



PLASTINDIA FOUNDATION®

INSIGHTS

Plastics Industry in Focus

- ▶ The Lifelines of "Make in India!"
- ▶ Pond Lining With Plastic Films
- ▶ India's First Full City "24x7" Water Supply
- ▶ Petrochemical and Polymer Industry in 2015

*Announcing the new 'Avatar' of
Plastindia's quarterly journal*

INSIGHTS

Plastics Industry in Focus

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Effective from 1st January 2016

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K K Seksaria

President - Plastindia Foundation

From The President's Desk

Dear Friends,

On behalf of Plastindia Foundation, I would like to wish you, your family and your Associates a very Happy, Healthy and Prosperous New Year 2016. May the New Year 2016 prove to be a Road to Success and Everlasting Prosperity to you all. On the New Year's note, a new beginning has taken place through this publication, which I would like to share with great pleasure. As the Chairperson of the Publication Committee, Mrs. Kavita Shah has decided to revamp the entire layout as well as the format of the in-house journal after lengthy deliberations amongst the Committee members. As we say – Change is the Necessity of Life for its betterment, this rationale has been applied to this issue to make it simple, elegant and more importantly, giving greater focus and relevant information to the reader from time to time on the happenings covering cross section of the Plastics & Polymer Industry. Apart from changes in the format of the publication, a major decision has been taken to solicit advertisements from our industry brethren with a view to benefit both the advertiser as well as the interested reader. I trust that this new Avatar as “INSIGHTS – Plastics Industry in Focus” of the Plastindia journal will definitely catch the attention of the readers.

Now, I would like to highlight some important activities carried out by the Foundation's Committees during the last quarter of 2015.

The activities pertaining to Empowerment Committee under the Chairmanship of Shri Arvind Mehta for setting up Plastindia International University (PIU) at GIDC Dunga, Vapi, are going full steam ahead. The reconstituted Empowerment Committee has taken several major steps. These are preparation and approval of Project Report for PIU from the Managing Committee of the Foundation, Coordination with Government of Gujarat for the application for granting PIU deemed university status and taking a step forward to closer collaboration with the University of Massachusetts, Lowell, USA etc. Further, in order to propagate the PIU to the Industry, the PIU team has participated in PLEXPOINDIA 2016 Exhibition held at Gandhinagar, Gujarat and at Polyindia 2016 Exhibition at Mumbai by having a separate stall for PIU alongside the stall of Plastindia Foundation. The responses from the industry during these exhibitions have been encouraging.

Regarding the activities of Plasticulture Committee, Dr. Y. B. Vasudeo, Chairman, in consultation with OPPI, has proposed to organize Kisaan Raja exhibition in Aurangabad in the month of October, 2016.

The website of the Foundation is also undergoing major changes to make it user-friendly with enhanced features. It is becoming more vibrant by constantly updating the news/events etc.

Under the Chairmanship of Shri Rajeev Chitalia, the NEC has commenced promotional work for Plastindia 2018 at selective fora, domestic and overseas to attract maximum exhibitors and business visitors.

During PLEXPOINDIA 2016 - 7th International Plastics Exhibition organized by the Gujarat State Plastics Manufacturers Association at the Exhibition Centre, Gandhinagar, Gujarat held between 7th to 11th January, 2016, the PIF Office Bearers, Managing Committee Members and the Chairmen of the Plastindia Foundation's Committees had fruitful interactions with the Members of various Plastics Industry Associations regarding the future growth of Indian Plastics Industry and the role of Plastindia Foundation to achieve the desired objectives. The inputs received from these discussions have been very useful.

In the month of January, 2016, I had the privilege of attending two important Conferences organized by FICCI held on the subject of “Plastics in Packaging - The Sustainable Choice” in Delhi on 19th January, 2016 and the “Indian Plastics Industry – Challenges & Opportunities” at the Poly India 2016 – 3rd National Conference on Polymers & Plastics on 29th January, 2016 in Mumbai. During the course of interactions at the Conferences, it gave me immense pleasure in exchanging views on the Indian Plastics Industry and Plastindia Foundation's activities, which elicited good response from the participants by their valuable feedback.

I also had the privilege of attending the 25th Asia Plastics Forum Council Meetings held on 20th and 21st January, 2016 in Dhaka, Bangladesh. On behalf of Plastindia Foundation, I made a presentation on the subject of Facing Challenges for Mounting Plastics Waste in Asia – Ideas & Strategies for United Participation by All Stakeholders with reference to India on 21st January, 2016. These forum meetings were very important from the perspective of the Plastics Industry because of the fruitful interactions with the members of other APF nations on the problem of plastics waste.

I am sure that this revamped edition of our magazine will prove to be both elegant and informative to the readers. We need your continued valuable support by way of your feedback / suggestions to improve the Plastindia Foundation's magazine in order to serve the Plastics Industry better.

Warm regards,

K. K. Seksaria

President - Plastindia Foundation

PLASTINDIA 2018

UNFOLDING BILLION OPPORTUNITIES

10th International Plastics Exhibition, Conference & Convention

Feb. 7-12, 2018, Gandhinagar - Ahmedabad, Gujarat.

It is our pleasure to communicate to our readers through "Insights". We plan to give regular updates on PLASTINDIA 2018 through this magazine. We are concentrating on further strengthening the globally recognized PLASTINDIA brand. In the last quarter, Plastindia 2018 was widely promoted at several industry based events:

- Plastics & Rubber Indonesia 2015 in Jakarta
- Indplas 2015 in Kolkata
- Plexpointindia 2016 in Gandhinagar, Gujarat.
- International Plastics Fair 2016, Dhaka
- Polyindia 2016, Mumbai
- Plast Pack 2016 Expo, Indore, Madhya Pradesh

In addition to this, we are identifying various options of promotion of Plastindia 2018 in CHINAPLAS 2016, to be held from 25th to 28th April 2016 in Shanghai, China and K Show 2016 from 19th to 26th October 2016 in Dusseldorf, Germany.

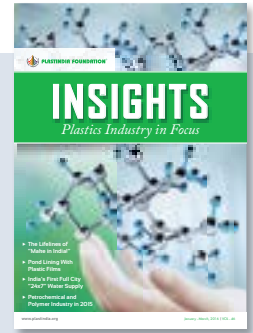
We are also working on our Brand Manual to set standards and parameters that need to be complied with in all our promotional activities to ensure correct usage of brand elements across all media for creating a strong impact.

Apart from this, we are tapping the potential of Digital Marketing to promote the brand and create visibility. We are keen to represent our brand on the blooming social media platforms to reach out to the masses that are directly or indirectly linked to the plastics industry.

We have started revamping our website using latest technology to create an unparalleled user experience. The PLASTINDIA website will act as a perfect platform for information sharing, education and event registrations. This is a Green initiative as we intend to reduce paper usage and encourage the use of digital media.

We are totally geared to meticulously design the exhibition layout in a very systematic and organized way. Also, we pride ourselves on the journey that we have traversed so far and are determined to go the extra mile to make PLASTINDIA 2018 a humongous success.

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Contributions represent the opinions of the authors and are not necessarily the official view of this Magazine or Plastindia Foundation

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From The Editor's Desk

I am delighted to announce a new 'avatar' of Plastindia's quarterly Inhouse Journal, that has been titled **INSIGHTS- Plastics Industry in Focus**. Creating a brand for the publication of India's apex body for the plastics industry was being considered for some time. With the support of the new team of office bearers headed by Foundation President K K Seksaria, as well as Rajiv Raval and Raju Desai, it was easy to make this happen. Built essentially with the efforts of a 5 person publication committee and PIF staff, we are proud of the result. This magazine will be in Print as well as online version.

Special Introductory Advertising Tariffs have been unveiled in this issue of INSIGHTS. We trust that the global plastics fraternity will take advantage of these rates to have a presence in a magazine with over 10000 printed copies distributed to decision makers across the globe.

The features that will be part of every issue of INSIGHTS include Make in India Corner, Investment Opportunity Report, Academia Corner, Industry Happenings, Industry Exhibitions & Conferences.

In this issue of INSIGHTS, we focus on water management.

The Lifelines of "Make in India!" delves on how we all depend upon functional, reliable and safe infrastructure system for safe drinking water delivery, and adequate waste water sanitation. Plastics pipes have proved to be much better even against those traditional material pipes whose first cost is lower than that of plastic pipes.

India's First Full City "24x7" Water Supply explores how the NMC recently implemented a revolutionary programme to improve the city's water supply with a focus on safety, equity, and reliability

Pond Lining With Plastic Films shows how to avoid depletion of stored water, pond sealing is necessary

Plastic Intensive Precision Farming System unveils the process for the intensified use of Plastics in Agriculture through precision farming system to achieve targeted goal of rural prosperity and social empowerment.

Investment corner reports on how Natural fibre based PVC composites show better properties than wood and are also recyclable and environment friendly.

Make in India reveals how Making Brush Machinery in India is a step towards Swacch Bharat.

Prediction of economic growth was lowered for 2015 and forecast for 2016 has also been cut. The world enters 2016 with concerns about the commodity price volatility, inflation in the U.S., reforms in China and the rate of rise by Federal Reserve.

I hope you all enjoy reading this magazine as much as we enjoyed compiling it.

Ms. Kavita Shah

Chairperson- Publication Committee

Plastindia Foundation

PLASTICS IS DURABLE

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RECYCLE IT

Every single day, plastics help business and customer to do more with less in countless ways. And plastic packing is a clear and shining example. From healthy foods to medicines and medical suppliers, lightweight, durable. Plastics help deliver more products safely with less material. And that means fewer trucks on the road and reduced emissions. It also means less packaging, food and medical waste.

And that's something we all can feel good about.



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Plastic Pipes - The Lifelines of "Make in India!"

Most of ancient civilization grew up beside river banks, hence it is also known as River Bank Civilization. As man started settling down and increased his social life, it was necessary to divert water from natural main course to his habitats. Construction of qanats, slightly sloping tunnels driven into hillsides that contained groundwater, probably originated in ancient Persia about 700 BC. The use of qanats became widespread throughout the region, and some are still in existence.



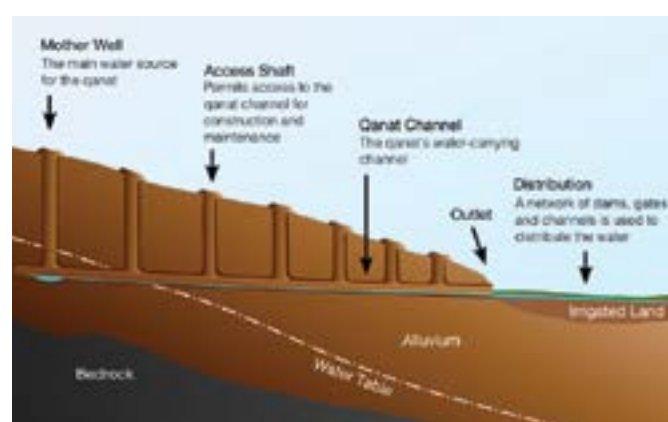
Oldest River Bank civilisation -Mesopotamia in Middle East

aqueduct included a series of underground and aboveground channels. The longest was the Aqua Marcia, built in 144 BC. Its source was about 37 km from Rome. The aqueduct itself was 92 km long.

Later on to prevent losses due to seepage, evaporation and breaches in the channel; and to prevent contamination, a closed system was sought and thus pipes evolved to be a better option for conveyance of water. Pipes, like numerous other products in the world, have seen a great deal of change.



Roman Aqueduct



Qanat structure

Among the most notable of ancient water-conveyance systems of the Roman Empire are the aqueducts. Extending from a distant spring-fed area, a lake, or a river, a typical Roman

Many of the innovations came through the development of new and improved designs, materials and cost efficiencies. As with any such evolution, change has resulted in the discontinuation and replacement of older, antiquated products with higher quality, less expensive and better performing products.

We all depend upon functional, reliable and safe infrastructure system for the production and delivery of goods and services, important ones being, safe drinking water delivery, and adequate wastewater sanitation. The physical condition of these systems and the reliability of services they provide are strongly related to the economic developments and public health standards of every community.

However some concerns started surfacing about the condition of the piping systems with traditional materials on account of breakages and incrustation leading to serious problems for quality and quantity of water. An extremely cost effective and technically superior solution to combat the ravages of most of

the problems associated with traditional materials came up as usage of safe, durable and corrosion free – Plastic Pipes.

