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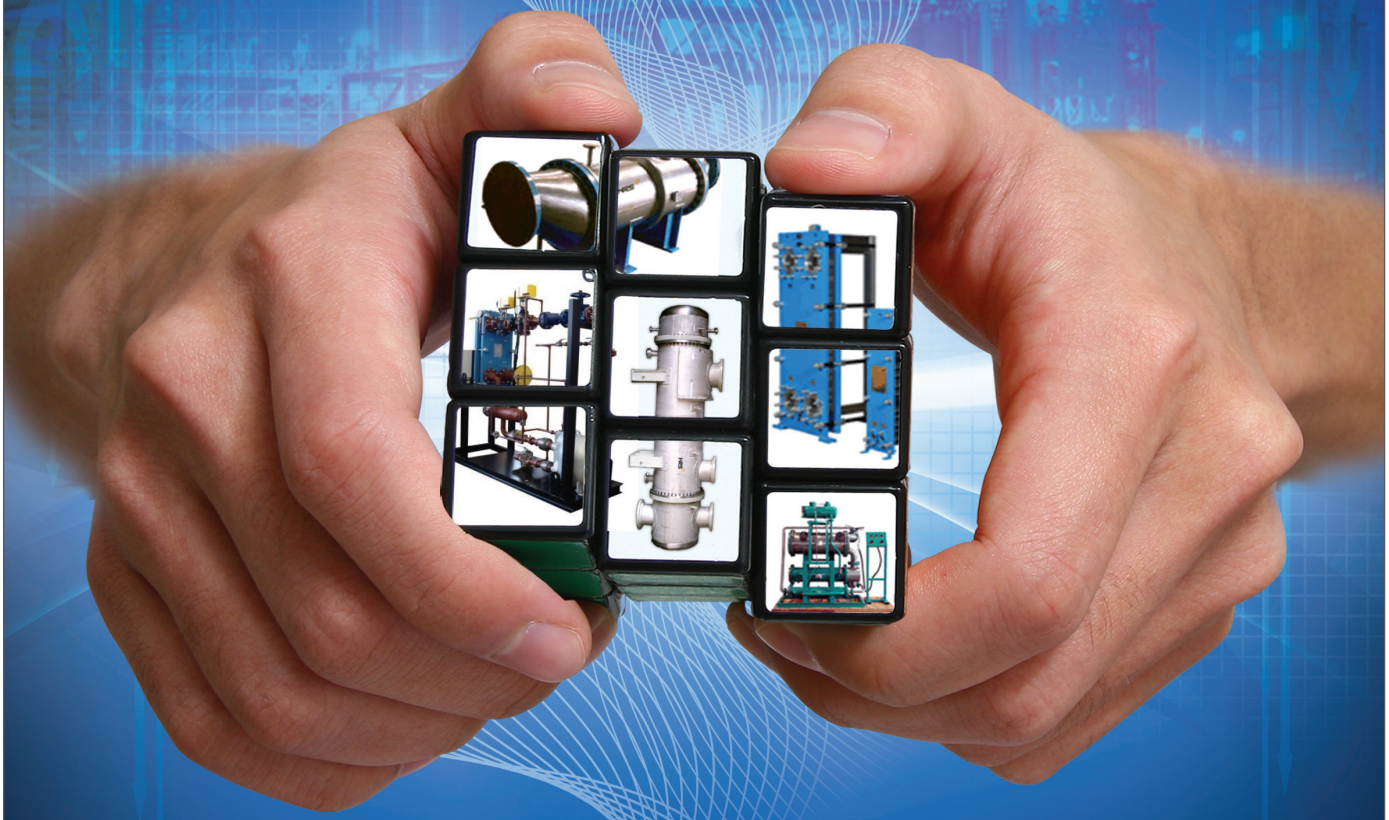

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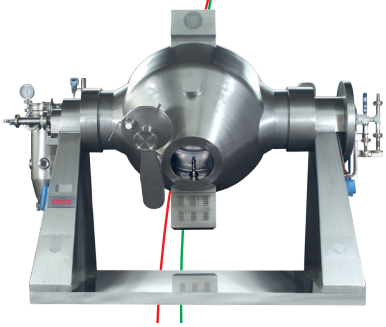

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Practicing Sustainability is of Utmost Priority in Pharma Today

In this article, the author narrates how the impact of industrial expansion leads the industry to transform towards Sustainability and Circular Economy, from traditional linear approach. And, along with that, there's also an account of what Cadila has been practicing to attain Sustainability.

Biswajit Mitra
Chief Mentoring Officer
Cadila Pharmaceuticals Limited

Over the past century, Indian industrial production has seen more than 50-fold growth. This rapid industrial growth has had a disastrous effect on pollution levels. This is why sustainability needs to be a key driver for innovation today. In the race to save the planet, all organizations need to pitch in and support the sustainability goals. As per the Central Pollution Control Board (CPCB), 77 percent of the industries contribute to water pollution, 15 percent to air pollution, and the remaining 8 percent commonly to both air and water pollution. Thus the role of sustainable manufacturing and circular economy has become highly critical.

Sustainable Manufacturing is the Future of the Manufacturing Industry

In a world where resources have been depleting day by day, sustainable manufacturing is an important initiative and we need to innovate ourselves towards it in this journey. We, at Cadila Pharmaceuticals, look beyond the extractive industrial model of take-make-waste. Cadila has been into the transition leading to circular economy from the traditional linear economy. Our focuses are on re-defining the growth definition and also on taking initiatives to impact the whole society. In order to do this, we facilitate product reuse, recycle, and cascading. This includes the supply chain logistics, sorting, warehousing, risk management, and power generation. With cost-efficient better-quality collection & treatment systems, and with effective segmentation of end-of-life products, the leakage of materials out of the system will decrease, thus supporting the economics of circular design.

The circular economy is not only beneficial to the environment, but also leads to the cost reduction and revenue growth. The pursuit of sustainability actually leads to a higher quality product, with fewer defects and rejects.

Aspects of Sustainable Manufacturing

There are four important aspects we need to consider when we talk about sustainable manufacturing:

1. Functionality first
2. Waste reduction and converting it into product development
3. Investing in energy and utility saving solutions
4. Sharing of ideas and experiences

The demand in the pharmaceutical industry is growing and so is the need for the industry to transform. But it is not that simple; there are multiple hurdles that need to be overcome. Notably there's a shift toward smaller batch-runs that enables product diversity. Not only is that, it requires more frequent changeovers that can create significant obstacles for pharma companies on

In a sustainability strategy, it's important to remember that any packaging which falls short of serving its purpose is never sustainable — no matter the material reduction, recyclability, or use of recycled materials.

their way to reduce energy consumption and to make an overall environmental impact. Additionally, advancements in drug delivery have also been happening with growing variety. Accurate dosing is of the utmost importance. Therefore when patients and consumers achieve better results with oral, injectable, or nasal sprays versus other formats, companies have strong incentives to offer those new delivery mechanisms.

