that the quality of packaging is one of the focal areas of concern for the Ministry. He mentioned that there are several schemes and incentives

available for the packaging industry for which he invited industry members to come forward to avail such schemes.

He said that nothing can succeed in the international markets unless the





brainstorm, showcase and forge meaningful partnership for business.

Concurrently with the INDIAPACK, the World Packaging Congress with theme “Packaging Strategies for Global Competitiveness”, was organised by IIP, where global experts from the Packaging and Allied sectors deliberated and shared their expertise for the benefit of Indian Packaging Industry.

Ms. Harsimrat Kaur Badal, Hon. Minister of Food Processing Industries, Government of India,

quality is protected.

INDIAPACK provided an excellent opportunity for the manufactures of Packaging and Allied Industries to showcase their technologies, new initiatives, products and services to the global audience.

It served as a platform for Entrepreneurs, Decision Makers, Senior Government Officials, Investors, Industry Members, Traders, Equipment Buyers & Suppliers, Academia, Engineers and Trade Delegations to congregate,



inaugurated the World Packaging Congress 2015.

She was joined by Professor MM Sharma, Emeritus Prof. of Eminence Institute of Chemical Technology; Mr. Rajani Ranjan Rashmi, Additional Secretary, Ministry of Commerce & Industry, Govt. of India; Mr. Ramakrishna, Chairman, Indian Institute of Packaging; Mr. Thomas Schneider, WPO President, at the inauguration ceremony.





Mr. K K Sharma, Plant Head, Neemrana (Rajasthan), HNG & Inds. Ltd., gave a presentation on “Glass: Delivering Packaging Solutions to the World” at the Congress.

Presentation and select photographs of the event are available at <http://www.aimf.com/past-events.php> ■