Advantages of plastics pipes over traditional materials, which have made them gain overwhelming preference world-over in a short time span include:

- Corrosion resistance,

Thus plastics are increasingly becoming the material of choice for achieving economic and environmental balance. Infrastructure development across the globe has achieved phenomenal pace with the use of plastics products! With natural resources becoming more and more scarce, conventional products are becoming expensive. Most of these are also more energy consuming. The benefit of lower pricing,



- Chemical resistance,

- Flexibility,

- Light weight,

- Low coefficient of friction,

- Leak proof joints,

- Sustainability

Plastics have a very good environmental profile. Only ~4% of the world's oil production is used for plastics and much lesser energy is used to produce plastics compared to other materials. Plastics are durable yet lighter than most of the competing materials and thus save weight in pipework.

At the end of their service life, plastics can either be recycled or if this is not economic or environmentally beneficial, the calorific value of the plastics can be recovered through energy from waste incineration.

'Life Cycle Cost' is the concept which covers a product from cradle to grave. In case of pipes, besides the cost of extraction of raw material and conversion to a pipe, it would also include the cost of transportation, handling, laying, service life, maintenance, repairing and recovery at the end of service life. Plastics pipes have proved to be much better even against those traditional material pipes whose first cost is lower than that of plastic pipes.

combined with installation benefits such as flexibility, reduced number of joints on site and reduced time to join can deliver an overall reduction in total installed costs for plastic pipes.

Improvements in manufacturing and installation technology, expertise and cost economics, flexibility, longevity, noise and heat insulation properties, good safety record and adherence to published standards is resulting in an increased market share of plastic pipes.

Plastics Pipes thus have become the lifelines of infrastructure development!

Today plastic piping systems have established themselves in all areas of Infrastructure:

1. Water Management, which includes water supply, plumbing, SWR (Soil, Waste and Rainwater) or DWV (Drain Waste Vent) and sewage transmission,
2. Building Premises covering the HVAC (heating, ventilation and air conditioning) and floor heating systems,
3. Irrigation including water supply, bore well, micro irrigation systems,
4. Gas transmission,
5. Cable ducts for power supply & telecommunications,
6. Industrial applications.

Having noted the establishment of plastic pipes in infrastructure, let us focus on the Indian Infrastructure sector which is a key driver for the Indian economy. The sector is highly responsible for propelling India's overall development and enjoys intense focus from Government for initiating policies that would ensure time-bound creation of world class infrastructure in the country.

India is witnessing significant interest from international investors in the infrastructure space. Many Overseas companies are keen on collaborating with India on infrastructure, renewable energy and developing smart cities. The Government of India is taking every possible initiative to boost the infrastructure sector.

To make all these dreams come true, Honorable Prime Minister, Shri. Narendra Modi launched on September 25, 2014 the "Make in India" Program. It is an initiative of the Government of India to encourage multinational companies to manufacture their products in India. Make in India is opening investment doors and multiple enterprises are adopting its mantra.

The major objective behind the initiative is to focus on job creation and skill enhancement in twenty-five sectors of the economy. These sectors include automobiles, biotechnology, chemicals, construction, food processing, mining, oil & gas, pharmaceuticals, textiles. The initiative which will attract capital and technological investment in India, is expected to increase GDP growth and tax revenue. It also aims at high quality standards and minimising the impact on the environment.

It is not only the construction sector; practically all the major sectors under 'Make in India' will be requiring piping systems. If we pick up just a few growth drivers of construction sector alone, we will get an idea of mammoth potential we are talking about:

- India has an estimated urban housing shortage of ~ 20 million dwelling units. The housing shortage in rural India is estimated at ~40 million units.
- There is need for re-generation of urban areas in existing cities and the creation of new, inclusive smart cities to meet the demands of increasing population and migration from rural to urban areas.
- A new urban development initiative will help develop 500 cities which will be supported and encouraged to harness private capital and expertise through Public Private Partnerships (PPPs), to holster their infrastructure and services in the next 10 years.
- To provide quality urban services on a sustainable basis in Indian cities, the urban local bodies (ULBs) will enter into partnership agreements with foreign players, either through joint ventures, private sector partners or through other models.

There are 10 major links in this specific value chain of plastic pipes. Every single value chain has to work for continuous up gradation to achieve sustainable development!

- Raw material Manufacturers
- Additive Manufacturers
- Machinery Manufacturers
- Technology Providers
- Processors
- Standardization Bodies
- Testing and Certifying Agencies
- Project Executors/ Contractors
- End Users
- End of Life Management System

Ajay Shah

*President – Polymers & Cracker
Reliance Industries Ltd.*

Based on the Keynote address delivered at SPE's "Plastic Pipes 2015 – Current Scenario & Future Trends".

INDIA PAVILION



at 2016 International Trade Fair

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Duesseldorf, Germany

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India's First Full City "24x7" Water Supply Contract Uses Trenchless Installation With PE100 Pipes

According to data from the World Bank, India's 2015 population stands at 1.29 billion. This forms 17.2% of the world population at a growing rate of almost 1/8% p.a according to the World Development Report, with India predicted to overtake China as the world's most populous country by 2025.

The continued rapid growth of India's population will significantly impact its economy and urban resources, especially with regard to water and sanitation. Today, an estimated 600 million Indians have no access to modern sanitation, and only a fifth of the country's collected sewage is treated. A study conducted by the Water and Sanitation program (2006) showed that the annual economic impact of inadequate sanitation in India amounted to an estimated USD 53.8 billion.

The running water supply of most Indian cities with populations exceeding 1 million is highly intermittent and under very low pressures due to the shortage of treated water and high water losses within underground pipe systems. Water supply planning, operations and maintenance operations are also not managed by a central authority, leading to low financial investments and a strong dependence on low capital subsidies from state governments.

A NEW APPROACH IN NAGPUR CITY

Maharashtra's second largest city, Nagpur spans an area of 217 sq km, has a population that is expected to reach 4 million in the next 30 years.

Nagpur's water distribution network is owned by the Nagpur Municipal Corporation (NMC), who manage the long-term development of the city's water supply and sewage services. The NMC recently implemented a revolutionary "24x7" programme to improve the city's water supply under the project "Water for all and 24x7 supplies with a focus on safety, equity, and reliability" funded by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM).

As with most Indian cities, Nagpur's water treatment plants are overloaded. Deficiencies in the system include a low water pressure, high number of leakages requiring repairs, high level of non-revenue water, pollution and water - borne disease and poor service delivery levels. A Water and Energy Audit was

conducted by NMC in 2005 to determine the upgrading needs of the existing water supply system.

THE WATER & ENERGY AUDIT

The water balance for the Nagpur water supply system is shown in figure 2. It revealed that in 2005, NMC was purchasing and paying for 620 million litres per day (MLD) from the Water Resource Department. Of this, 140 MLD was lost during transportation from the treatment plants, with a further 20 MLD lost during treatment. Thus, NMC was only able to supply 480 MLD for the distribution system.

The results of and water and energy audit spurred a number of initiatives to improve water efficiency:

- New higher efficiency pumps
- Rehabilitation and capacity enhancement of water treatment plants

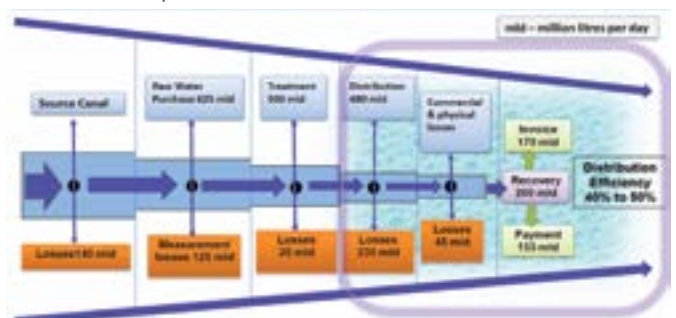


Figure 2. Water Supply Situation in Nagpur

- Commissioning of leak detection and pilot studies to deliver 24x7 water supply in one distribution zone with 15,000 consumers
- Raw water pipelines to eliminate water losses in the canals
- Tariff revisions
- Implementation of a 24x7 water supply program for the whole city under a long term performance based Rehabilitate, Finance, Operations and Maintenance contract through a Public Private Partnership for sustainability

IMPLEMENTATION OF 24 X 7 WATER SUPPLY PROJECT FOR NAGPUR USING PPP MODEL

The main target of the performance based PPP scheme was to improve the efficiency of the water services in Nagpur City, including decreasing non-revenue water, providing affordable and accessible water for all, and improving water quality and the accountability of the water authority. The scheme structure is shown in Figure 3 where the Nagpur Environmental Company Limited (NECL) grants a 25 year performance oriented leased contract to a Special Purpose Company (SPC) formed by the selected operator with recognised experience in improving O&M efficiency of source-to-delivery water supply systems and in implementing infrastructure investment projects in the water sector. The SPC will operate, maintain, repair, refurbish and provide for replacing any granted facilities from source to connection plots and deliver water supply to consumers according to committed service levels targets. The 25-year contract was ultimately awarded to Veolia Water India. To accomplish this, Veolia set up Orange City Water (OCW), a joint venture with Vishvaraj Environment Ltd.

The technical challenge of the project is considerable as it involves connecting 350,000 to 450,000 homes to the distribution network and increasing the amount of water available per person from 90 to 130 litres a day over the next five years. OCW's USD20 million investment will cover renovations on the city's water production plants and repairs and extensions of the 3,000 km pipe network. The targeted production capacity of the system will be approximately 750 million litres a day and the leakage from the network, which is currently 60%, will be gradually reduced to meet international standards.

INITIAL PILOT PROJECT

A pilot project was undertaken in the Dharampeth area of the city to validate scheme parameters and garner public feedback. Veolia and the consultants chose PE pipes and electro fusion fittings after an evaluation based on JNNURM guidelines. The water piping systems was designed for a maximum of 10 bar pressure using PE100 material water mains and MDPE PE80 pipes for house connections. The pipe jointing was carried



Figure 3&4: Some typical scenes from the pilot project in the Dharampeth area of the city.

out using electro fusion fittings of up to 110mm and with butt fusions in larger sizes of up to 250mm.

Leak detection studies of the project area revealed that the tertiary network (150mm and below) was mainly responsible for the leaks, with 44% being galvanized iron main leaks and 37% from house connections. The major reasons for the commercial losses were faulty poor quality and aging metres, illegal connections, inefficient billing systems, non-existing structured consumer service centres and poor recovery mechanisms leading to corrupt practices.

To reduce the disruption to daily life, trenchless installation techniques, particular Horizontal Directional Drilling (HDD), were employed wherever possible.

PROJECT IMPLEMENTATION

Following the pilot project, OCW worked with Borouge India to determine suitable PE materials for their HDD operations. High Stress Crack Resistance (HSCR) PE100 compounds from Borouge were selected as they offer the best protection from scratches and scores on the pipe's exterior during installation and any point loads that arising from stones or other hard objects in the soil.

HSCR PE100 materials are bimodal, with a hexene co-monomer rather than the butene used in standard PE100 materials. This

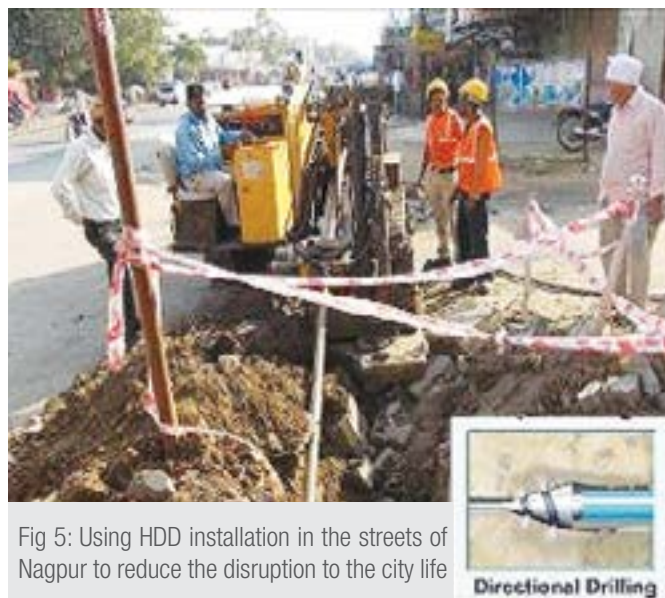


Fig 5: Using HDD installation in the streets of Nagpur to reduce the disruption to the city life

results in a PE molecular structure with more and longer side branches and in turn, stronger tie molecules that resist crack propagation through the pipe wall or dramatically slow down the process. This is measured by the Notched Pipe Test (NPT) under the international PE Water pipe specification ISO 4427. In this test, a HSCR PE100 pipe will not fail within 10,000 hours as compared to the minimum 500 hours required by the specification for standard PE100 pipes.