Packaging remains an important factor in the pharmaceutical industry. In a sustainability strategy, it's important to remember that any packaging which falls short of serving its purpose is never sustainable — no matter the material reduction, recyclability, or use of recycled materials.

Although the high efficacy, sterility, and safety standards of the pharmaceutical and medical device industries provide some barriers to traditional avenues of material savings, the requirement for change in production facilities is immense. Anything contradicting the sustainability objectives needs to be done away with. This also means that huge opportunities are being opened up for innovation.

For example, if the pharma and medical device sector start collaborating with each other having an intent of combining pharmaceutical products and medical device delivery systems, it would mean the simplifying and making the overall products more convenient, which ultimately would lead to the requirement for less packaging. This collaboration is similar to one between pharmaceutical and medical device manufacturers in the implantable device space.

Pill bottles equipped with digital timestamp readouts are another example of innovation. They remind patients to take their medication and can be monitored remotely by a doctor to ensure patients taking the correct dosage. These examples highlight how important it is for organizations to drive innovation in order to ensure that they meet up the sustainability goals. The UN's sustainable development goals also align with the same concept of responsible consumption and production.

Initiatives of Cadila Pharma:

Cadila Pharma has taken this goal as a part of their 5-year strategy and has been working towards building a resilient infrastructure and promoting initiatives which foster the innovation in order to achieve sustainability. Some of these initiatives include generating the energy through solar panels and rainwater harvesting. Water segregation, disposal, and recycling also remain a part of the core goals. As a part of the 2025 goal, we also target to reduce CO_2 emission by 20 percent and water consumption by 25 percent.

Cadila has successfully implemented many circular economy principles. To name a few,

- Sustainable supply chain and promotion of eco-design.
- Encouraging industrial and territorial ecology to optimize resource management in collaboration with several local economic partners.
- Extending the usage period through reuse and recovery processes.

Conclusion:

While the pharmaceutical business is always affected by customization and product diversification, the need for sustainable practices is of utmost priority. Looking at the changing environment, it is necessary for the organizations to make continuous choices and to do their bits in contributing to sustainable development. ■

As a part of the 2025 goal, Cadila targets to reduce the CO_2 emission by 20 percent and water consumption by 25 percent.

Sustainable Manufacturing and Circular Economy in Pharma Industry

Sustainable manufacturing and circular economy maintenance being one of the major concerns for pharma industry, the author here in this article has given a comprehensive account of where does the industry stand, as well as what Pioma Chemicals has been practicing towards it, thus making the article a time-compliant read.

Jaynil Pankaj Doshi
Head – Business Development
Pioma Chemicals

Why Sustainability and Circular Economy?

Sustainability is no longer a value addition to your existing circumstances, but a necessity for a better future. The Pharmaceutical Industry is largely based on the intensive research & development initiatives with an objective to provide healthy life and also to cure the existing health problems. So, in order to stay at par, it won't be very wise for pharma industry not adapting to the sustainable development in terms of the manufacturing, supply chain, as well as the research & development initiatives. All these initiatives prevent the disastrous consequences of industrial activities upon the life & environment of all living beings. Hence, the collective efforts are mandatory to curb the stress on our environment with an ultimate intention of improving the human health. Approaches across the industry have started with a reduction-reuse-and-recycle approach across the levels. Installing water treatment systems have become mandatory for factories applying for certifications, whether it's for domestic use or for export. To promote the reuse of goods, the raw material industry has shifted from HDPE & LDPE drums to Double Liner Bags, Fibre Drums, Cartons, and Tin Drums. This has not only reduced the use of plastic & non-biodegradable material causing to environmental hazards, but also has increased the usage of reusable material.

Circular Economy is the need of the hour. It is about changing the mind-sets and the business models. Even though this approach requires time and patience, in the long run – this will lead to waste reduction across the levels and across the industry. Circular economy will ultimately end up relieving the pressure on our resources and our environment. The intension is to provide our economy a more sustainable direction.

- Reducing carbon footprint is the major step which will have a direct impact on the positive improvement of our health & lifestyle.
- Innovation, efficient material usage, and long-term business value improvement will get the major boost with a prominent focus on circular economy.

Restrains and Improvement Areas:

It is important to note that implementing sustainability and circular economy will face some major challenges for the pharmaceutical sector as it is not easy to change the existing methods & goods (raw materials as well as packaging materials) being used for medicines and vaccines. The reason being, these goods – unlike the other goods – must meet many different regulatory requirements to ensure the product quality.

Operational excellence & innovation are two of the core areas that need to be reworked according to the concept of circular economy. The factory is to be so designed that it can facilitate the natural flow of the goods towards the production advantage, to prevent additional energy usage, and also towards the reduction of efforts for goods movement on the floor. To add further, raw material manufacturers at times face wastage issue when the material gets stuck in the huge vessels and pipes while processing. This material can be removed separately during the cleaning process. However, this is not viable for further use, because it may or may not comply with the regulatory requirements enforced in the pharmaceutical industry. In this regard, it is of note that instead of disposing, these goods can alternatively be used for non-pharma purpose thereby reducing the waste.

Pioma Practicing Circular Economy:

With an industrial experience of over 3 decades and with the requisite technical expertise, we have come around with the idea of sustainable product development and are also making it a priority. It has been a conscious effort from our side towards making a better future. We have also come up with an idea of using our strengths, i.e. the products and the application

oriented knowledge, with a further touch of innovation towards the mentioned purpose. To name a few – reducing the waste, shifting to renewable energy resources, and reusing the products are some of the common practices that being adopted towards aiding the process. And in continuation to this, we have come up with a solution of reducing raw material consumption in product manufacturing, thereby reducing the stress on the entire chain right from the root. We have also come up with certain combinations of our polymers ranging in Hydrocel & Biopol® with an intention to reduce the quantity of excipients in a formulation, as well as the average weight & size of tablet. Though it appears as a small change, rippling effect is to be understood here to gauge the bigger picture. Reduced tablet size, in turn, will also lead to the reduction of raw material consumption and increased output from the same batch size. As a further consequential toting – reduced packaging material, required for smaller units, can be used to ultimately reduce the overall wastage of solvents and raw materials. With such reduction in consumption, the requirement for raw materials & packaging materials will also come down resulting to efficient production and drug delivery, with the compliance of regulatory requirements.

Initiatives by the Industry:

So far, many companies have taken initiatives towards carbon footprint reduction and to the broader extent – towards Sustainability and Circular Economy.