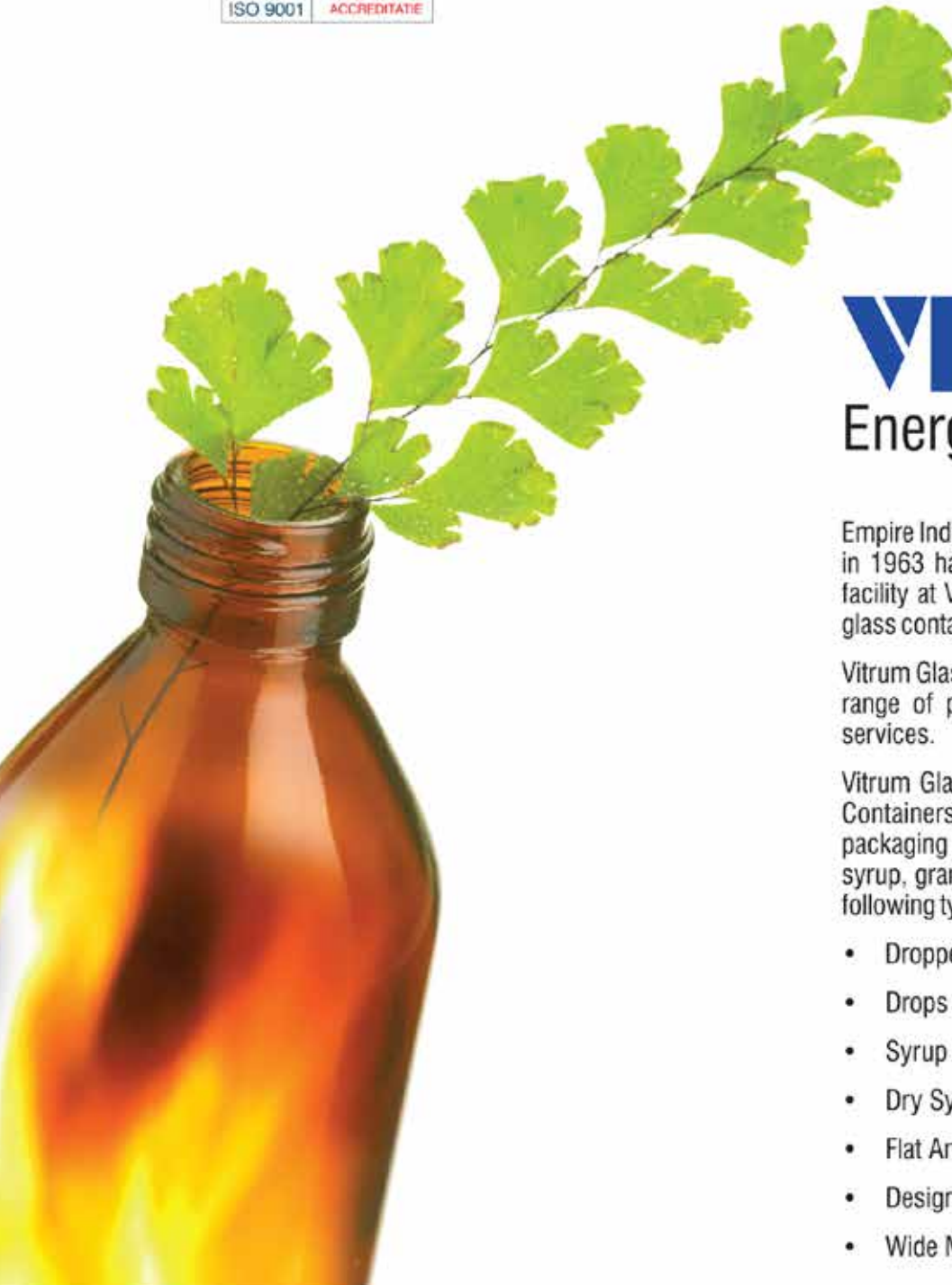


As a Supporting Association, participated in the 6th edition of International Packaging Exhibition held on Oct 8-11, 2015 at Bombay Exhibition Centre, Mumbai.





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(An ISO 9001-2008 company)



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Vitrum Glass is widely acclaimed for its extensive range of products, superior finish & excellent services.

Vitrum Glass's extensive range of Amber Glass Containers (10ml to 550ml) provides the packaging media for liquid/oral suspensions, dry syrup, granules, Capsules, Tablets & consists of following types

- Dropper Series Glass Bottles
- Drops Glass Bottles from 10ml - 30ml
- Syrup Bottles from 60ml - 550ml
- Dry Syrup with mark bottles
- Flat Amber Glass Bottles
- Designer Glass Bottles
- Wide Mouth Glass Bottles

Empire Industries Ltd. - VITRUM GLASS

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E-mail: vitmktg@vitrum-glass.com, sgupta@vitrum-glass.com

Website: www.vitrum-glass.com

Company Profile:

Nirmal Glasstech Industries

Nirmal Glasstech Industries (NGI) was founded in 1978 to manufacture I.S. Machine variable Equipment and Spare parts

NGI is recognized as a specialist in I.S. Machine, Various Mechanisms Variable Equipments, Spare parts and special purpose Gauges manufacturer.

NGI Components are used by Glass Container Industry and I.S. Machine Suppliers throughout India and worldwide.

Today, Company has an excellent track record for supplies of its vast range of standard and special Various I.S. Machine Mechanisms, their Spare Parts, Variable Equipments, Mould Checking Gauges and Special Purpose Gauges.

Over 1550 different parts are manufactured in house including the main components of Various I.S. Machine Mechanisms.

NGI Products are supplied world over and exports contribution is 80% of the sales Turnover.

NGI employs more than 200 workforce which comprises of technical workmen, skilled workers, production personnel, senior team leaders, commercial/



financial staff, personnel management and contract labour.

The Company has been recognized as the manufacturer and supplier

of Customs Designed products. It has committed and dedicated team of qualified Engineers, technical Supervisors and designing Personnels and Workmen.

Award Presented By
Hon'ble Chief Minister of Rajasthan
Shri Ashok Gehlot

- 1st AWARD | Excellent Unit For Manufacturing of Glass Industry Components
- 2nd AWARD | Highest Export In Last 3 Years In Engineering Industries
- 3rd AWARD | Young Entrepreneur Championship Award presented by Hon'ble Governor of Rajasthan Mrs Margaret Alva
- 4th AWARD | Highest Exports Award for the year 2012-13 Awarded by EEPC India
- 5th AWARD | Best Assessee Unit Award for the Year 2013-14 by Central Board of Excise and Customs.

MAIN PRODUCT DETAILS

NGI manufacture:

Variable Equipment & Various Mechanism and their Spare parts suitable for S.G., D.G., T.G. and Q.G. in 2 1/8" Ctr. T.G. & Q.G., 3" Ctr., 84 mm Ctr., 85 mm Ctr. & 4 1/4" Ctr. T.G. and 4 1/4" Ctr., 5" Ctr. 5 1/2" Ctr. & 6 1/4" Ctr. D.G. I.S. Machine.