The project specified the Indian Standard IS: 4984 with the ISO 4427 standard and included an extended slow crack test

requirement for the PE100 material.

Training workshops were also conducted by Borouge India on the importance of using quality materials and the correct installation techniques.

HDD INSTALLATION USING HSCR PE PIPES KEEP PROJECT ON TRACK



Fig 8: Concrete overburden on utility lines difficult to handle by open trench

One of major concerns highlighted from the pilot project was to use HDD during the installation process to reduce the overall disruption to the city as much as possible. Other benefits of HDD include:

1. Avoiding damages to other utilities not mapped on plan that cause inconvenience and penalties
2. Avoiding lengthy clearance procedures for open trench digging of roads and traffic diversion
3. Maintain the PE pipe installation rate and keep the project on schedule
4. Minimise disturbance to congested urban areas
5. Avoid restricting access to hospitals or other important public buildings

The determination of HDD installation sites are on a case to case basis and conducted by local site engineers and the consultant team. The minimum length for an HDD installation was set at 50m, with 200m as the maximum depending on site conditions. PE pipe lengths in terms of percentage of the total length executed are as follows:

1. 110 mm – 90% (HDD bore size 150 mm),
2. 125 to 160 mm – 9 % (HDD bore size 200 or 250 mm),
3. 180 up to 250mm – 1% (HDD bore size 350 mm),

The total length of mains installed by HDD would be around 190 km - almost 30 % of the total network length, making it the first time in India where HDD is used so extensively in a water network project.

One of the key benefits of HDD installation enjoyed by OCW is the timely execution of project. There was also zero incidence of pipe failure during the process.

CONCLUSION

The HDD technique for installing PE water pipes in Nagpur city in India has proven to be beneficial by significantly reducing the overall costs and environmental impact. The HSCR PE 100 material for critical HDD applications will provide the most reliable and enduring service life of the water networks, giving the utility operator a “peace of mind”. India’s first PPP “24x7” water supply project is excellent case that demonstrates how a utility company can benefit from collaborations with pipe, equipment and raw material suppliers.

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PLASTINDIA 2018

UNFOLDING BILLION OPPORTUNITIES

10th International Plastics Exhibition, Conference & Convention

Feb. 7-12, 2018, Gandhinagar - Ahmedabad, Gujarat.

Plastindia 2018 is gearing up to be one of biggest plastics expos in the Asia-pacific region in 2018. It will be a game changer for many. For some it will be a trigger to foster new growth opportunities and upgrade technologically. New products marked with innovation will be the limelight. Time to get ready for Plastindia 2018. There will be nothing quite like it.

Highlights of Plastindia 2018

- Total Gross Area - 1,25,000 Sq. Mtrs. • Targeted number of Exhibitors - 2000
- Participation from around 45 Countries • Participation from nearly 600 Overseas Exhibitors
- Concurrent Events - Proplast, International Conference, Plastics Awards, Plastwin, B2B



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Pond Lining With Plastic Films

An Introduction:

Water is one of the most important natural resources and all forms of life are dependent on it. It is, therefore, very essential to properly conserve and manage this resource and regulate its use to obtain maximum benefits. India is a traditional user of PONDS, these are small water bodies either man-made or natural which have been used since ages. To fulfil the demand of irrigation potential, supplementary irrigation water management plays an important role, especially in drought prone areas where rainfall is highly erratic making rain water harvesting indispensable. It is therefore necessary to harvest water from any water sources e.g precipitation, perennial sources, roof water etc in ponds and reservoirs for various domestic, agricultural and industrial purposes over a period of time to stretch its usage to the maximum.

However, a major portion of stored water is lost through seepage. To avoid depletion of stored water, Pond Sealing (mechanically treating the Ponds) is necessary. This is done by installing lining of impervious material such as Plastics Film alone or in combination with conventional lining. This proves to be most effective and cost economic. Major benefits of Pond Lining with Plastic Films include:

- Reduction in seepage losses to the maximum extent (95%)
- Harvesting and storing of rain water from early monsoons
- Improved water availability over a longer period of time
- Highly useful in porous soils where water retention in Ponds and water harvesting tanks is minimal
- Eliminate water logging and prevent upward intrusion of salts into stored water
- Useful for the purpose of storage of drinking water, Pisciculture and for providing supplementary irrigation
- Prevents soil erosion
- Technique is also suitable for lining of effluent ponds and channels to reduce soil and ground water contamination
- It can also be used in the lining of salt pans for improving productivity as well as quality of salt.

Most widely used Films are made from LLDPE (Linear Low Density Poly Ethylene), LDPE (Low Density Poly Ethylene), HDPE (High Density Poly Ethylene), VLDPE (Very Low Density Poly Ethylene), VFPE (Very Flexible Poly Ethylene), PVC (Poly Vinyl Chloride)

Hot Air Welding Of Plastic Films for a Secure Agri Pond-

For a Secure Agri Pond, the quality of the sealing system is the top priority. Any leaks can have fatal consequences. Therefore, it is incredibly important that the processing quality fulfills extremely stringent requirements. Not only the material itself and the processor are responsible for this – in large part, so is the tool used to carry out the work.

In order to prevent groundwater from penetrating a finished structure, the foundation is protected by a sealing system consisting of plastic geomembranes as a preventive measure. Leister tools are employed all over the world to join the individual sheets of HD-PE, PP, PVC or TPO material used for this purpose.

Leister Tools not only facilitate precise welding, they also stand out from the crowd thanks to their ergonomics. They can be relied on, no matter where in the world they are used.

All welding procedures require an accordance of the following parameters:- Temperature, Pressure, Speed

Hot Air Welding techniques used for sealing Plastic films in Agri Ponds:

- Hot Wedge Welding (element)
- Extrusion Welding
- Hot Air Welding

Combi-Wedge/Wedge Welding Procedures for a Neat Seam And Finish For An Agro Pond:

Welding Procedure under Site Conditions:

1. Condition of Surface: Solid underground with smooth surface without bumps
2. Environment Conditions / Weather Conditions / Rain: In case of rain it must not be welded without any special safety measures.
3. Air Temperature: Welding procedures have to be stopped at temperatures under +5°C in order to prevent high thermal strains of the membrane.

4. Air Humidity: High air humidity might cause perspiration water on the welding surface which is unfavourable for the seam strength (towel or pre-heat).
5. Wind: Due to strong wind the required welding temperature might not be reached. To solve this problem, the welding temperature has to be increased up to 20–30°C. If the wind is too strong, the welding area should be protected, or the welding process has to be stopped.
6. Sunshine: Sunshine causes strong heat, especially of black membranes. This causes an increased thermal expansion of the membrane and results in wrinkles. The welding process becomes more difficult, and when cooling down abnormal strain in the seam area occurs. Leister’s lightweight and flexible ASTRO, TWINNY, and COMET

wedge and combi-wedge welders feature special nozzles, hot wedges, and pressure rollers, which double-weld the overlapping sheets. The small, easy to handle COMET and TWINNY tools adapt to the surface topography perfectly and weld the plastic geomembranes safely, making them absolutely leaktight.

- After welding, the testing needle and compressed air are used to check the tightness of the test channel which has just been created.
- Leister offers the EXAMO for inspecting test strips.
- The tightness of the seams or of entire sectors can be checked using the VACUUM BOX and vacuum bell.

Welding Parameters for Wedge Welders:

Power Consumption	1500W		1200W		700W	
Type of material	Wedge Length	Material Thickness	Wedge Length	Material Thickness	Wedge Length	Material Thickness
PE-HD, PE-C, PP	70mm Copper	1.5 - 2.0 mm	50mm Copper	0.5 - 1.5 mm	20mm Steel	0.5 - 1.0 mm
PE-LD	70mm Copper	2.0 - 3.0 mm	50mm Copper	1.0 - 2.0 mm	20mm Steel	0.5 - 1.0 mm
PVC-P	70mm Steel	2.0 - 3.0 mm	50mm Steel	1.0 - 2.0 mm		

Extrusion Welders and Hand Tools :

Extrusion welding is generally confined to repairs on the liner material. Leister also offers a wide range of hand welding tools and matching accessories, such as nozzles or the legendary Leister pressure roller, for welding connections and details.



Pond Lining for Horticulture at Zopar, Bangalore



Pond Lining at Nasik, Maharashtra

**OUR GOAL
IS TO HELP
YOU
ACHIEVE
YOURS**

How do we go about ensuring that you meet your business goals?

Simple; by offering you a wide-range of technologically advanced plastic auxiliary equipment and innovative solutions; that enhance productivity, minimize downtime, optimize energy efficiency and ascertain quality output through seamless operations.



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 Upcoming Conferences			
Sr. No.	Date	Name of Conference	City/Country
1	09 - 10 February 2016	Plastics In Automotives	Pune, India
2	12 - 13 February 2016	Disposables / Imolants Industry 2016	Ahmedabad, India
3	12 - 13 February 2016	IMDI 2016	Ahmedabad, India
4	21 - 24 February 2016	2016 International Polyolefins Conference	Houston, Texas
5	10 - 11 March 2016	10th European Thermoforming Conference 2016	Sitges (Barcelona), Spain
6	22 - 24 March 2016	2016 Shanghai TPO Conference	Shanghai, China
7	29 - 31 March 2016	Spe Shape Extrusion Top Con	Gurnee, Lllinois
8	18 - 20 April 2016	Thermoset Top Con	Cleveland, Ohio
9	19 -21 April 2016	Bioplastic Materials Top Con and Tutorial 2016	Bloomington, Minnesota
10	25 - 27 April 2016	Re/ Focus Recycling Summit & Expo	Orlando, Florida

 Upcoming Exhibitions			
Sr. No.	Name of Exhibition	Date	Venue
1	Plastics Recycling 2016	1 - 3 February, 2016	Hyatt Regency, New Orleans, Louisiana
2	Polyurethanex 2016	17 - 19 February, 2016	IEC Crocus Expo, Moscow, Russia
3	Plastivision Arabia 2016	22 - 25 February, 2016	Expo Centre Sharjah, Sharjah
4	Plastics & Rubber Vietnam 2016	1 - 3 March, 2016	Saigon Exhibition and Convention Center (SECC),Ho Chi Minh City, Vietnam
5	5th Plastasia 2016	3 - 6 March, 2016	Pragati Maidan, New Delhi, India
6	Plastimagen Mexico 2016	8- 11 March, 2016	Centro Banamex Mexico City, Mexico
7	Capindia 2016	20 - 22 March, 2016	Bombay Exhibition Centre, Goregaon, Mumbai, India
8	P4 Expo	5 - 7 April, 2016	India Expo Mart, Greater Noida, Delhi, India
9	Vinyl India 2016	21 - 22 April, 2016	Hotel Grand Hyatt, Mumbai, India
10	Chinaplas 2016	25- 28 April, 2016	Shanghai New International Expo Centre, Shanghai
11	PackPlus 2016	27 - 30 July, 2016.	Pragati Maidan, New Delhi, India
12	IPLEX2016	26 - 28 August, 2016	Cochin International Airport Limited (CIAL) Trade Fair and Exhibition Center
13	India Chem 2016	1 - 3 September, 2016	Bombay Exhibition Centre, Mumbai,India
14	K 2016	19 - 26 October, 2016	Dusseldorf Germany
15	Plast Show 2016	4 - 7 December, 2016	Race Course Ground, Rajkot, India
16	10th Plastivision India 2017	19 - 23 January, 2017	Bombay Exhibition centre, Mumbai, India

Making Brush Machinery in India - A step towards Swacch Bharat

This initiative of Making Brush Machinery in India was a foresight to the New Government initiative towards “Swacch Bharat Abhiyan” followed by the “Make In India” campaign. To boost these initiatives we started to look at the Indian Rural market because most of the Entrepreneurs look to start their marketing in Urban Areas and then push their products in the Rural market. Our idea of pushing the products in the rural market have given birth to new ideas and new marketing strategies which I am elaborating below.