- One such is moving towards renewable energy resources. This would be a major movement in context of difficulty in changing or replacing the plastic for medicines & vaccines due to regulatory requirements, as mentioned earlier.
- Another initiative taken up by the pharma sector as well as encouraged by the regulatory bodies is: the reuse of water & solvents. As per certain regulatory requirements, setting up of an ETP and Water treatment plant in the factory premises has become a mandatory element. This norm is in existence, both in developed as well as in developing industries. In the pharmaceutical industry, water is one of the major ingredients in many medications, and also used in large quantities on daily basis for cleansing purpose. Recovery & reuse of water have become a major source of waste reduction, thus can be counted on as a sustainability quotient.
- Raw material & packaging material manufacturers have been increasing their use of computerized systems and artificial intelligence to reduce the human intervention in the process & automation, which has further led to improved output & reduced wastage while maintaining the product quality. This has been one of the most impressive steps towards reducing wastage while enjoying the product consistency from batch to batch.
- Presently, the need for plastic elimination is at an all-time-high across the globe. However, Pharmaceutical Industry still continues to be a major consummator of plastic and is yet to find an alternative option. And at the current scenario, this confers to the major challenge of unavailability of suitable alternatives. Nonetheless, it is of note that efforts are in place to recycle the plastic waste to the maximum possible extent.

Benefits in Nut-shell:

Circular Economy brings multiple benefits to the table.

- It helps in waste and carbon footprint reduction, with output increment and efficacy improvement. It also reduces the environmental damage caused by resource extraction. There would be less pollution entering the earth's life support systems.
- It also leads to increased resource savings which confers to a positive impact on our economy as well as on our environment having a statistics of alarming resource depletion.
- It makes provision for new jobs in the green industries because of the increased requirement of labour towards reducing, reusing, and recycling of goods. It in turn makes an impact through the unemployment rate reduction thereby helping in the economy growth.
- It's been a stimulus to increase the efforts towards innovation and is a big boost to it. Though this may or may not have a direct impact on the economy, it surely has a positive process oriented outcome.

Conclusion:

Overall, circular economy has all the positives in every aspect thereby making our lives and environment friendlier as well as brighter for the future. Circular economy is about all green and no red. Its benefits once achieved will be felt at every level of the environmental chain and every level of the pharmaceutical industry. It is the spearhead of the sustainable development that the world has been talking about for years at various forums, in political agendas, as well as through national policies. However, with increased awareness & proactive steps being taken on regular basis and with innovation adding to the existing stream of efforts, we must look ahead at a positive outcome provided we do not cease or get discouraged when we do not achieve the immediate or short term results. It's a process to be devised for longer term and needs patience as well as proactive approach towards immediate action without losing the faith in the process to relish the benefits and to be proud of it in the coming future. ■

Circular Economy is the need of the hour. It is about changing the mind-sets and business models. Even though this approach requires time and patience, in the long run – this will lead to waste reduction across the levels and across the industry.

Upward Trail of Sustainability: Technology as an Enhancer

Although sustainable manufacturing is a decade old concept, pharma manufacturing industry has started the spot-lighting very recently. And, as an adage, technology and digitalization do act as a great enhancer here towards the attainment of this objective. The author, in this article, narrates the scope in a very comprehensive and exclusive way.

India has been witnessing a major transition in the manufacturing industry. With introduction of new technologies such as Industrial IoT, robotics, cobots, industrial transport technology, 3D printing, etc, entire manufacturing industry have wrought huge changes in processes and production lines. Along with technological changes, another area – where manufacturing has been experiencing the changes – is: sustainability. Sustainability helps to manufacture the products with efficient resource utilization and economically sound process management that minimize the negative environmental impact and thus conserving the energy and natural resources at the same time. Sustainable manufacturing comes into force for the industry with required compliance regulation, waste disposal management, energy and water management, carbon footprint reduction, and also with the availability of more efficient and greener facilities.

While sustainable manufacturing is almost a decade old topic, the pharmaceutical industry has recognized the significance of efficient and environment friendly manufacturing process in the recent years only for a greener and cleaner world through carbon footprint and waste reduction, as well as smart water management. Many organizations have increasingly been putting their focus on reducing the Electronic waste (e-waste). Some are even taking it up as an act of Corporate Social Responsibility (CSR) from the point-of-view of carbon footprint reduction in order to have a healthier environment. On the contrary, manufacturing setups and factories have consistently been looking up to upgrade their existing systems towards smart management which ultimately leads to a catch-22 situation for the manufacturing setups and factories. If we look at it from a factory-perspective, both the activities are extremely important. While one will help the factories in becoming environment friendly by reducing e-waste, the other one will help them to become increasingly automated and smart.

Smarter machines and factories

In order to stay competitive and ahead in competition, machines and factories need to focus on technology. As the world has been moving towards Industry 4.0, digitalization, Industrial IoT, etc, the extent of focus on technology as well as on smarter operations through new products incorporation has drastically been increased. Such new technologies

Ninad Deshpande
Head - Marketing & Corporate Communication
B&R Industrial Automation Pvt. Ltd.

not only automate the processes, but also focus on efficient and optimized operations. This helps the factories to save millions which otherwise was incurred as the operational cost. Thus, incorporation of these technologies for machines as well as for factories is the topmost priority.

Ensuring higher machine availability reduces the downtime, thus ensuring higher productivity. Incorporating predictive maintenance ensures reduction in unplanned downtimes, leading to reduction in raw-materials-and-products wastage. In any pharmaceutical factory, – heating, ventilation and air conditioning, and cooling (HVAC) technologies consume high energy. Energy monitoring in different forms helps the factories to save energy, thus reducing the operation costs. B&R's energy monitoring package allows manufactures to measure, to record, and to analyse the energy consumption in order to support the continuous improvement process. It calculates and improves the effectiveness of individual machine or that of the entire plant.

For machine builders, incorporating virtualization means reducing the time to market the new machines and to avoid reworking. This eventually saves time and effort for them, which in turn helps them in waste avoidance. Gathering data from sources, viz. machines and lines, enables the factories to analyse the performance in real-time avoiding the human errors during the data entry activity which leads to spontaneous decision making. These are a few instances exemplifying the various benefits that are being confered to machines and factories by the technologies.

Sustainability management for industry comes into force with the required regulatory compliance, waste disposal management, energy management, carbon footprint reduction, and also for the availability of more efficient & greener facilities.

Smarter yet cleaner

There is a dilemma that machines and factories do face in making their operations smart, along with to be cleaner for the sake of healthy environment and life. Factories need to find their ways not only to be benefitted from smart manufacturing concepts, but also to take good care of the environment.