Mould Holders & Mould Holder Inserts
Mounting Parts Suitable for Assay of Mould Holders with the M.H. Inserts
Neck Ring Arms
Baffle Arm available in Std./Hinged Back Up/Quick Change/Easy Mounting Type
Blow Head Arm in Std./ Hinged Back Up /Quick Change/Easy Mounting Type With Features of Finish / Internal Cooling
Funnel Arm in Std./ Hinged Back Up /Quick Change/Easy Mounting Type
Take Out Arm - Gear Driven / Timing Belt Driven Type / Gear Driven with Bearing Fitted
Tong Head - Pneumatic Std. type / Quick Change Type with Anti-wing Cartridge
90 Degree Pushers
Spare Parts Suitable for all type of above Variable Equipments likewise: Lock Rings, Bushings, T Lock & Knob, Pins, Bolts, etc.
Plunger Positioners for NNPB & Press and Blow Mechanism
Quick Change Cartridge for Blow & Blow Plunger Mechanism
Piston & Rods Suitable for Plunger, Baffle, Blow Head and Funnel Mechanism
Link Pins, Connecting Links, Lever, Spline Shaft and Link Arm Bushing
Various Mechanism Assay. Parts
Printing / Decorating (ACL) Machine Spare Parts
On Line Inspection Machine Spare Parts
General Plant Maintenance Items
Furnace Spare Parts
Gullet Scraper Parts
Anti Back Lash Neck Ring Mechanism

Mould Checking Gauges:

- Flush Pin Gauge for Blank and Blow Mould
- Plug Gauge suitable for Blank and Blow Mould
- Taper Profile Gauge for Neck Ring and Bottom Plate
- Snap Gauge for Neck Ring and Bottom Plate

Bottle Quality Checking Gauges:

















- Total Bottle Height Checking Gauges
- Major Body Diameter Checking Gauges
- Bottle Vertically checking Gauges
- Neck Finish Checking Combination / L,T,N & F Gauges suitable for CC and Thread Neck Finish

- Fill Point Checking Gauges
- Body Profile Checking Gauges, etc

Any other as per the Customer Requirement can be designed

Inspection / Checking Fixtures

- Mould Holder inspection Fixtures

			<p>LATEST</p> <p>Quick Change/Easy Mounting</p> <p>Blow Head Arm </p> <hr/> <p>Baffle Arm </p> <hr/> <p>Funnel Arm </p>
			
			
			
			<p>UPCOMING</p> <p>Moulds Manufacturing Unit with Highly Advanced CNC Machines & Foundry </p>

NGI is the approved Gauge Manufacturer in India for PepsiCo and Coca Cola India and are supplying complete Quality Checking Gauges to all Bottling Plants and to their Bottle Suppliers.

- Mould Holder Inserts Inspection Fixtures
- Neck Ring Arm Inspection Fixtures
- Baffle, Blow Head Arm and Funnel Arm Inspection Fixtures
- Plunger Alignment Fixtures

Can be developed any type of Fixtures as per Customer's Requirement

Anti Back Lash Neck Ring Mechanism

- Running successfully NGI's Anti Back Lash type Neck Ring Mech. with world's best I.S. Machines manufactures such as: **EMHART Glass, Maul Technology, Bottero, BDF, Owens Brockway, Heye Glass**
- Sold More than 598 Units

within last 4 Years

- Sold To More Than 17 Countries Excluding India

Design Features

- The all new Anti Back lash Neck Ring Mechanism
- Uses Six Hardened and Precise Ground Rods Instead of OD Splines

NGI can Design and develop any Mechanical Parts as per customer specification and need.



Mr. Nirmal Mundra, Director, Nirmal Group receiving award from Rajasthan Industry Minister, Mr. Gajender Singh



Mr. Nirmal Mundra (2nd from right), Director, Nirmal Group interacting with AIGMF office bearers in the recently held Executive Committee Meeting at Jaipur. Nirmal Glasstech Industries, hosted the Ex Com Meeting on Dec 19th, arranged site visits to select glass façade buildings and dinner reception in honour of visiting delegates.

- These Allows Perfect Alignment of Neckring Arm Halves
- After 4 Years of Continuous Operations, Prototype versions of These Mechanisms Show Virtually no Signs of Wear.