What is an Indian Rural Consumer? This is what we asked our marketing team. To understand better we installed our first machine in a small village with the help of a local entrepreneur and even sold the machine on a one year credit.... Amazing was the result and even more amazing was the urgency from the entrepreneur to pay our dues even before the due date. What we took up as a challenge seems to us that it was a wise decision to understand the needs of a rural consumer. Rural Indians are changing – fast. Cleanliness becomes prime importance. Increase in Incomes, growing awareness towards hygiene and personal needs drive the consumer to buy better products leading to an increase in demand. The ease in access to information through social media as well as then constant hammering on Television and Newspapers transforms the rural Indian in their decision making process. Keeping this in mind a manufacturer must develop good products to support the increase in spending power. Our aim was to promote the use of good products made from good quality plastics (even good recycled materials) and longer lasting products. Cleaning tools made from good quality will be appreciated and become well accepted.

We must forget our conservative thinking that a rural consumer grace only about the price and will be happy with a stripped down low cost version of our products. The reality is they want better products. Another assumption is that they buy products only during festivals or after a good harvest season. This is also changing to need based buying. With the advantage of online purchase the rural consumer will soon look beyond their immediate vicinity to buy their products and if they have a good option to buy online they will surely give great weightage to the same. Another behavior which influences buying is the traditional influences. This is losing importance but endorsement by celebrity is the new behavior that drives them to consider a purchase. What follows hereafter is not

only related to our brand building of cleaning products but also relevant to most consumer products that we have to produce in India under the Make in India initiative.

Building Trust of Our Brand.

Key Points required to build the trust of a rural consumer are

1. **Need Recognition:**

Understand the need of the rural consumer and cater to his needs. Identify and target the right customer and ensure that the brand evokes his attention.

2. **Awareness:**

A good marketing mix based on the geographical location and a good marketing Tool will help build our brand.

3. **Consideration:**

A rural consumer will weigh several options before making the purchasing consideration. Making an irresistible offer would differentiate our product. Also highlight that this product would elevate his social standing will boost his ego.

4. **Validation:**

A company should identify what is this key point that would influence a consumer to buy our product. Whether they are influenced by trust or by loyalty or by a word of mouth publicity? A good piece of advice from the marketing could pursue a prospective customer to try the product and of course the possibility thereafter that he will repeat the purchase.

5. **Purchase:**

When a consumer walks into the store he expects personal service and expert advice. Therefore the more you offer to the consumer in terms of flexibility, payment options, finance schemes, free delivery and so on, this helps to complete a successful purchase.

6. **Experience:**

A good experience from an existing customer after his purchase helps a new purchaser to evaluate the product performance as well as the after sales service and create a positive impact on the customer.

7. Retail Advocacy:

Retail Advocacy means post purchase experience of a customer, his loyalty to the brand. Is he willing to switch brand? Does he like loyalty progress?, Has he heard something bad about the brand? This needs to be analyzed to determine future strategies.

We need to be extremely passionate about our consumer. We need to listen to him patiently without being critical to his approach. Even knowing that he may be having a wrong notion or a wrong attitude towards our product but when we listen to him patiently we create a positive impact on his mind and change his attitude to our product.

We need to be passionate about their thinking without telling

him point blank that he is wrong. Create a strong Network that will influence the consumer and make him feel that we understand his needs. Service is the key factor to win the hearts of the rural customer. Make them feel that they are valuable and important for us and our products. Focus and commitment is critical to succeed in Rural Markets. The new, young and elite consumer will be the driving force of rural India and the Make in India initiative.

Rajiv Sanghavi
 Director
 Borghi Brush Machinery P. Ltd.

AcademiaCorner



Dr. Shanti Swarup Bhatnagar Award

Dr. Shanti Swarup Bhatnagar Award is considered to be a coveted Science honours in the Country. The Ministry of Science and Technology announced 11 awards in Seven different fields of study. The prize is given each year for Outstanding Contribution to Science & Technology and also is a recognition of Notable Indian Work in the chosen field of applied or fundamental science. Prof. Yogesh M. Joshi from IIT Kanpur was awarded from Engineering Science in the Current Year 2015.

Dr. Yogesh M Joshi obtained his BE in Polymer Engineering in 1996 (Maharashtra Institute of Technology Pune). He completed his Ph.D. in Chemical Engineering in 2001 from National Chemical Laboratory Pune and Indian Institute of Technology Bombay under the guidance of Dr. Ashish Lele and Dr. R. A. Mashelkar. During his Ph.D. he worked on polymer melt extrusion instabilities. He then joined Benjamin Levich Institute, New York as a post-doctoral fellow during which he worked on rupture of polymer filament in melt spinning. Dr. Joshi joined Chemical Engineering Department at Indian Institute of Technology Kanpur in 2004, where he presently holds C. V. Seshadri Chair Professor position. Dr. Joshi's research interests include rheology of pastes, polymer nanocomposites and amorphous (glassy) polymer materials. The above mentioned materials are known to undergo physical aging, which causes time dependent evolution of their structure leading to continuous change in physical properties. Such time dependency leads to uncertainty with respect to physical properties. To address this issue he developed procedures that predict the rheological behavior of these time dependent materials over a period of years by carrying out experiments over a period of days. Many industries use this procedure to predict shelf life of their polymeric and pasty products. Dr. Joshi received Shanti Swarup Bhatnagar Award in the year 2015 in Engineering Science for this fundamental work.

Petrochemical and Polymer Industry in 2015, A Challenging Year for the Global Economy

For most of 2015, oil prices traded in the range of US\$40-60/bbl on NYMEX. However, post-Christmas of 2015, Brent as well as WTI crude oil futures fell to levels seen in 2008-2009, as there is no end in sight for oversupply concerns. Brent traded at US\$37.74 a barrel, while U.S. West Texas Intermediate (WTI) futures dipped to US\$37.73 per barrel. As we approach 2016, some market observers are forecasting another year of distress and bearishness for oil futures.

A significant part of oil's problems in 2015 can be attributed to refusal by Organization of Petroleum Exporting Countries (OPEC) to reduce production to maintain market share and squeeze out high-cost shale gas producers in USA. Lower oil prices are beginning to take a toll on rich OPEC members. Saudi Arabia has announced massive subsidy cuts after falling oil prices for 18 months caused a record deficit, announcing prices would rise on fuel, electricity, water, plane tickets and cigarettes. The Kingdom recorded a 2015 budget deficit of US\$98 bln. Oil prices began to fall because of a glut in the market caused largely by new production in North America-US drillers relied on hydraulic fracturing to get oil from shale and Canadians extracted oil from its western tar sands. Both processes are expensive, and have seen a fall in production levels as profits narrowed. Supply is expected to ramp up in the next quarter when supply will resume from Iran, where a lifting of Western sanctions over its nuclear program frees it to resume production.

US naphtha exports increased in 2015, as refiners continue to seek new outlets for increased production, but growing condensate exports could impact naphtha output.

The end of 2015 saw naphtha prices in Asia sink to six-and-half-year low of around US\$384/ton CFR Japan, triggered by the sell-off in financial markets and steep losses in overnight crude futures, as per ICIS.

Unlike the fluctuations in spot ethylene prices in Asia and Europe, the spot ethylene market in the US continued to fall for the most part of 2015. At the end of the year, spot ethylene hit its lowest levels seen since early 2009, widening the gap between other regions to record highs. As per Chemorbis, Asian ethylene has been rather tight for most of 2015 due to a heavy maintenance season in South Korea and Japan, which paved the way for a record high spread between spot ethylene and naphtha from April to July 2015. Although spot ethylene prices tanked from July to mid-September, the same tightness factor has been helping Asian ethylene gain steadily since then despite the record low crude oil prices. The news that Shell declared force majeure from its cracker in Singapore in early December expected to last for 3-6 months added to tight supply concerns in Asia. The strength of the spot ethylene market was so visible that import HDPE and LLDPE prices to China traded below ethylene prices in December .

China continued to add more coal based capacity in 2015 as new plants came onstream. This was particularly evident in



the PP market, which pushed domestic PP prices to the same levels with or even below import offers in China for the most part of 2015. The same factor caused PP prices to post a larger decrease than that of PE both in Asia and the Middle East in the second half of the year. Accordingly, Chinese coal based PP showed up occasionally in Southeast Asia while overseas suppliers to China also started to seek new export outlets. China's homo PP imports for January-November also suggest a 7% decrease on a yearly basis, according to ChemOrbis Import Statistics, affirming the reduced appetite of China for PP imports.

European polyolefins markets were hit by a significant number of production outages in H1-2015.

Force majeure declarations were seen for both for olefins and polyolefins from many major producers including Ineos, Borealis, Sabic, LyondellBasell, Total and Versalis. Severe production issues stemming from the absence of these suppliers caused triple digit hikes in the region for several consecutive months until July. In the following three months, a downturn was in place, which was arrested by renewed production issues again in November. These also paved the way for price increases in Europe for November and December. The numerous force majeure declarations in Europe attracted more imports to the region as traders in Turkey reported shifting their allocations to Europe due to better netbacks. Italy's polymer imports gained

arrival of material from some new production units. Borouge 3, with 1mln tons of PP and PE each, has not made much of an impact so far in Europe, and Sadara's new LDPE/LLDPE plant is not expected to have much effect before H2-2016.

The petrochemical and polymer industry witnessed several mergers & acquisitions in 2015. Some of them are:

- * The Board of Directors at DuPont and Dow Chemical Company unanimously approved a definitive agreement under which the companies will combine in an all-stock merger valued at US\$130 mln. The combined company will be named DowDuPont. The merger transaction is expected to close in H2-2016, subject to customary closing conditions, including regulatory approvals, and approval by both Dow and DuPont shareholders
- * INEOS and Solvay announced the launch of their INOVYN joint venture on July 1 that has led to developments in the formation of the PVC market in Europe.
- * Bayer has announced the new name of its Material Science business - Covestro, with effect from September 1, 2015.
- * Solvay has completed the acquisition of the Ryton® PPS (polyphenylene sulphide) business from U.S.-based Chevron Phillips Chemical Company for US\$220 mln, enlarging its high-performance polymers offering and entering a solid growth market.



5% in the first three quarters of 2015 vs 2014, according to ChemOrbis Import Statistics, confirming the region's increased need for imports owing to long-lasting supply constraints. As per ICIS, polyethylene (PE) and polypropylene (PP) buyers in Europe are under strong pressure to accept revised conditions from their sellers in 2016 when discussing volumes and pricing, strongly influenced by the 2015 situation, when force majeure led to extreme volatility and price hikes. A change in the euro/USD exchange rate and the collapse in crude and naphtha prices were principally responsible changes in supply, with the lack of imports exacerbated by an increase in duties. Producers are generally very confident for 2016, in spite of the

- * Indorama Ventures (IVL) completed 100% acquisition of the PTA business of CEPESA Chimie Montreal. The 600,000 ton PTA plant will provide Indorama Ventures with feedstock security.
- * Indorama Ventures Public Company Limited (IVL), a world-leading producer of intermediate petrochemicals, has acquired Indian Polyethylene Terephthalate (PET) manufacturer Micro Polypet Private Ltd. (MicroPet), subject to necessary legal approvals. Situated in Panipat district, Haryana state, India, the plant is located 90 kms north of Delhi and has a capacity of 216,000 tons.

- * With the acquisition of an additional 17.5% stake in Polief, Russian petrochemicals producer Sibur has completed acquisition of 100% stake in the Bashkortostan polyethylene terephthalate (PET) producer. Polief modernized its existing PET production lines last year and built an additional line, scaling up its PET capacity to 210,000 tpa.
- * The Samsung group will sell its stakes in petrochemical affiliates to the Lotte group, in a deal, worth an estimated 3 trillion South Korean won (\$2.66 billion), exiting the industry to focus on mainstay businesses such as electronics and finance. Under the deal announced Friday, Lotte Chemical Corp., a petrochemical company controlled by Korean-Japanese conglomerate Lotte, will acquire a 90% stake in Samsung SDi Co.'s chemical business, a 31.5% stake in Samsung Fine Chemicals Co. and a 49% in Samsung BP Chemicals Co.