B&R Industrial Automation takes both the aspects seriously with providing next generation smart automation solutions for machines and factories with an endeavour to reduce the e-waste. B&R offers the machine builders an advanced automation technology and solution in order to incorporate them in the new machines to become future ready and innovative. In addition, it also provides solutions to the brownfield factories via leading-edge architectures, thus enabling them to use their legacy systems with the incorporation of new technologies. As a consequence, factories using B&R's edge architectures are able to leverage the benefits that those new technologies bring in – such as energy monitoring, predictive maintenance, condition monitoring, virtualization, IT / OT convergence enablement, remote access, seamless horizontal and vertical connectivity establishments, etc. to name a few. In addition to this, factories do also use e-waste reduction in order to become smart.

A step towards digital manufacturing and carbon footprint reduction

Industry understands the value as well as the potential of digital transformation, which has led to significant changes towards improvement. The companies who clutch these initiatives can give themselves a sustainable competitive advantage, and operate with greater agility, cost-efficiency, & control. This ultimately confers to the better care for the patients. Such edge architectures will continue to play a pivotal role in helping the factories to reduce their carbon footprint in their endeavour to becoming smart. ■

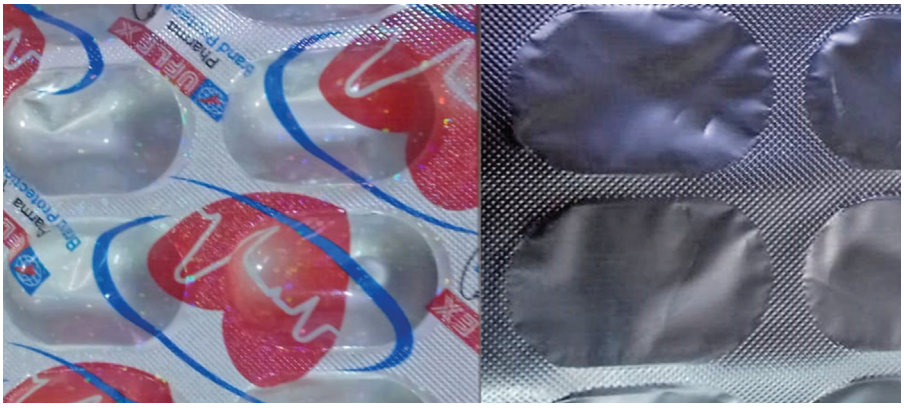
Alu-Alu Blister Packaging: A Silver Bullet towards Sustainability

Amitava Ray
Executive Director,
UFlex

Over the last few years, the healthcare landscape has undergone a paradigm shift. With new levels of transparency, stringent compliances, and improvement towards safe packaging, – the pharma products have evolved in manifolds. In general, healthcare is moving from a treatment model to a prevention model, which signifies the health of the packaged medicine to be at its best suiting to patient's consumption in every possible way. This led to resurgence of Pharma packaging with an objective to make the drugs hold their qualitative attributes for a longer duration, and also to protect it against – biological contamination & degradation as well as physical or mechanical damage during supply chain handling and also to avoid counterfeit. Drug Packaging also helps in having the correct information about the drugs / medicines in place which includes manufacturing date, ingredients, dosages, storage instruction, process, and much more.

Blister packaging, which is also known as unit dose packaging, is most commonly used in the pharmaceutical industry for packaging medicine. In this, a plastic sheet is thermoformed to form multiple cups or blisters that hold the product. Blister packaging is made from different types of polymers. Cold form blister packs are manufactured by sandwiching aluminum foil between PVC and Nylon films using dry bond lamination technology. The film laminate is simply pressed into a mold by a stamp without applying heat. Thus the material is called cold forming blister laminate. Over time, conventional PVC (Polyvinyl Chloride) and BOPA (BON) (Bi-axially Oriented Polyamide), films have been extensively used in the cold formed pharma packaging industry. The use of aluminum offers a near complete barrier for water and oxygen, allowing an extended product expiry date in cold form foil blisters.

However, the cold formed pharmaceutical blister pack carries quite a few environment threatening factorials. It



generates hydrochloric acid vapor in contact with sunlight/burning, which is extremely harmful for the environment. Besides this, exhibiting resistance to very low temperature is another shortcoming. It releases poisonous gases like dioxin & hydrochloric acid when PVC is recycled or reprocessed. BOPA (BON) on the other hand is also fraught with challenges like high moisture absorption to the levels of 8-10 percent making its processing difficult to form the packs. This in turn also leads to de-lamination and impairing the ability of the film to be chemically primed.

The Transformation to a Sustainable Pharma Packaging

The limitations and environmental threats of conventional packaging could have been a deterrent to the pharma ecosystem in the long run. Keeping these challenges of BOPA and PVC substrates in mind, UFlex has gone through an extensive R&D activities for almost two years and has come up with a special polyester film that provides a viable solution to the problems posed by BON and PVC films. UFlex has developed revolutionary Alu-Alu packaging where special polyester film has replaced the conventional Nylon and PVC while retaining the Aluminum. For this unique development, UFlex has also been granted a United States Patent covering entire categories of Formable Films that include one or more BOPET layers used in Alu-Alu blister packaging.

A typical Alu-Alu blister laminate, manufactured by UFlex, comprised of three layers viz 25 micron BOPA, 60 microns soft aluminum foil and 60 micron PVC. The special polyester film has replaced the top and bottom substrates of the conventional cold-formed Alu–Alu laminate, to a whole new structure of polyester based Alu-Alu Blister packaging which comprises of 25 micron special polyester, 50 micron soft aluminium foil, and 25 micron special polyester.

This speciality substrate that has been developed by UFlex can be laminated on both sides of the aluminum foil, without any problem quite like the one used in the conventional pharma packaging. The R&D team at UFlex was successful in bringing metaphase morphology which made it possible to form the film in Z direction which is a pre-requisite for blister packaging. The moisture consumption of this film has also been curbed phenomenally to 0.8 percent, which is 92 percent lesser than the earlier statistics.

Polyester is a para-crystalline material which possesses excellent barrier, clarity, printability, and hardness properties. Film forming and orientation of polyester augurs well for the creation of thin profile webs with excellent properties for use in flexible packaging. Aluminium offers high barrier properties against oxygen and vapor which are way beyond the requirement of the drugs packed inside. Thus, the use of polyester films to pack pharma products have become the most suitable alternative which lightens the overall weight of the ensuing laminate without deteriorating the quality of drugs packed inside and which eases the task of the supply chain with no compromise on the quality of the drugs.