Design Benefits

- Direct Replacement of Conventional Neck Ring

Mechanism

- Elimination of Backlash, Associated with Conventional Spline Type Mechanism
- Using 02 Halves Types Gears for Faster Changing During Maintenance
- Prevent of Air Leakages
- Working on Less Air Pressures
- Low & Easy Maintenance

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Nirmal Glasstech Industries

Largest Manufacturer & Exporters in India

Note: This profile is based on company information as provided by Nirmal Glasstech Industries to the AIGMF

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GLASS News



International Conference & Exhibition on 'Sustainable Habitat & Smart Cities' at Jaipur

Committed to hold programs focusing glass use and promoting regulations to ensure safe use of glass, Confederation of Construction Products and Services (CCPS) availed the opportunity to participate whole heartedly in the MUNICIPALIKA co-located with CAPEX, 13th International Conference & Exhibition on 'Sustainable Habitat & Smart Cities' on December 9-11, 2015 at Jaipur. The event was supported by host State Rajasthan, Ministries of Urban Development, Communication and Information Technologies, New and Renewable Energy, Urban stakeholder Organizations and Institutions. CCPS was one of the Institutional partners of this big event.

The 3-day event was inaugurated by Ms. Vasundhara Raje, Hon'ble Chief Minister, Govt. of Rajasthan. Mr. Rajpal Singh Shekhawat, Minister of

Urban Development and Housing GoR; HH Nadir Patel, Canada's High Commissioner to India; Ms. M Teresa Kho, Country Director, Asian Development Bank; Mr. Yuri Afanasiev, Resident Coordinator, United Nations Development Programme; Mr. Choo Whatt Bin, Executive Director of Building & Construction Authority of Singapore; Mr. Alain Grimard, country's representative of UN

Habitat in India and many dignitaries and officials graced the Inaugural Session.

Mr. V Suresh, advisor to the Good Governance India Foundation and former CMD of HUDCO reported that over 1600 delegates participated which included over 150 Mayors & Chairpersons, Secretaries from 24 states, 40 Municipal Commissioners, over 500 Municipal Counselors from Rajasthan, large number of exhibitors, manufacturers, professionals, and delegates from 300 cities and delegates from seven countries. Experience and case studies were shared by foreign delegates and variety of issues

from vibrant cities, technological regime for acceptance of new products and approval systems, healthy cities integrated water management and Swachh Bharat Mission 2019 and integrated solid waste management, sanitation for all by 2019 were discussed. Smart Cities and AMRUT (Atal Mission of Rejuvenation and Urban Transformation) cities would be developed with holistic approach to bring in smart elements, materials and service delivery for the city development.

Glass is anticipated as one of the popular materials to be abundantly used during development of Smart Cities. Focusing on this issue, seven papers on (i) Human Safety aspects on use of glass in buildings by Mr. Shashi Kant, CCPS (ii) What are the types of Safety Glass for Modern architectural buildings by Mr. Nishikant Sharma, Eastman Chemical India (iii) Smart Glass Facades with Advanced Interlayers for Laminated Glass by Mr. Malvinder S Roprai, Kuraray India,



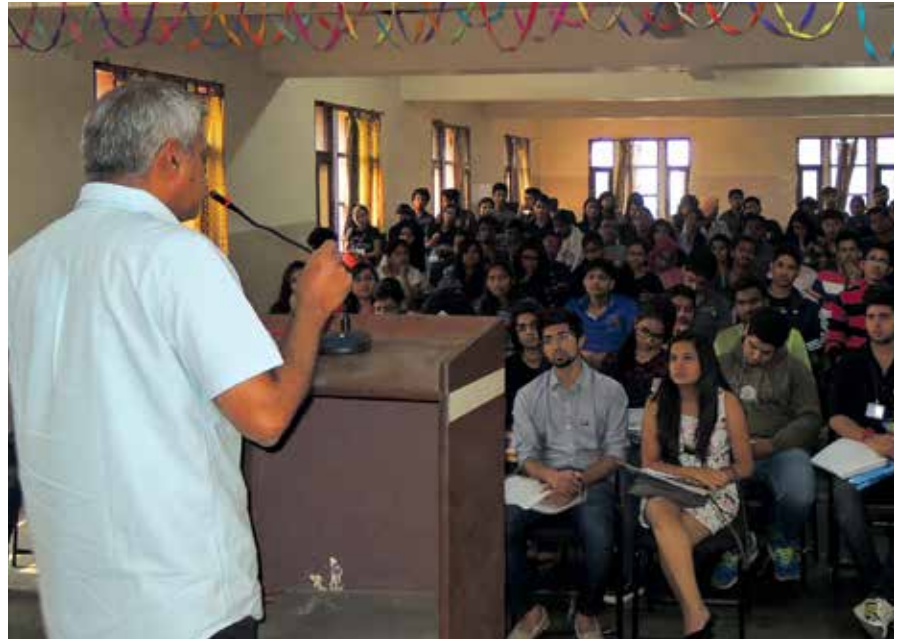
(iv) Standards and Acceptance of New and Emerging Building Materials by Ar. Deepak Gahlowt, CCPS, (v) Managing Noise in the Modern Architectural Buildings with Glass by Mr. Vishaw B Sud, Eastman Chemical India, (vi) Glass for Energy Efficient Windows for Modern Homes by Mr. Jaskirat Singh, Saint Gobain India Glass and (vii) Architectural Hardware by Mr. Arun Aherwal, LGF SYSMAC were presented during Technical Sessions of CAPEX segment along with other topics by reputed Speakers.