- * Solvay has successfully completed the acquisition of Cytec and will begin the integration of Cytec's businesses to deliver cost synergies and capture significant business opportunities in advanced lightweighting materials for the aerospace and automotive industries and in specialty chemicals for mining. Cytec will be fully consolidated within the Solvay Group as from Jan 1st, 2016.
- * A. Schulman, Inc. has executed a definitive agreement to acquire all of the issued and outstanding capital stock of privately held Citadel Plastics Holdings, Inc. (Citadel) for US\$800 mln. Citadel is a leading North American specialty engineered plastics company that produces thermoset composites and thermoplastic compounds for specialty product applications.
- * The Radici Group Plastics Business Area has strengthened its production capacity in the North American market by acquiring the polyamide engineering plastics division of Resinas TB, a Mexican manufacturer with over 40 years' experience in the plastics industry,
- * Total has acquired a majority 68% interest in Germany's Polyblend. Polyblend produces compounds, which are blends of polymers (polyethylene and polypropylene) and other ingredients such as mineral fillers, glass fibres, elastomers and additives, formulated to customer specifications. Total recently began building two polypropylene compounding lines at the Carling Platform

as part of its project to secure the French site's future. The lines are scheduled to start up in mid 2016.

- * Clariant has acquired the black pigment preparations portfolio of Lanxess in Nagda, Madhya Pradesh.
- * Evonik Industries AG successfully completed acquisition of India's Monarch Catalyst Pvt. Ltd. All of Evonik's future catalyst activities in India will be operated through the newly acquired company.
- * Thermoplastics supplier RTP Company has acquired Polymer Partners LLC, a manufacturer of black concentrates and specialty compounds.
- * LyondellBasell has entered into a definitive agreement for the acquisition of SJS Plastiblends Pvt. Ltd. (SJS), a polypropylene compounds (PPC) manufacturer, located in Aurangabad, India. This strategic acquisition will expand LyondellBasell's existing footprint in India and further enhance the Company's position in India's growing automotive market.
- * LyondellBasell is to acquire the polypropylene compounds assets of local company Zylog Plastalloys to increase its access to the Indian market.
- * Davis-Standard, LLC announced today the acquisition of blown film leader Gloucester Engineering of Gloucester, Mass. The purchase of Gloucester strengthens Davis-Standard's blown film offering by adding experienced design and process engineering capabilities, a large installed base and greater after market capabilities worldwide.
- * Mumbai-based polymer products manufacturer Time Technoplast Ltd has sold its Poland-based subsidiary Novo Tech SP Z O.O. to an unnamed Polish private equity fund at an enterprise value of €11 mln (US\$12 mln).
- * Time Technoplast Ltd divested 50% of its holding in a JV with a Chinese partner in South China in a deal valued at around US\$1.3 mln to Mauser.

New Plant start ups that have added to polymer capacity include:

- * Borouge 3 in Ruwais, Abu Dhabi, that comprises a 1.5 mln tpa ethane cracker and derivative plants, including two high density PE (HDPE)/linear low density PE (LLDPE) units with a combined capacity of 1.08 mln tpa, a 350,000 tpa LDPE unit, and two polypropylene (PP) units with a combined capacity of 960,000 tpa.
- * Sadara Chemical started up a linear low density polyethylene (LLDPE) plant at its Jubail complex in Saudi Arabia to produce 375,000 tpa of products used in specialty applications.
- * SABIC SK Nexlene, a 50:50 joint venture between SABIC and SK Corp have launched operation at its 230,000 tpa

high performance polyethylene plant located in Ulsan,

- * The Dow Chemical Company has announced its new world-scale propane dehydrogenation unit (PDH) located at the Company's Oyster Creek site in Freeport, Texas, has begun commercial operations. Capacity for the new propylene production facility is 750,000 tpa, making it the largest on demand propylene facility of its kind.

As per Chemorbis, the constant depreciation of currencies, particularly in emerging economies, was a buzz word in petrochemical markets as it has had a considerable impact on trade. Players in financial markets spent most of the year anticipating a rate hike from the US Federal Reserve, which finally materialized in December. The euro has ended 2015 with a depreciation of 9% against the US dollar before rebounding from a loss of 12%. The Turkish lira recorded a much larger depreciation of 33% against the US dollar before ending 2015 with a relatively smaller depreciation of 27%. China's Central Bank also devaluated the yuan for 3 days in a row in August in a surprising move, which was interpreted as a strong sign of the weakness of the economy. In October, more depressing news came from China, where GDP for Q3 fell below 7% for the first time since Q1-2009. This was followed by the decision of China's Central Bank to lower interest rates to fresh lows in an attempt to tackle the slowing economy. Plunging crude oil as well as China's slowing imports have also made themselves felt on the freight rates from Asia as players reported rates as low as US\$5-10/ton from Asia to Turkey in the second half of the year.

The world's economy is growing at a slower pace than the International Monetary Fund and other large forecasters are predicting. The IMF on Oct. 6 lowered its 2015 global gross domestic product forecast to 3.1% from 3.3% previously, citing a slowdown in emerging markets driven by weak commodity prices. Forecast for 2016 was also cut to 3.6% from 3.8%. The Organization for Economic Cooperation and Development lowered its forecasts for the global economy, saying that GDP will grow 2.9% in 2015 and 3.3% in 2016.

Here's the mainstream outlook in a nutshell, as per Peter Coy in Bloomberg:

China will continue to decelerate and U.S. will continue to outperform its rich-nation peers. With global demand soft, the price of money (interest rates) and the prices of oil and other commodities are likely to remain low. Central bankers Janet Yellen, Mario Draghi, and Haruhiko Kuroda will be in the spotlight as the Federal Reserve attempts to nudge rates higher and the European Central Bank and Bank of Japan look for ways to stimulate growth. The most important variable for 2016 is China, where the annual gross domestic product growth rate dipped below 7% in Q3-2015 for the first time since the 2008-09 financial crisis. Developing nations that have come to depend heavily on China as a customer for their resources include Brazil, Chile, Indonesia, Malaysia, the Philippines, South

Africa, Thailand, and Vietnam. Demand for Chinese goods has slowed down globally, and the pace of infrastructure projects is slowing down in China. This is pushing China to guide the economy toward domestic consumption as a new source of growth. With Russia and Brazil already in recession, a sharp slowdown in China would drag other emerging markets down.



Anders Borg, Sweden's former Finance Minister's perspective of 2016 in a nutshell: 2016 will be a challenging and difficult year for the global economy. In the Eurozone, expansionary policy is still called for and further steps to support growth could be expected. In the U.S. and Europe, investments levels are low, productivity growth is very weak and the export sector is only providing a small contribution to the recovery. At the same time growth is slowing in Asia and world trade is likely to grow at a slower rate than GDP. In 2016, weak economic activity and low productivity growth mean that real wages and consumption are likely to continue to be disappointing. U.S. presidential elections will be a major political event of 2016. From a global perspective, the key issue is whether the next president will be able to restore the U.S. as a global force for stability. The refugee crises in Europe will remain a major factor during 2016. UN estimates indicate that over one million people have entered Europe with the intention of claiming asylum during 2015. A key factor shaping Europe's political future in the decades to come is the referendum on the UK's membership of the EU. Another political factor contributing to financial uncertainty is Russia. At the end of 2015, President Putin has rapidly repositioned Russia from being the outsider rocking the boat to a constructive force dealing with ISIS in Syria and Iraq. Along with weak global growth in 2016, substantial turmoil is expected in financial markets. The key factor deciding the degree of turbulence will be inflation in the U.S. and reforms in China. If China is able to gradually move forward with rebalancing the economy from investments to consumption, that could open a path towards more sustainable growth and a gradual return of optimism in the Chinese business sector.

Source Courtesy:



New Tribology Test Data Aids In Material Selection for Single-Use Drug Delivery Devices

In an emergency situation, there is only one opportunity to use a single-use injection pen, safety syringe or other medical device. The device may remain in its package for 2-3 years and when called upon to perform its function, it must move easily, have a low break away force, and not stick during the full movement pathway. One of the key design challenges for single-use medical devices is to ensure the “stiction” free movement of the device on the first and only usage.

Single-use medical devices with moving parts have a unique set of performance criteria that include low forces, a short movement path, and low speeds (see Figure 1). Many of these devices use a secondary external lubricant like silicone to give them quiet and smooth operation. These secondary operations can add significant cost, difficult clean up procedures, and additional quality inspections to ensure lubricant is applied correctly.

A more desirable or cost effective or manufacturing friendly alternative is to introduce internal lubrication by compounding the lubricant within the plastic; this improves dispersion of the lubricant and eliminates the added cost of secondary operations. Until recently however, selecting the appropriate materials for this purpose has been a challenging trial and error endeavor. Although standardized thermoplastic tribology tests use conditions that are predictive for long term wear performance, they do not help in the selection of materials to eliminate the stick-slip phenomenon that is critical to the performance of single-use medical devices. To alleviate this issue, RTP Company developed an innovative friction test to accurately predict friction behavior in single-use medical devices. RTP Company created a modified test procedure which uses a standard thrust washer apparatus to measure friction. Although commonly used for wear testing, this apparatus also has the option to change the test routine variables such as wear path, force and speed which are used to quantify start-up friction. This new test allows more accurate plastic-on-plastic performance replication of single-use applications in the medical industry.



Figure 1: Plastics that have low friction properties are essential for applications like single-use injection pens.

Glide Factor SM Testing Accurately Predicts Results

A custom oscillation routine was created for the thrust washer machine, and was used to mimic the movements, pressures and velocities found in the moving parts of typical auto-injection pens and syringes. This allowed RTP Company to specifically investigate friction at the initial start-up of a test, while also having the ability to vary the pressure (normal force on the interface) and rotating velocity of the test. By varying these components, the test can more accurately reflect the end use application.

Using this test method, RTP Company explored base resins including Polycarbonate (PC), Acetal (POM), Acrylonitrile Butadiene Styrene (ABS), Polycarbonate/ABS Alloy (PC/ABS), High Density Polyethylene (HDPE), and Polybutylene Terephthalate (PBT). These resins were tested in a variety of combinations with friction reducing additives including Polytetrafluoroethylene (PTFE), Perfluoropolyether (PFPE) Oil, and a selection of silicones, along with RTP Company's own All Polymeric Wear Alloy, known as APWA Plus™. The combination of two compounds, one on each side of the assembly and tested against one another, is referred to as a “friction pairing”.

The Data Tells A Story

For each friction pairing, RTP Company engineers measured the Static and the Dynamic Coefficients of Friction (COF). Like wear factor, the lower the COF value, the better, when trying to reduce friction in a system. Engineers looked for the lowest and most consistent static COF values possible with a minimal difference value between static and dynamic COF. The threshold representing the smallest delta between the two measurements has been coined by RTP Company tribologists as the “Glide Factor SM”.

Consistent, repeatable tests showed that the ideal friction pairings exhibited low Static Coefficient of friction (< 0.15) and

a Glide Factor SM of < 0.015 (see Figure 2). A low Glide Factor SM is an indication that the mating surfaces will perform better, with less sticking, slipping, and inconsistent sliding. By conducting numerous statistically valid tests and gathering performance data, RTP Company engineers came to a number of conclusions regarding materials selection for single-use medical devices, including resin selection, internal lubricant selection, and the challenges of factors such as pressure and load.

Resin Selection is Critical

Selecting plastic-on-plastic friction pairings is the first step toward designing a smooth functioning medical device using these guidelines:

1. Internally lubricated dissimilar plastic friction pairs yield the best performance
2. Internal lubrication of friction pairs composed of the same resin can achieve good or acceptable performance, depending on the internal lubrication system.
3. Neat dissimilar plastic friction pairs yield poor and unpredictable performance
4. The worst friction performance is by unlubricated self-on-self plastic friction pairs, and should be avoided

Internal Lubricant Selection is Critical

Each lubricant performed very well under certain conditions and should be selected based on the pressure/speed/friction conditions as well as plastic pairing. Below are general guidelines for selection depending on plastic pairing:

1. Silicone has very good average performance across the resin systems that were tested depending on force and speed conditions in the injection system
2. APWA PLUS with (or sometimes without) silicone performs very well in some plastic friction pairs that were tested especially self-on-self applications.
3. PFPE is a good lubricant option in certain plastic friction pairs and offers very low lubricant levels.