Conclusion:

Alu-Alu packaging from the house of UFlex provides sustainability and cost optimization, thus giving it an edge over conventional Alu-Alu packaging. This special polyester film can also be recycled and reprocessed; and it is 100 percent environment friendly. Since both the PVC and BON have to be imported from other countries into India, UFlex has also been able to make this a completely indigenous product. With increased thrust on sustainable packaging by companies across the world, this new innovation has proved to be a game changer for the pharmaceutical packaging industry in India, as well as across the globe. ■

In spite of having many benefits, the cold formed pharmaceutical blister pack carries many environment threatening factorials. It generates environmentally hazardous hydrochloric acid vapor in contact with sunlight/burning. Not only is that, exhibiting very low temperature resistance is another shortcoming. It releases poisonous gases viz. Dioxin & Hydrochloric acid when PVC is recycled or reprocessed.

Recruitment Trends for 2020

Over the period of time, recruitment trend has been changed a lot. Now the entire recruitment procedure is dominated by automation, and human intervention is being implemented to the minimalistic level & only where it is absolutely required. Not only is that, social recruitment has also occupied a fair share in the pie of recruitment methods. The author, in this article, focuses on the recruitment trends for 2020 and forthcoming years.

Recruitment has always been a major challenge for organizations and 2020 will be no less different. In fact, the talent war is likely to get more intense with organizations vying to hire candidates that are both quality-and-cultural fit. 2020 will witness organizations redefining their recruitment strategy to build a solid talent pool.

This can happen only when HR is aware of the latest trends in hiring and incorporate them into their recruitment strategy.

Let's take a look at the top trends that will rule the recruitment landscape in 2020.

1. **It will be a Candidate-Driven Market :** A candidate-driven market is one where candidates have an upper hand over employers and command their own salary, perks, working hours, and other terms of employment. It's no longer the case of an employer choosing talent, rather its talent picking the employer of their choice and deciding whether the employer is worth joining. This means that there will be a tough competition among employers to recruit the same talent pool. Hence, employer branding and candidate experience will gain further momentum in the recruitment strategy.

According to the global survey titling 'Randstad Employer Branch Research', attractive salary and benefits (59 percent), work-life balance (46 percent), job security (45 percent), pleasant work atmosphere (44 percent), and career progression (37 percent) remain the most sought-after reasons to choose an employer.

A Career Builder survey titling 'Candidate Experience from End-to-End: What's Your Weakest Link?' highlights that while 82 percent of hiring managers think that candidate experience is extremely important, 86 percent of job seekers believe that employers should treat candidates with the same respect as they show for their current employees. 81 percent of job seekers say that employers continuously communicating status updates to them would greatly improve the overall candidate experience.

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2020 will see employers enhancing their employee value proposition and overall perception of the company's end-to-end recruiting process for better candidate experience.

2. **Use of Recruitment Automation Tools will Pick Up Speed :** Recruiters receive an average of 250 resumes per position and spend about average 5-7 seconds per resume. It takes an average of 42 days' time to fill a position which makes the recruitment cycle even longer and puts pressure on recruiters to hire fast. Traditional hiring is a tedious and time-consuming process based on gut and biased decisions. This often results in a poor hire. However, automation in recruitment has enabled to overcome the limitations of traditional hiring in a major way. Right from application tracking, resume screening and candidate communication to interview scheduling, telephonic interviews and auto-administered tests, recruitment automation tools can handle it all.

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Recruitment automation tools driven by artificial intelligence, gamification, natural language processing, and machine learning are already enabling organizations to make data-driven, logical decisions regarding talent and make human interventions only where it is necessary. Moreover, these tools also increase the candidate experience during the recruitment process. According to Career Builder study, 58 percent of candidates are less likely to join a company if they don't get a response to their application; 69 percent are less likely if they have a bad experience in the interview, and the same is true of 65 percent if they didn't hear back after an interview.

2020 and coming years will witness organizations leveraging automation tools heavily to hire talent.

3. **Employers will Increase Their Focus on Social Recruitment:** An SHRM survey revealed that 84 percent of organizations are already using social recruitment and 82 percent of them use it for hiring passive candidates. Social recruitment refers to tapping into social media platforms such as Facebook, LinkedIn, Twitter, online forums, and job boards for hiring candidates. Recruiters dig out information on candidates through their social media handles and activities to get insight into their profiles beyond resumes.

Social recruitment will become more popular among employers to hire millennial candidates in the next few years. Millennials will constitute 75 percent of the global workforce by 2025 and they are very active on social media, spending several hours a day online. So, social media makes a good platform to form connections with prospective candidates and spread a good word about the employer brand.

2020 will also see employers to fine-tune their social recruitment strategy. They will even explore Instagram as a powerful tool to showcase their work culture to candidates and use analytics in a big way to measure the effectiveness of a platform in successful recruitment.

4. **Employers will Look for Soft Skills on Resume :** 2019 Global Talent Trends research by LinkedIn revealed that 91 percent of hiring managers cited soft skills as a major concern, 80 percent struggle to find better soft skills in the market, 92 percent say that soft skills are more important than technical skills, and 89 percent have experienced lack of soft skills in bad hires.

Educational qualification, work experience, and/or technical skills will continue to hold importance on candidates' resume; but employers will start looking for soft skills such as critical thinking, communication skills, strategic thinking, leadership, disaster management, social responsibility, teamwork, problem-solving, creativity, resilience, time management and work ethics.

The LinkedIn survey also stated that soft skill assessment is also a major challenge during hiring. So, employers will also look for technology and automated tools that could enable them to test-and-map soft skills in candidates in terms of personality traits, weaknesses and strengths, interpersonal attributes, temperament, and attitude through speech, vocabulary, facial expressions, etc.

5. **Remote Workforce Hiring and Usage of Collaboration Tools will Increase :** When Google conducted a two-year-study of its remote workforce of 5600 employees across the US, Africa, the Middle East, Asia, and Europe, it found that around 30 company's meetings involve staff in more than two time zones and that of 39 involves staff in more than two cities! One of the key reasons for Google's remote workforce stands so strong and successful is: the implementation of technology infrastructure.

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The remote workforce is the need for both employers and employees. Employers want to attract and retain top talent, irrespective of geographical barriers. On the other side, employees are also expressing interest in working with companies that offer remote work capabilities to reduce challenges related to daily commute or relocation. In fact, the other reasons for which employees prefer telecommuting are: it improves their productivity and strikes a work-life balance.

According to a study by Global Workplace Analytics, non-self-employed remote workers have grown by 140 percent since 2005! The exponential growth is likely to continue in 2020. In order to maintain a seamless workflow and control for a remote workforce, organizations will incorporate a range of sophisticated technologies and collaboration tools such as VPN, VoIP, think apps, chatbots, etc.

6. **Employee Referrals will Become Important Sourcing Tool :** Employee referrals are perhaps the most undermined and underutilized source of recruitment, in spite of the benefits that it brings to the organization. Statistics indicate that employee referrals contribute to the average retention rate of 46 percent as compared to 33 percent in hires from career sites; new hires, sourced via employee referrals, generate 25 percent more profit than those hired by other means. Referrals can save organizations USD 3000 or more per hire. Moreover, employee referrals are also a valuable way to incentivise existing employees and boost their morale, engagement, and loyalty. Companies like Google, InMobi, Intel,

and Accenture are well-known for their employee referral programs.