Mr. Deepak Gahlowt and Mr. Shashi Kant successfully conducted two Technical Sessions as Chairman and Co-chairman on 9th December 2015 in CAPEX.

ARCHOTSAV 2015

Confederation of Construction Products and Services (CCPS) supported and participated in ARCHOTSAV 2015 organized from Oct. 30 – Nov. 1, 2015 at Sunderdeep Group of Institutions, Dasna, Ghaziabad. A full day "DAY LIGHT & GLASS WORKSHOP" was organized which was attended by more than 150 architectural students from various colleges. As a whole ARCHOTSAV could be termed as good initiative to expose students with the latest know how and technologies. More than 2500 students and faculty members from Architectural colleges and Institutions from various colleges spread across the country attended the ARCHOTSAV. During the workshop on October 31, 2015 lectures on following topics were delivered by CCPS members:

- i. Use of Glass in Buildings Basics of Day Light, Architecture & Form by Ar. Deepak Gahlowt, Convener, CCPS
- ii. Role of Glass in Architecture



& Design by Ms. Suchi Verma, Design Engineer, Saint Gobain India-Glass Business

- iii. Glass Selection Factors by Mr. Vivek Dubey, Director, Gold Plus Group
- iv. Shattering Myths & Establishing Facts for Glass by Mr. Sanjay Mantri, Zonal Head (N & E), Asahi India Glass Ltd.,
- v. Laminated Glass by Mr. Malvinder S Rooprai, Consulting Specialist, Kuraray India Pvt. Ltd.
- vi. Role of Silicone Sealants in Structural Glazing & Fire Seals by

Mr. Himanshu Jain, Regional Sales Manager, Dow Corning India Pvt. Ltd.

- vii. Conclusion Remarks and Summary of the workshop by Mr. Shashi Kant, Adviser, CCPS and former Dy. Adviser, Planning Commission

AGI glaspac gets 'Excellence in All Round Performance' award

AGI glaspac (an SBU of HSIL Ltd.) was presented with "Excellence in All Round Performance" Award by the Federation of Telangana and Andhra



Pradesh Chambers of Commerce and Industry (FTAPCCI) on Nov 14, 2015 in Hyderabad.

The Award (*Rolling Cup & Citation*) was given by Mr. M. Venkaiah Naidu, Hon'ble Minister for Urban Development Housing & Urban Poverty Alleviation and Parliamentary Affairs.

The Minister has presented the annual awards to 20 different businesses, industries and individuals in various categories.

SCHOTT to Produce More Pharmaceutical Glass

In response to growing global demand, the SCHOTT Group is expanding its production capacity for pharmaceutical glass. The company plans to put a new melting tank for its Type I glass named FIOLAX® clear into operation at its site in Mitterteich, Germany. From 2015 to 2016, SCHOTT will be investing a sum in the mid-double-digit millions in the expansion. This move will increase the company's production capacity for glass tubing to more than 140,000 tons.

FIOLAX® glass tubing is used to manufacture high-quality vials, syringes, ampoules and cartridges. The pharmaceutical industry then fills these with injectable drugs. The needs of the pharmaceutical companies for such high-quality packaging are rising steadily because of an ever-increasing regulatory pressure and more stringent standards for patient safety. FIOLAX® is designed to meet these exact requirements. Thanks to its special properties and its chemical resistance the drugs are kept stored in the best possible way. Since it was first developed more than 100 years ago, FIOLAX® has grown to become the de-facto standard for glass packaging

in the pharmaceutical industry.

Construction work on the new tank has already begun and will be completed in spring 2016. Moreover, a new palletizing line will complement the extension.