Pressure and Load Impact Results

As the force interacting on the two moving surfaces increases, the friction rises exponentially. Some of these forces are side loads and others may come from spring or human actuation force. Force can increase under dirty conditions or temperature changes. Using internal lubricants can overcome variable or increasing system forces very well.

Tribology Data Improves Material Selection Process

Optimal low friction, one-time performance of a single-use medical device –even after long term or hot/cold storage – depends on reducing the system friction in two critical measurements:

1. Lowest possible static coefficient of friction and
2. Lowest possible Glide FactorSM.

The new friction test developed by RTP Company has been validated with single-use drug delivery device manufacturers in multiple continents, and the test results have proven useful for:

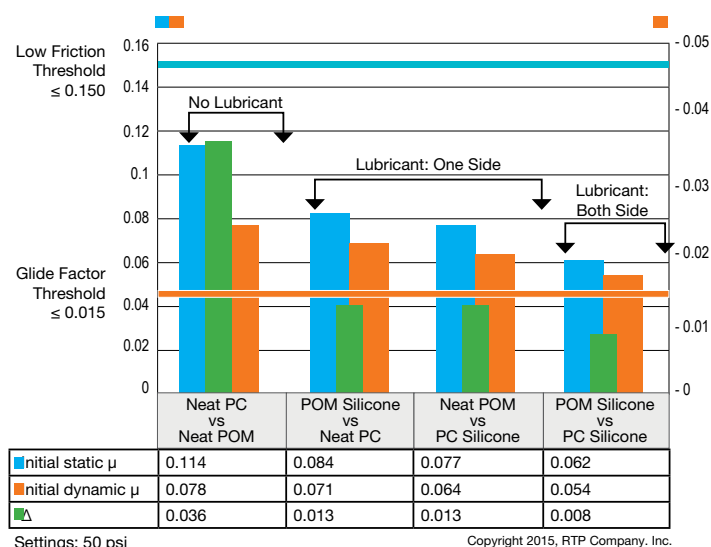
1. Selection of optimal friction pairs
2. Reduced time to determine optimal friction pairs by reducing trial and error
3. Lowering system costs by the elimination of topical lubricants
4. Predicting performance in most drug delivery and single-use disposable systems such as syringes, pens, auto injectors, stop cocks and similar devices

Benefits of Utilizing Tribology Data

The data collected from RTP Company’s new friction test enables designers to make informed choices, rather than spend valuable resources on a conventional trial and error approach to medical device design and manufacturing. Accurate, up-front data also lowers the cost per part and accelerates the time-to-market.

In addition, the data shows that costly external lubrication and processing steps can be reduced or eliminated by using an internally lubricated compound. Most importantly, concrete material data helps ensure optimal medical device performance and safety.

PC against POM Test Results



Ben Gerjets (Product Development Engineer), Tom Schell (Sr. Product Development Engineer), Josh Blackmore (Global Healthcare Manager)
RTP Company, Winona, MN USA.



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Investment Opportunities Corner

Wood that is not wood

In Jan-2016, the World Bank projected that India will be the fastest growing economy in 2016. This fast pace of growth comes at a price. With the increasing growth in the construction activities, India continues to consume huge quantities of wood and wood based products as building materials and furniture. This has led to a loss of 370 km square km of forest cover in the country. It is high time for us to take responsibility to reverse this situation.

Natural fibre based PVC composites are an answer to this problem at hand. They show better properties than wood and are also recyclable and environment friendly.

Product type	: Natural fibre based PVC sheets, profiles with properties better than tropical wood.
Present Consumption	: 60 KT
Penetration	: 1%
Total potential	: 3900 KT
Estimated realistic Potential	: 1200 KT
Growth	: 20 %
Growth Drivers	: Product properties (moisture and termite resistance), environment friendly, look and feel of wood
Major manufacturers	: Industry is growing very fast. In the last three years 40 converters have begun operations in related segment
Machinery	: Same as used in PVC extrusion



Project Summary		
	Unit	Value
Capacity	MT	5000
Capex	Rs. Crs.	5
Est. cost of project (Capex + working capital)	Rs. Crs.	15
EBITDA (10yrs. Average)	Rs. Crs.	15
Capex/EBITDA		0.5
Simple payback	years	4
NPV	Rs. Crs.	44
IRR	%	87%



Detailed project report available on request

Ramki Subramanian, S.S. Naik, Aruna Kumari, Sarada Purkait
Reliance Industries Limited, Mumbai



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FACILITATING EXPORTS FROM INDIA

Leno Bags for Fruits and Vegetable Packing

CII had organized a programme for farmers in a small city called Tiruchi in Tamil Nadu in early 2000. This program aimed at deliberating newer products, practices in the field of agriculture. Situated in the river Cauvery delta, the Tiruchiand region is very fertile, rich both in horticulture and agriculture. It was decided to propagate a new product to the end consumers in the meet. At that time “Leno bag” for packing vegetables and fruits was not the common site. Hardly two manufacturers were present and most of the products were exported. Hence it was the great opportunity to introduce the leno bags in Indian market , which was predominantly dominated by Jute bags. One Chennai-based new leno manufacturer was persuaded to participate in the stall.

More than 150 farmers attended the programme hailing from nearby areas. Realizing the importance of being at the same level as that of farmers, the team removed all such big city paraphernalia as ties and suits. The presentation was made on the topic “Leno bags” in the local dialect of Tamil. The team also gave a live demo of leno bags packed with potato and onion. There were many queries from the farmers on various subjects like supply chain, end of life of bag, etc, and the team answered all of these to the full satisfaction of the audience.

At the end of the meeting, the team was - happy that they could reach hundreds of farmers and communicate the key aspects of the new product leno. What they could not visualize was that this meet would open a huge market for Leno in other region. After a few days, the team got a call from Delhi referring Tiruchi presentation and enquiring about leno bags for a large scale trials by a well-known chemical company. That took the team a little by surprise – after all, they were not clear as to what a chemical company wanted to do with leno bags.

The confusion was cleared up very quickly. They make a chemical called CIPC which when sprayed on to potato enables it to be stored at a much higher temperature thus saving huge quantities of electricity. Traditional jute bags absorb the chemical and only a fraction of the chemical applied reaches the potato. A Leno bags, on the other hand, enable almost all of the chemical suppressant to reach potatoes efficiently without

interacting with the bags. Potato is grown for only three months in a year, but it is consumed throughout the year. For this reason, it needs long periods of careful storage. If potatoes are stored below 4 degrees Celsius, they become sweet. Stored at 10 to 15 degrees Celsius, it sprouts. CIPC helps potato to be stored above 10 deg C without sprouting. The trial was successful and soon leno bags became synonymous for cold storage of potato. It opened up a huge market in West Bengal, UP, and many other states.

Today Leno is an established product throughout India. Many fruits and vegetables like onions, potato, cauliflower, cabbage, lemon, brinjal, baby corn, oranges, etc., are packed in leno bags. Supply chain expanded and many dedicated manufacturers are present at every regions. Have you noticed that whenever there are news item on shortages about onions and other vegetables, the leading newspaper carry a picture of truckloads of onion packed mainly in Leno bags?



Leno bags become synonymous with packaging of fruits and vegetables.

V.Kannan
Reliance Industries Limited, Mumbai

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Plastic Intensive Precision Farming System for ensuring the Rural Prosperity and Social Empowerment

Hon'ble Prime Minister of India had shared the concern that there should be prosperity and social empowerment at rural sector across the country as an initiative of Secretaries of GOI, by availing all the state-of-art-technologies at their reach. Mr. Surjit K.Chaudhary IAS , Secretary, Chemicals and Petro Chemicals, GOI had initiated the process for the intensified use of Plastics in Agriculture through precision farming system to achieve targeted goal of rural prosperity and social empowerment.

Accordingly, Plastindia Foundation, Hindustan Insecticides Ltd, Jain Irrigation Systems, District Administration and Agri Systems Foundation came together at the guidance of the Secretary (C&PC) GOI and initiated the process of project planning, site visit and interaction with beneficiary farmers. The project site was Sullikadu village of Kotagiri block in Nilgiris district of Tamil Nadu. The area under the pilot project is 10 ha. The Plastindia Foundation was the sponsor, Hindustan insecticides Ltd and M/s Jain irrigation Systems Ltd were the collaborators and Agri Systems Foundation was the implementing agency. The total budget outlay was Rs.48.00 lakhs. The Plastindia sponsored the budget of Rs.21.00 lakhs as fund and shadenet and mulching sheet as kind from its subsidiary plastic industries. Hindustan Insecticides Ltd provided the required quantity of Hybrid seeds and Water Soluble Fertilisers in kind. The District administration provided the overall support for the project and rendered co-operation to implement the project. The plastics viz., drip system, shadenets and pro trays, mulching sheets and pond lining sheet were the primary plastic inputs in agriculture; 5 ha of Carrot and 5 ha of potato were cultivated under the plastic intensive systems to demonstrate that 80 % productivity enhancement was possible.

Kotagiri District

Kotagiri is a Panchayat town in The Nilgiri District in state of Tamil Nadu. Kotatagiri is situated at an elevation of around 1793m above sea level and is one of the three picturesque and popular hill stations located in the Nilgiris.



Mr. Surjit K. Chaudhary IAS, Secretary Chemicals & Petrochemicals, GOI visited Sullikadu village several times.

The Precision Farming System (PFS) has largely accepted the plastic items and blended with the rest of the technologies for doubling the productivity and tripling the profitability as demonstrated over 80,000 ha between 2005-06 and 2014-15 in the plains of TN, yet, this Precision Farming System package was not introduced in hills this far at Nilgiris and hence this demonstration was done project at Kotagiri.

Carrot, cabbage, peas, potato, beans etc were the major crops grown in the region. The productivity was well below average even though the farmers use the F1 Hybrid seeds provided by state Department of Agriculture at 50% subsidy. There was no drip system or plastic of any kind used by the farmers except the watering hose before the project. There were three seasons viz monsoon – South West (June-August) North East (September-December) and Summer (January-April). There shall be rains (980mm) per annum from June-August, and the second season falls during winter; The excess water used by the farmers for irrigation invited pests and diseases, leading to root suffocation and improper growth of the crops. The farmers were unaware of markets other than Mettupalayam at the foot of the hills (60KM). The traders offer credit facility to the individual farmers and keep them under their control for generations. The price realized is always poor and that is why always the farmers are under economic stress; Hardly 40% of the houses have toilets of their own while 60% of the families haven't; This phenomenon is the critical indicator of their economic status and quality of life.

The following were the common facilities created at the project site, the inputs provided and trainings organised:

Solar Power Fence

Solar Power Fence around 10 ha site: As the village was surrounded by forest and hills and hillocks, the wild animals like boars, elephants and bison used to damage the crops at odd times. and enter into villages as the village was surrounded by mini forest like scrub jungle. Domestic animal trespassing also occur frequently leading to quarrel among the families in the village. The scrub jungle 12.5 acres was removed and brought to cultivation by the villagers collectively. Hence solar powered fence system was established around 10 ha site (1340M); The PIF funded for this infrastructure.



Concrete Ring Wells

There was a stream running at the eastern boundary at a lower level. But during summer months (February to July) the water flow will not be there in the stream. But the summer crop fetches good prices in the market. Hence it was proposed to have wells with concrete rings (3 m dia x 4 m depth) which would supply adequate water for irrigation through drip system during the summer months. PIF funded for this infrastructure.



Dug two concrete ring wells 3 meter diameter with 4m depth as source of irrigation for 10 ha under drip and fertigation system. Installed 2 Nos of 5 HP solar paneled pumping system.

Solar Power system

The electricity connection for pumping water would not be available for next one decade as the power for irrigation is free in TN and the list of pending application in the queue was too lengthy. Hence solar powered pumping system (5 HP) was installed at two ring wells for pumping water. The efficiency of pumping was good compared to the same system in the



plains. The motor starts running from 8.30 FN and upto 4.30 in the AN. The 80 % of cost was released as subsidy by the Agricultural Engineering department and the balance 20 % cost was met by PIF.

Farm Ponds

Two farm ponds were provided with plastic lining to store water and re-pumping.

Shade Net House

Established shadenet community nursery for pro tray seedling production (300m²).