Many organizations have realized the importance of employee referrals and will now be willing to have a dedicated recruitment strategy around it. Employee referral tools and software will also gain traction to automate the entire process flow, to give control and visibility over referrals, and most importantly - to make it easier for employees to give referrals.

Recruitment automation tools driven by artificial intelligence, gamification, natural language processing and machine learning are already enabling organizations to make data-driven, logical decisions regarding talent and make human interventions only where it is necessary. 2020 and coming years will witness organizations leveraging automation tools heavily to hire talent.

7. **Building and Nurturing Talent Pipeline:** Talent pool, recruiting inventory, talent pipeline - all are synonymous. The basic premise of the talent pool is to keep potential hires ready for sourcing. It is the data mining of candidates profiles who would be interested to work for your organization. The larger the pool, the better it is. It reduces the cost of recruitment & time spent on hiring, and also assures a better quality of hire.

A survey revealed that 72 percent of employers cited building talent pools as their number one priority in 2019 was to combat skill shortages. This trend will have a spillover effect in 2020 and in the succeeding years too. Organizations will forecast their recruitment need at least 4-5 years in advance and focus on building a ready, accessible pipeline for it. They will reach out to passive job seekers, college graduates, international talent, interns, former employees returning professionals (people who want to resume their professional life after career breaks or sabbaticals), and even internal talent to build this pool.

That's not all. Organizations will also make conscious efforts to nurture this pipeline by actively engaging the prospective hires and maintain their job interest. They will feed the talent pool by sending out personalized communication, newsletters, latest trends in job landscape, company updates, open positions, etc.

Conclusion:

Recruitment has significantly evolved over past five years. Technology and candidate expectations have been the major drivers of the upcoming trends in the recruitment domain. The above-mentioned trends for 2020 will serve as a guideline for your organization to solidify your recruitment strategy and to stay at the top of the talent war. There is no other option, but to follow these trends and leverage them to your advantage! ■

Glass Packaging in the Pharmaceutical Industry

Glass is a very important material in pharma packaging. Here, in this article, the author provides a detailed account of glass packaging with a special emphasis on market dynamics.

Rajesh Khosla
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AGI glaspac

Glass is the oldest form of packaging material, which is being used since 4000 BC as a packaging material to preserve food by protecting it from contaminants, etc. Comprising mainly of natural minerals like sand, limestone, and soda ash, — glass is an eco-friendly material that has always been in demand for its purity. Hence, glass has always been the first choice and is the most preferred form of primary packaging material for the pharmaceutical industry.

Type of Glass: Even though glass packaging provides enhanced chemical durability and damage resistance, not all types of glass can be used for pharma packaging. The key criteria to select glass for pharmaceutical packaging include sensitivity to calcium and barium ions, thermal expansion properties, hydrolytic resistance, and limited alkalinity.

The types of glass containers that can be used for pharmaceutical packaging include:

- **Type I - Borosilicate glass:** This type of glass contains 10 per cent boric oxide, 80 per cent silica, and small quantities of aluminium oxide & sodium oxide. The presence of boric oxide makes it hydrolytically resistant and chemically inert. Additionally, its coefficient of expansion is very low and its thermal shock resistance property is very high. Due to its characteristics, a Type I glass container is suitable for packaging a lot of parenteral and non-parenteral preparations and can be used to store strong alkalis and acids.
- **Type II - Treated soda-lime glass:** Referred to as a modified Type III container glass, it has high hydrolytic resistance. Type III container when

treated with sulphur, leads to the creation of Type II containers that help prevent weathering. With a lower melting point, Type II glass is usually easier to mould and is suitable for storing neutral aqueous and acidic preparations, be they parenteral or non-parenteral.

- **Type III- Regular soda-lime glass:** Made of 10 per cent calcium oxide, 15 per cent sodium oxide, and 75 per cent silica, it also contains negligible amounts of oxides of aluminium, potassium, and magnesium. While magnesium oxide reduces the temperature required to mould the glass, aluminium oxide improves its chemical durability. This type of containers is used for packaging specific types of parenteral products and non-parenteral products.

Advantages: Glass containers are the preferred packaging material for the pharma industry because of the host of plus points that they offer. Some of them include:

- Glass is chemically inert and stable. Hence, it provides exemplary resistance to atmospheric and chemical agents. It does not interact with or alter the taste, odour, or composition of the products it contains. Glass packaging provides optimum long-term conservation of the original qualities and virtues of food and beverages.
- Coloured glass has the ability to protect its contents from certain wavelengths like the ultraviolet rays of the sun that might alter the composition of the content.
- Glass containers are impermeable to air and water, thus making them a great storage facility for drugs and preventing biological contamination.
- Glass is the easiest material when it comes to sterilising. It can easily undergo extreme temperatures of heat and cold.
- The transparency of glass displays the content and reveals the quality, thus giving an added advantage over other packaging products.

Classification: Depending on the product, glass packaging is divided into three categories.

- **Primary packaging** is the packaging that most closely protects the product. It can also be referred to as retail or consumer packaging. Primary packaging in the beverage industry would be the Bottles or the Cans the beverage is stored in. The labels on the bottles or cans are also considered a part of the primary packaging. In the pharmaceutical industry, primary packaging refers to the blister packs

The key criteria to select glass for pharmaceutical packaging include sensitivity to calcium and barium ions, thermal expansion properties, hydrolytic resistance, and limited alkalinity.

that hold a certain medication, like the kind you would see for over-the-counter allergy medications you got from your doctor.

- **Secondary packaging** is used for the branding and display of the product. The pill pack that holds the allergy medication comes packaged in a small paperboard box that you see displayed in the pharmacy shelves. Secondary packaging makes it easier for retailers to display and handle products. The demand for unique secondary packaging is a marketing priority for all major consumers. You'll notice that a company's re-brand is often reflected in its secondary packaging, including brands like Pepsi.

- **Tertiary packaging** is used for the protection and shipping of a product. Any company that ships goods uses tertiary packaging in the distribution process. If you have ever ordered anything online, you've received it in a piece of tertiary packaging. Its purpose is to protect its products and facilitate their delivery from Point A to Point B.

Pharmaceutical Containers: With the evolution of the industry, the options that come for pharmaceutical packaging are many. Some popular pharmaceutical containers include:

- **Ampoule**
  A container sealed by fusion and to be opened exclusively by breaking. The contents are intended for one-time-use only.

- **Bag**
  A container consisting of surfaces, whether or not with a flat bottom, made of flexible material, closed at the bottom and at the sides by sealing; the top may be closed by fusion of the material, depending on the intended use.