"Given the growing size of India's pharma market and the significance of quality packaging for life saving drugs, we need to keep up with the extraordinary demand of the market. Thus, we welcome the introduction of the new melting tank at our Germany site to further ensure timely and efficient supply of the most important base material- world market leading SCHOTT FIOLAX® tubes," said Vice President- Sales and Marketing, SCHOTT Glass India Pvt. Ltd., Mr. Sundeep Prabhu.

European Container Glass Industry Welcomes Long Awaited Circular Economy Package

The European Container Glass industry welcomes the long awaited European Commission's package, which paves the way for a real EU Circular Economy. The new recycling targets for glass packaging are ambitious but the industry is ready to take on the challenge with the right support in a level-playing field for all materials.

Glass holds a special place in the EU Circular Economy. It is a permanent material that is 100% and endlessly recycled without any degradation of its intrinsic properties, as long as it is separately collected and treated. According to the latest statistics, 73% of all post-consumer glass packaging in the EU is collected for recycling.

"Our industry is engaged in a real circular business model! We endlessly recycle glass bottles to produce new ones since 40 years, and by

doing so we reduce environmental impacts, we create jobs, we reduce costs and grow our businesses. It is encouraging that the closed loop now becomes the model for the whole EU economy" comments Vitaliano Torno – President of FEVE, the European Container Glass Federation. "The proposed recycling targets for glass packaging are challenging especially for those countries where a lot still needs to be done; more investment will be needed to develop glass recycling infrastructures."

Closed loop production systems must be at the heart of the future EU circular economy. A strong partnership between the manufacturing industry and other important partners of the value chain such as national and local authorities, waste processors, EPR schemes and consumers, will be essential to ensure a successful transition. Public and private investments should be channeled to reduce waste, improve separate collection systems (i.e. bottle banks for glass) and foster research into the use of technology as well as behavioral science to engage the end-consumer.

"As there is almost 30% of glass that is not yet collected in the EU, our goal is to get this precious resource back in the bottle-to-bottle loop. With the help of national and EU authorities, collectors and processors, our ambition is to increase the quantities of good quality glass collected so that we can make our production system even more environment friendly" Adds Vitaliano Torno.

The European Container Glass industry looks forward to an open debate with policy makers on how to best achieve ambitious recycling targets and guarantee that the EU economy becomes more circular and more competitive.

Heye Robot combines enhanced productivity and operator safety

An important breakthrough in the automatic swabbing of glass container forming equipment is among the latest innovations from Heye International GmbH. Successful trials of the Heye Swabbing Robot have been conducted at a high speed, high performance plant in the Netherlands, where the equipment is now in permanent operation, making NNPB ware.



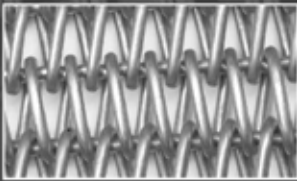
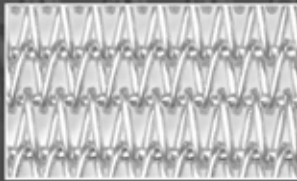
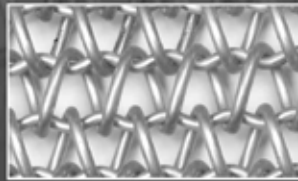
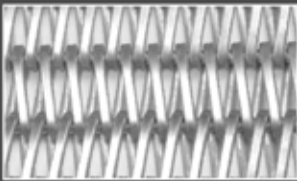
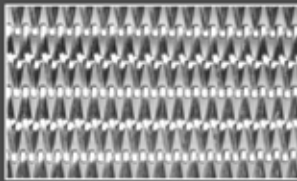
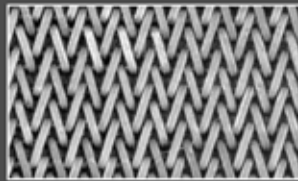
Benefits observed by the customer include zero rejects from swabbing, the avoidance of section stops, a 75% saving on lubrication and improved operator safety. Stable and repeatable volume, thickness and location of swabbing agent in the process have been realised, with more time for operators to focus on production optimisation and defect correction.

Two versions of the swabbing robot are installed at the same site, emphasising Heye’s continuing focus on the realisation of further improvements. The latest version features a cycle time of just one second. In addition, the zero station is smaller at 1150mm, more parking positions have been provided and a smaller safety cage has been created.

The Swabbing Robot is the latest in a series of equipment developments from Heye International, aimed at optimising the glass container production process. In combination with the company’s Multilevel Safety Concept, the SpeedLine IS-Machine offers different options to increase work safety, as well as providing higher product quality ■

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

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