Community shade net nursery: The farmers followed raised bed nursery system since generations. The seedling quality was poor due to uneven germination and growth. The pro tray system of nursery under shade net structure generates physically and physiologically uniform seedlings. Hence 300 sm shade net nursery was provided with plastic portrays and hose pipes for raising healthy seedlings. PIF funded this structure.

Drip system

Today, a stage has come that without drip system, a plastic application in agriculture, there is no agriculture at all as drip system had proved that it is a multi benefit infrastructure in agriculture.

Installed drip system with the support of Commissioner of Horticulture and Plantation Crops, Government of Tamil Nadu under 100% subsidy in as much as all the farmers belong to small and marginal category.

Drip system is a multi benefit technology hither to unknown to Nilgiri hills. The State government provided 100 % subsidy for installation of drip system for small and marginal farmers. The Joint Director Horticulture took the initiative to release the subsidy part of the drip system. The actual cost was almost two times of the guideline value in view of the fact that the land gradient was steep, necessitating use of pressure compensated drippers. M/s Jain Irrigation Systems Ltd absorbed the excess cost as their contribution to the project. They have given hands on training to farmers.

Mulching sheet

Plastic mulch for vegetable cultivation is a boon as it suppresses weeds and the soil solarization enables the fast spread of root system and avoids soil borne bacteria to infect the plants. The mulching sheets would be used for crops like cabbage , cauliflower, peas and beans which they would grow in the summer ie after potato and carrot. PIF supplied the material.

Water soluble Fertiliser

The usage of Water soluble fertilizer was almost nil in the hills. The farmers were taken to Jain farms Udumalpettai and Precision Farms Hosur to provide hands on training on fertigationie application of water soluble fertilizer through irrigation water. The fertigation scheduling was done in such a way that the crop enjoys optimum dose of nutrients at different critical stages of growth. HIL supplied the water soluble fertilizer.

Hybrid Seeds

F 1 Hybrid seeds of carrot (Romamse) and seed potato of (Giridar variety) were provided by the Hindustan Insecticides Ltd.,

Plant protection

The fungal and bacterial diseases used to affect the potato and carrot. The farmers were trained on various methods of plant protection ie agronomical, chemical and biological pest and disease control during their training at Hosur and Udumalaipet.

The farmers were taken to Hosur and Udumalaipettai to provide them hands on training on precision system of agriculture and marketing.

Market visit and Buyer seller meet:

The farmers visited Hosur market, Coimbatore market and interacted with the buyers to understand the price trend over an year for different commodities. Two Exporting firms came to project site and negotiated with the farmers for long term buy back tie up.

Expert visits were also arranged and farmers did good interaction with experts.

Plastic crates, packing materials, farm tools and pond lining sheets, hose pipes, HDPE pipes, PP bags, vessels of small and big (barrel)containers for packing seeds etc have been introduced in agriculture and all such plastic items were accepted and embraced by the farming community as on date and there was no profitable agriculture without plastics.

Outcome: Economic domain

The harvest of carrot and potato is in progress. The farmers harvested 60 percent enhanced yield in both the crops inspite of non stop, unprecedented and torrential rains for 25 days during December 2015. In the ensuing summer, the farmers are hopeful of 80 percent enhanced yield and good price in the market. Every farmer appreciated the ease of cultivation due to introduction of plastics. Social domain: A new area of 4.2 ha was brought into cultivation for the first time around the periperi of the village where



Dr. Vadivel from Agri Systems Foundation & Dr. Vasudeo with village leaders

they pooled every resource and did all operations collectively. They also learnt that group approach (two registered groups), shared responsibilities and collective approach not only reduced the cost of cultivation but also attracted the attention of the district administration, which provided new roads, bridges and other social amenities to the village and now every department prefer to extend the benefit of their new schemes to the Sullikoodu village. The district administration and few corporate firms came forward to scale up the project in further 40 ha on this plastic intensive model.



Mr. Surjit K. Chaudhary IAS, Secretary Chemicals & Petrochemicals, GOI visited Sullikadu village several times.

*Dr. Yatish B. Vasudeo - PlastIndia Foundation, Mumbai
with inputs from Dr. E. Vadivel - Agri Systems Foundation*

INDIA PAVILION at



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Plastindia International University - on Move

Plastindia Foundation has great pleasure in announcing that Plastindia International University (PIU) at VAPI which was under wrap, is now moving forward.

A committee of members has been formed comprising of one representative each of Founder Members and Past Presidents as advisors, which is actively working. The new team of office bearers lead by Shri K.K. Seksaria as President, Shri Rajiv Raval as Vice President, Shri Raju Desai as Treasurer and Shri Subhash Kadakia as Immediate Past president are actively supporting the noble cause, which is envisaged.

The Project Report of the PIU is ready and discussed thoroughly with the help of Shri Achal Thakkar, Co-Chairman of Empowerment Committee and other professionals.

Again the relationship with Lowell University Massachusetts has been put on high priority. Full team is under one voice and supporting the cause of establishment of PIU to go forward. The Project Report includes the financial outflows and inflows.

To create awareness in industry, we participated in Plexpo India 2016 exhibition held in Gandhinagar, Ahmedabad from 7th to 11th January 2016, alongwith Plastindia Foundation Booth. To our surprise there was a wonderful response from the industry stalwarts including students, faculties, employers and Government officials. All felt that this project is the need of the plastic industry. During the Plexpo exhibition, in the All Association Meet attended by associations of North, South, West and East, they totally supported the project to our great satisfaction.

PIU proposes to offer 3 streams i.e. Plastics, Mechanical & Chemical Engineering

Bachelor's Degree – B.Tech, Master's Degree – M.Tech, Doctorate programme – PhD, Management of Technology, Continuing Education Programme CEP, Management Development programme. One of the best Architects in Ahmedabad, M/s, HCP Design, Planning & Management Pvt. Ltd., who are famous for making Sabarmati River Front & Petrochemical University (PDPU) in Ahmedabad. He has been assigned the work of designing and layout of PIU. Just for the benefit of the knowledge of the students, given here below is today's Fee Structure of Lowell University Massachusetts.

University of Massachusetts		
	In-State	Out of State
	Massachusetts Residents only	Outside of Massachusetts and International
Undergraduate	\$ 22,739	\$ 29,125
Graduate	\$ 18,398.36	\$ 32,637.08
	Cost includes Tuition Student Activity Fee, Operating Fee and Campus Tech Fee	
	Cost does not include Room and Board, Meal Plans, Graduation Fee, International Student Fee, Health Insurance Fee, First Year Student Fee, Advanced Health Assessment Fee or Masters of Education and Instruction Pre-Practicum Fee.	

Plastindia International University aims at giving same best quality of education at affordable fees.

We have full confidence that our Plastic & Polymer industry with its size of Rupees 1,44,000 Crores, will make PIU a grand success for its own future growth, and thus our country.

Arvind M. Mehta

Chairman –Empowerment Committee, Plastindia International University (PIU)

Past President – AIPMA and Plastindia Foundation



PLEXPOINDIA 2016

An Awestruck International Plastic Exhibition



The 7th edition of PLEXPOINDIA 2016 International Plastic Exhibition organized by Gujarat State Plastic Manufacturers Association [GSPMA] was held between 7th and 11th January, 2016 at The Exhibition Centre, Gandhinagar (Gujarat).

The Exhibition was inaugurated by Shri. Nitin Bhai Patel, Hon'ble Minister & Family Welfare, Government of Gujarat



The event was supported by Ministry of Chemicals & Fertilizers, Department of Chemicals & Petrochemicals, Government of India, INDEXTb, Industries Commissionerate, Gujarat along with Plastindia Foundation & all major plastic associations of India. More than 300 exhibitors nationally & 18 international exhibitors from different segments of plastic industry participated in this event. Many business/trade visitors, dignitaries, VIPs, Government officials, Students & faculties from Engineering/Management/Design Universities/Colleges and general public witnessed the show. The exhibition concluded with vibrant business opportunities for exhibitors & visitors with strong industry presence.

Key Highlights Of PLEXPOINDIA 2016

- No. of exhibitors- more than 300 national & 18 international
- Business visitors - more than 35,000
- Live Demo of latest Plastic processing machineries
- Gross Area covered 25,000 sq. mts.
- Theme Pavilion : PLASTICS IN ENVIRONMENT, PLASTICS IN HEALTH CARE, NCPAH (Ministry of Agriculture, Govt. of India]
- Plastics Processing machineries

MAJOR EXHIBITOR GROUPS

- Plastics Raw Materials/Compounds/Thermoplastics
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- Instruments & Controls
- Specialty Chemicals/ Additives
- Associations/Institutions
- R&D Institutions
- Technical Education Institution



By Shri. Tushar Parikh- Chairman, PLEXPOINDIA 2016 in presence of Shri.Nitin Shah- President, GSPMA along with GSPMA & PLEXPOINDIA 2016 Team.



PRESENCE AT GANDHINAGAR

Plastivision Arabia 2016 industry meet was organized by The All India Plastics Manufacturers' Association (AIPMA) on 23/12/2015 at 19:00 Hrs onwards at Hotel Narayani, Gandhinagar. The industry meet was attended by over 100 plastic companies' owners from Ahmedabad, Gandhinagar, Vadodra, Mehsana etc. 5 Medias were also present. The event was lead by Shri Manish Dedhia, Shri Harish Dharamsi and Shri Harshad Desai and attended by Shri Er. R. K. Aggarwal, President, AIPMA and Shri Vajubhai Vaghasia, Special Advisor. Shri Govindbhai Patel, Hon. Minister of State, Energy

& Petrochemicals, Science & Technology, Government of Gujarat was the chief guest of the aforesaid event. Smt. Mamta Verma, Commissioner of Industries, Government of Gujarat was the Guest of Honour. The Guest of Honour of the event could not attend the event due to urgent meeting convened by his Senior Officer in Secretarial Office of Gujarat. She had deputed Mr. N. M. Trivedi Joint Commissioner of Industries, Government of Gujarat for the above event.

The event was supported by Reliance Industries Ltd., Prasad Group & National Stock Exchange (NSE).



Dignitaries present (L TO R) Shri Er, R. K. Aggarwal – President AIPMA, Shri Vajubhai Vagasia – Advisor AIPMA, Shri Ramesh Thummar – Co Chairman, Plexpo 2016, Shri Govindbhai Patel, Hon. Minister of State, Energy & Petrochemicals, Science & Technology, Government of Gujarat, Shri Harish Dharamsi – Chairman Plastivision Arabia 2016, Shri Harshad Desai – Chairman Delegation Committee PVA 2016

7th International Plastics & Packaging Exhibition organized by Gujarat State Plastic Manufacturers Association (GSPMA) held from 7th to 11th January, 2016 at Helipad Ground, Gandhinagar (Gujarat). Large number of visitors from all over the country including delegations from countries China, Taiwan, Sri Lanka, Germany, etc. visited the exhibition. Moreover many dignitaries, VIPs, Government Officials, High School Students, Management / Engineering Faculty along with their student and General Public at large viewed the exhibition.

Mr. R. K. Aggarwal – President, Mr. Sanju Desai – Senior Vice President, Mr. Haren Sanghavi – Vice President (West Zone), Mr. Meela Jayadev – Vice President (South Zone), Mr. Arvind

Mehta – Chairman AIPMA Governing Council, Mr. Kailash Murarka – Chairman PVI 2017, Mr. Rituraj Gupta – Co-Chairman PVI 2017, Managing Committee Members – Dr. Asutosh Gor and Mr. Chandrakant Turakhia were the dignitaries of AIPMA visited AIPMA Stall.

Team Plastivision Arabia 2016 promoted dedicated theme pavilion like Plastics Finished Goods Pavilion, Arabia Mold Pavilion, and Processing Filling & Packaging Pavilion during the Exhibition.

All in all it was a successful event and provided a perfect platform for both our mega exhibitions Plastivision Arabia 2016 and Plastivision India 2017.