- **Blister**
  A multi-dose container consisting of two layers, of which one is shaped to contain the individual doses. Strips are excluded.

- **Bottle**
  A container with a more or less pronounced neck and usually a flat bottom.

- **Cartridge**
  A container, usually cylindrical, suitable for liquid or solid pharmaceutical dosage forms; generally for use in a specially designed apparatus (e.g. a prefilled syringe).

- **Gas Cylinder**
  A container, usually cylindrical, suitable for compressed, liquefied or dissolved gas, fitted with a device to regulate the spontaneous outflow of gas at atmospheric pressure and room temperature.

- **Injection needle**
  A hollow needle with a locking device intended for the administration of liquid pharmaceutical dosage forms.

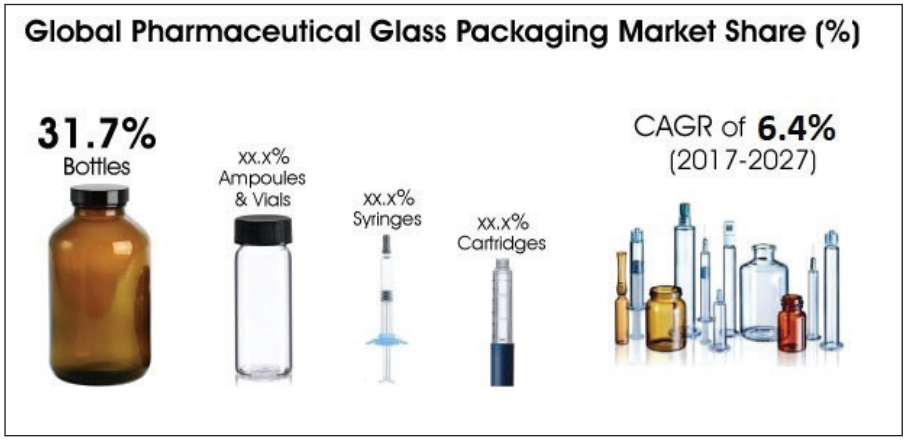
- **Injection syringe**
  A cylindrical device with a cannula-like nozzle, with or without a fixed needle and a movable piston, used for the administration, usually parenteral, of an accurately measured quantity of a liquid pharmaceutical form. The syringe may be prefilled and can be for single-dose or multi-dose use.
- **Pressurised container**
  A container suitable for compressed, liquefied or dissolved gas fitted with a device, which, after its actuation, produces a controlled spontaneous release of the contents at atmospheric pressure and room temperature.
- **Single-dose container**
  A container for single doses of solid, semi-solid, or liquid preparations.
- **Strip**
  A multi-dose container consisting of two layers, usually provided with perforations, suitable for containing single doses of solid or semi-solid preparations. Blisters are excluded.
- **Tube**
  A container for multi-dose semi-solid pharmaceutical forms consisting of collapsible material; the contents are released via a nozzle by squeezing the package.
- **Vial**
  A small container for parenteral medicinal products, with a stopper and overseal; the contents are removed after piercing the stopper. Both single-dose and multi-dose types exist.

As the pharmaceutical industry grows, the amount of waste generated from the primary and secondary packaging of drugs, grows. And tackling it has been one of the most complex sustainability issues.

Waste Reduction: As the pharmaceutical industry grows, the amount of waste generated from the primary and secondary packaging of drugs, grows. And tackling it has been one of the most complex sustainability issues. Therefore, at each step of the production, it must be ensured that least waste is manufactured.

The following initiatives can be taken to ensure that the waste created is minimal.

- **Reducing primary and secondary packaging:** Efforts should be made to lessen the volume and weight of packaging materials and eliminate packaging that is unnecessary for the protection of the contents of medicinal products.
- **Recycling packaging:** More attempts should be made towards the use of environment-friendly packaging, i.e. recyclable or degradable packaging. However, materials that have been in contact with toxic or highly potent drugs require special consideration.
- **Eliminating and incinerating packaging:** Those plastic materials that cannot be recycled are incinerated. However incineration can only be recommended if the combustion heat produced by it can also be used for other purposes.



Market Dynamix: The global market size for pharmaceutical glass packaging was around USD 14.27 billion in 2018, and it is growing at an estimated CAGR of 6.4 per cent. High demand from the pharmaceutical industry, exports, and the extensive use of generic injectable drugs are expected to drive the growth. Key indicators such as – an overall percentage of the population over the age of 65, GDP, per capita expenditure on healthcare, etc are expected to influence the market over the period.

The pharmaceutical glass packaging market is highly fragmented with a large number of regional and global players. The top ten players from the industry combined, however, accounted for most of the revenue in 2018. However, most of the manufacturers and suppliers are focusing on shifting their base to countries like China, India, Brazil, North America and Europe as a result of the growing opportunities offered by the pharmaceutical industry, in these countries, especially in the generics sector.

The rising importance of biotech drugs and cost-sensitivity in the healthcare sector has resulted in the establishment of strict drug-delivery product regulations. Many manufacturers of glass pharmaceutical packaging are now investing in products that aim to increase the drug's shelf-life, which is expected to increase demand in the coming years.

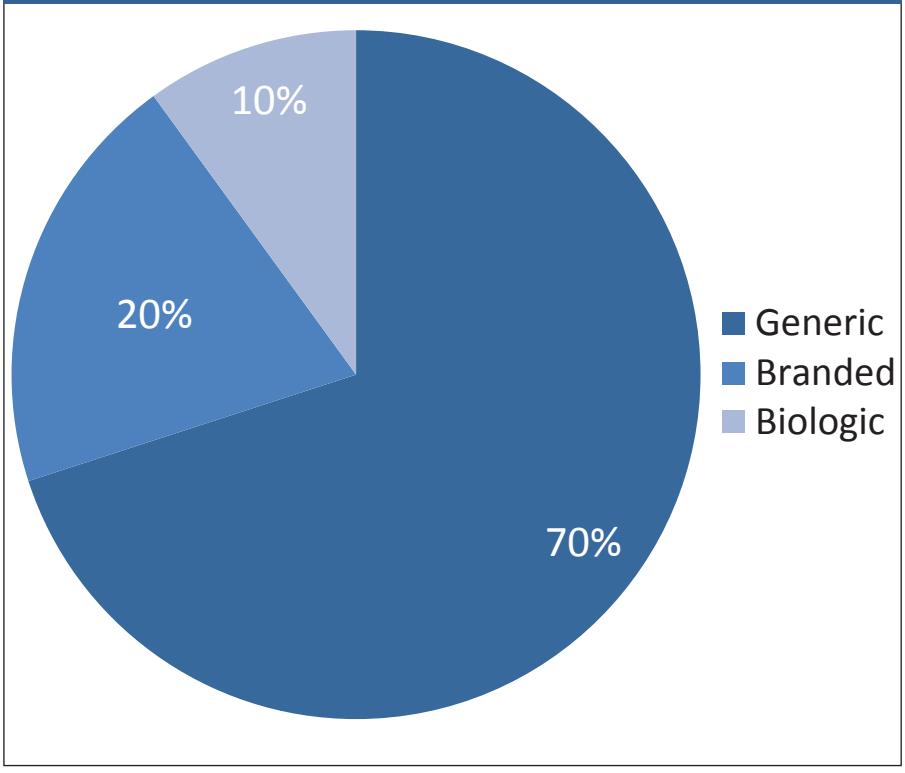
Over the past couple of years, the global market for generic drugs has seen an increase due to the expiry of prescription patents, an increase in the ageing population, and the prevalence of chronic diseases. Because of its superior barrier properties and regulatory ease, the glass packaging industry is expected to grow.