Mr. Arvind Mehta – Chairman AIPMA Governing Council, Mr. Sanju Desai – Senior Vice President, Mr. Haren Sanghavi – Vice President (West), Mr. Rituraj Gupta – Past President discussing at the Stall





Corporate Learning Programme (CLP)

Indian Plastic institute (IPI) proud to announce the introduction of our new Corporate Learning Programme (CLP) PLASTICS FOR NON PLASTIC PEOPLE. This is aimed for people dealing with plastic raw materials and products in the plastic industry but not familiar with the science of plastics. The aim of IPI is to familiarize these non - plastic people, the basics of plastic material, its properties and end products performance. This programme has following modules:

1. Introduction of polymers
 - What are plastics
 - How plastics are produced
 - Basic properties of Polymers &Plastics
2. Fundamentals of Polymer Processing & Processing Methods
3. Role of additives
4. Basic testing of plastics: Key mechanical properties (MFR, Tensile etc.)
5. Polymer products & Applications
6. Future of plastics, latest development in Plastics.
7. Group Discussion

This programme is designed for a 4-5 hrs. Class room training including open house discussion.

Who all should attend this programme?

New entrepreneurs, People in Sales & Promotion, People in Accounts & Purchase, People in Legal and Regulatory affairs, Managers, Supervisors & Operators. IPI also Offer this programme to Corporates and Business Houses at their Business Locations. The entire schedule will be supervised and conducted by our experts of IPI.

The modules offered:

	Module	Content
1	History of Plastic	This display chronicles some of the key discoveries, Invention
2	Introduction of Polymers	What are Plastics. How they are made and Processed. What are their Basic properties
3	Fundamentals of Polymer processing & processing methods	Rheology, Screws & Design. Common Processing methods, Typical Properties
4	Role of Additives	Mechanism of Degradation, Additives and their role in Product Performance
5	Testing Of Plastics	Characterization Plastics. Identification Methods, Mechanical properties, Thermal Properties
6	Polymer Products & Application	Plastics in Daily use, Typical structures
7	Key Drivers & Latest Developments	Key Sectors in plastics
8	Future of Plastics	Exciting Applications
9	Plastics and Environment	Sustainability, recycling

Programme Schedule/Details:

- One full day Programme with selective modules
- Lecture by Qualified experts
- Video clippings
- Question answer sessions
- Supported with Study Material
- Participation certificate

INDIAN PLASTICS INSTITUTE

30-Sarvodaya Industrial Estate 1st Floor, Near Paper Box Factory, Off Mahakali Caves Road, Andheri (East), Mumbai, Maharashtra 400 093, India.

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Founder members activities



PLEXCONCIL Participated and organized Indian Pavilion at Saudi PPPP 2016, the 13th International Trade Exhibition for Plastics, Petrochemicals, Printing and Packaging Products & Technologies, Riyadh, Saudi Arabia January 18 - 21, 2016

45 prominent Indian companies from plastics and allied industries sector participated in this prestigious event under an exclusive 'India Pavilion' showcasing India's strength and expertise in manufacturing plastic products of world class quality, the latest machinery and the technological advancement made by it in this sector. The Indian pavilion was also exhibiting a wide range of household and industrial plastic products, medical devices and related machinery.

Mr. Hemant H. Kotalwar, Charge d'Affaires, Embassy of India, Riyadh inaugurated the India Pavilion and interacted with the

exhibitors. Mr P K Agrawal, Second Secretary (E&C), Embassy of India, Riyadh also attended the event.

Embassy of India Riyadh, in coordination with the Riyadh Chamber of Commerce & Industry (RCCI), organised a B2B interactive session for the participating Indian companies at RCCI premises on 19th January 2016 where businessmen from both the sides interacted with each other for mutually beneficial opportunities of collaborations and enhancing trade in this sector.



Mr Hemant H. Kotalwar, Charge d'Affaires, Embassy of India Riyadh, Saudi Arabia Inaugurating India Pavilion.



Mr Hemant H. Kotalwar, Charge d'Affaires, Embassy of India Riyadh, Saudi Arabia interacting with the Indian Exhibitors



Mr Hemant H. Kotalwar, Charge d'Affaires, Embassy of India Riyadh, Saudi Arabia interacting with the Indian Exhibitors.

Indplas'15- the 7th International Exhibition on Plastics

Indplas'15 – the 7th International Exhibition on Plastics, organized by Indian Plastics Federation was held from November 27-30, 2015 at Science City Ground, Kolkata. The exhibition was formally inaugurated on 27th November 2015 by Chief Guest Dr. Amit Mitra, Hon'ble Minister of Finance, Commerce & Industry, Government of West Bengal. Heads and members of leading associations, members of the Managing Committee of Plastindia Foundation and many dignitaries were present during the inaugural function.



to showcase use of plastics in everyday life. NCPAH stall showcased use of plastics in horticulture and plasticulture.

The exhibition concluded on 30th November 2015. The entire team Indplas'15 comprising of experienced and young new members worked extremely hard day and night and contributed to their best in the success of the exhibition. Feedback received from exhibitors and visitors has been extremely encouraging. We are confident that the success of this exhibition will motivate us to have an even better and bigger exhibition in 2018.



The exhibition was held on an area of 40,000 sq. m. There were 291 exhibitors and many with live demonstration of machines. Around 50 foreign exhibitors participated in the exhibition, with separate Chinese and Taiwanese pavilions. A 40 member Chinese delegation visited the exhibition on 28th November, 2015. Large number of visitors from all over India and specially from eastern states attended the exhibition. Visitors from neighboring countries and other parts of the world also attended in large numbers.



A Gala Nite programme was held on the evening of 28th November, 2016 for the entertainment of the Exhibitors. Awards in various categories viz. best designed stalls, most innovative finished product displayed, best overseas stall of China and Taiwan, best machinery stall etc. were given in the Award Nite function held on the evening of 29th November, 2015 to recognize the efforts of exhibitors. Students from different schools also visited the exhibition to learn about plastics. A theme pavilion "ALL IS PLASTICS" was constructed





Important events & happenings of CIPET

Technical Seminar on “Positive Attributes of Plastics & its Waste Management”

One day technical seminar on “Positive Attributes of Plastics & its Waste Management” held at Varanasi, Uttar Pradesh on 18th December, 2015 was organised by CIPET with the support of Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India.



Poster & Slogan writing competition for the School students was also conducted & prizes were distributed during the seminar



Around 175 participants including State Government Officials, Plastics manufacturers, processors, recyclers and distributors from Rajasthan, people from press and media, NGOs and Students attended the Technical Seminar.

INAUGURATION OF HOSTEL BLOCKS AT CIPET JAIPUR:

New Hostel Blocks of CIPET Jaipur was inaugurated by Shri. Ananth Kumar, Hon'ble Union Minister of Chemicals & Fertilizers at a function organized on Thursday, November 19, 2015. In his inaugural address, he announced that Rs. 100



Crore investment will be done in CIPET Jaipur to start B.Tech, M.Tech & Ph.D programmes, to establish Deptt. of Plasticulture, Green house, Highend Testing Lab with the facility for Bio Plastic testing & Research. In order to ground the facilities, he requested the Govt. of Rajasthan for the allotment of 10 acres land to CIPET Jaipur. He exhorted state govt. & CIPET to move at a rapid pace to start the announced expansion within 100 days. In response to this, Hon'ble Minister for Technical & Higher Education, Govt. of Rajasthan assured that state govt. will provide the required 10 acres of land to CIPET Jaipur.

About 700 delegates from various Government deptts., Plastics Manufacturers' Association Rajasthan, Sitapura Industry Association, Plastic Industry and Chamber of Commerce, students fraternity etc. attended the inaugural function.

INDPLAS'15

CIPET had participated in the Indplas' 2015 exhibition held between November 27-30, 2015 at Kolkata and exhibited a stall depicting the various activities / programmes of CIPET and the various schemes of administrative Ministry for the plastic industry

6th National Awards for Technology Innovation:

6th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry (2015-16) was organized by CIPET during January 20th, 2016 at FICCI, New Delhi. Hon'ble Minister for Chemicals & Fertilizers - ShriAnanth Kumar rewarded the awardees of the 6th National Awards for Technology Innovation in Petrochemical and Downstream, Plastic Processing Industry in the presence of Shri - Hansraj. Gangaram Ahir, Hon'ble Minister of State for Chemicals & Fertilizers, Secretary to the Govt. of India, Deptt. of Chemicals & Petrochemicals, Special Secretary & Financial Adviser, Joint Secretary (PC) presided over the function.



Organization of Plastic Processors of India

Kisaan Raja 2016



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Mail: plasticulture@plastindia.org



Plastindia Foundation, 401, Landmark 'B' Suren Road, Off Andheri Kurla Road, Andheri (E), Mumbai 400093, India. Website: www.plastindia.org

Foundation activities

Plastics & Rubber Indonesia 2015

Plastindia Foundation participated in Plastics & Rubber Indonesia 2015 held at Jakarta from 18 Nov – 21 Nov 2015 with 9 sq mts stall.



Meeting with Indonesian Packaging Federation – Ms. Ariana Susanti – President, Mr. Henky Wibawa – Executive Director in foundation activities



Meeting with INApas – The Indonesian Olefin Aromatic & Plastic Industry Association – Mr. Suhat Miyarso – President Director, Mr. Edi Riva’l – Vice Chairman of Industry Olefin & Aromatic, Mr. Donny Syarief – Vice Chairman of Organisation Affair, Mr. Fajar A.D. Budiyo – Secretary General.

Indplas 15

Plastindia Foundation participated in Indplas 2015 held at Kolkata from 27 Nov – 30 Nov 2015 with 18 sq mts stall.



Mr K K Seksaria President PIF (Guest of Honour), Mr Rajiv Raval Vice President PIF at the inauguration of Indplas 2015. Others in the picture are Mr Ajay Desai Co Chairman Plastindia 2018 and Mr Tushar Parikh Co Chairman Plastindia .



Plastindia Foundation stall – Mr K K Seksaria President PIF and other Office Bearers in a meeting with Senior members of Plastics Industry.

Plexpo 2016

Plastindia Foundation participated in Plexpo 2016 held at Gandhinagar from 7 Jan – 11 Jan 2016 with 36 sq mts stall.



Inauguration of Plastindia Foundation Stall by Mr K K Seksaria President Plastindia Foundation



Mr K K Seksaria President PIF and his team with Mr Arvind Mehta Chairman Empowerment Committee (Plastindia International University)

International Plastics Fair

Plastindia Foundation participated in International Plastics Fair held at Dhaka from 20 Jan – 23 Jan with 9 sq mts stall.



Mr K K Seksaria President PIF and Mr Pradeep Nayyar CO Chairman NEC Plastindia 2018 at Plastindia Foundation stall

Plast Pack 2016

Plastindia Foundation participated in Plast Pack 2016 held at Indore from 29 Jan - Feb 2016 with 9 sq mts stall.



Mr Ameya Gokhale from Team Future Communication presenting the participation certificate to Plastindia Team in Plastindia Foundation Stall at Plast Pack 2016.

Poly India 2016

Plastindia Foundation participated in Polyindia 2016 held at Mumbai from 28 -30 Jan 2016 with 54 sq mts stall.



Mr K K Seksaria President Plastindia Foundation and Mr Rajeev Chitalia Chairman NEC PI 2018 at PIF stall in Polyindia 2016

President in Action



President Plastindia Foundation Mr K K Seksaria and Co Chairman Plastindia 2018 Mr Pradeep Nayyar at 25 th Asia Plastic Forum Meet at Dhaka during the international Plastic Fair. Mr K K Seksaria presented the country paper at the APF meet.



Inauguration of PIF stall at Polyindia 2016 by Mr Arvind Mehta Chairman Empowerment Committee PIF and Mr Raju Desai Hon, Treasurer PIF



Mr Karthikeyan K S, Mr Arvind Mehta, Mr Ajay Shah, Mr K K Seksaria President PIF at the International Conference on Polymers & Plastics – Polyindia 2016

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PLASTINDIA 2018
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10th International Plastics Exhibition, Conference & Convention
Feb. 7-12, 2018, Gandhinagar - Ahmedabad, Gujarat.

The Plastindia 2018 will be organised in the same venue of Plastindia 2015 - Gandhinagar, the capital city of Gujarat. An emerging financial hub of India which offers a futuristic infrastructure with excellent connectivity. A world-class infrastructure designed and developed at par with the other leading exhibition venues across the world.

Highlights of Plastindia 2018

- Total Gross Area - 1,25,000 Sq. Mtrs.
- Targeted number of Exhibitors - 2000
- Participation from around 45 Countries
- Participation from nearly 600 Overseas Exhibitors
- Concurrent Events - Proplast, International Conference, Plasticon Awards, Plastwin, B2B

For Participation Contact



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