The global pharmaceutical glass packaging market share in 2018 was as follows.

medicines. The decline in the volume sales of generic drugs over the forecast period is expected to result in slower growth of primary glass packaging for these goods.

The U.S. market is expected to remain a key area for various pharmaceutical glass packaging business activities due to the significant increase in the volume of generics in the country, arising from the competitive intensity and customer

Global Pharamaceutical glass packagingmarket share, by drug type,



Due to the expiry of patents and the availability of cost-effective drugs, the generic drug industry in North America is expected to gain a greater market share relative to other markets, both in terms of prescription volume and sales. Increasingly, patients treated for chronic diseases prefer generics over marketed

consolidation. These combined instances put pressure on prices, which, by expiring patents and generic low cost, is expected to limit the selling of branded products.

The demand for pharmaceutical packaging in India in 2017 was valued at USD 2.107 billion. This market is expected to hit USD 3.57 billion by the end of 2023 in 2018-2023 (the forecast period) at a CAGR of 9.2 per cent. The Indian packaging industry is about 4 per cent of the global packaging market. Indian packaging consumption per capita is quite small (at about 4 kg) compared to countries such as Taiwan and Germany (with 19 kg and 42 kg consumption, respectively). The boom in organised retail and e-commerce, however, is changing the packaging industry. Together with the country's economic growth, the purchasing power of India's middle-class population has increased in terms of medicine consumption.

Milestones: The following milestones reached by AGI in glass packaging for the pharma industry are noteworthy -

- First to develop NNPB bottles in the pharma segment (100ml, 200ml, and 500 ml).
- First to develop glass bottles with child-resistant caps (CR) in Pharma.
- Helped in CO_2 emission reduction due to light-weight bottle production.
- Supplied more than 400 lacs pcs light-weight bottles in NNPB.
- Has the largest range of pharma bottles in India (4 ml to 4000 ml)
- Are the first to supply glass vials in green colour. ■

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For more information
visit www.agi-glaspac.com

Digital Freight Forwarding Solutions to Benefit Pharma Industry

Pharma logistics is very niche acumen. Right infrastructure and technology are of utmost importance here to mitigate the risks during commutation, for cost optimization, and also for safe on-time drug delivery keeping the quality and value of the drugs intact. The author, in this article, gives a comprehensive account of the context, challenges, and respective digital solutions to alleviate the risk quotients.

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India is the third largest producer of pharmaceuticals in the world and is currently the largest provider of generic medicines globally. It is the source of 60,000 brands across 60 therapeutic categories and manufactures more than 500 different Active Pharmaceutical Ingredients (APIs). The industry boasts of annual revenues of about USD38 billion- thanks to its world-class capabilities in formulation development and the vision of the industry to establish India's footprint internationally.

For years now, the industry has played a crucial role in offering better health services across the world through its affordable and superior generic drugs. India's pharma exports reported an 11percent growth during the first quarter of the fiscal ending June 2019 at USD5 billion, while during July alone the Indian pharma exports saw a 21.7 percent growth at USD1.72 billion. India is also one of the major countries to export drug formulations to the US. Besides holding a key position in the pharmaceutical market worldwide, India provides 80 percent of the global supply of antiretroviral drugs, 50 per cent global need for different vaccines, 40 percent generic demand in the US and 25 percent medicine distribution in UK.

Challenges to pharma logistics

At a time like this when the Indian pharma industry is making great inroads globally, it also becomes crucial to ensure proper transportation of the cargo. Pharma logistics require specialty freight services to ensure that the sensitive materials being transported are not damaged, destroyed or have lost their value. However, monitoring pharmaceutical cargo as it transitions between land, sea, and air routes is not easy. Due to factors like temperature excursion, the healthcare industry faces losses of USD35 billion globally. Of these, close to USD15 billion is product cost.

Typically, a drug goes through a number of handoffs once it leaves the manufacturer. Moving pharmaceutical products between the warehouses, suppliers, customers, and end users requires careful attention to the environment in which it is being transported. It is extremely important to manage supply chain security risks during transit in order to mitigate the potential loss of revenue and reputation for manufacturers, distributors, as well as logistics providers.

Pharmaceutical products are the most vulnerable for excursions during the transit phase. Often the start of the journey and the last mile both are high risk periods. Over 50percent of temperature excursions take place while the products are handled by airlines and airports, according to IATA, which leaves the products worthless or even risky for patients. In this background, it is important for freight forwarders and transportation companies to focus on the

Pharma logistics requires specialty freight services to ensure that the sensitive materials are not damaged, destroyed, or have lost their value during transportation.

right infrastructure and technology that could help mitigate logistics risks and reduce costs.

Digital solutions to alleviate logistic risks

In the age of digitisation, it is possible to leverage technology and digital transformation to build a safety-first, quality control supply chain. This can be done by combining the physical solutions with digital freight solutions to create a new and connected culture of supply chain safety.

Pre-Trip Inspection (PTI): An important measure that needs to be in place is the **PTI** which is an inspection conducted on an empty reefer container before its release, to ensure the correct functioning of the cooling unit, temperature control and recording devices and to see to it that it complies with the safety standards. PTI also includes checking the container for structural damage, to ensure that the inside of the container is pharma grade and set to receive cargo.

Backup generators: Since transportation journeys can be long and arduous, temperature issues can result in damage of the entire cargo. To ensure that the temperature range is maintained throughout the journey, especially for highly sensitive or for high value cargo, backup generators on trailers provide an extra layer of security against temperature excursions.

GPS tracking: This is another widely used element to keep track of high-value shipments. GPS tracking helps to locate vehicles, effectively plan drivers' assignments and manage costs from smart mobile device. It allows to keep track of the goods at any time, any place from the collection point to the delivery point. GPS also helps to monitor cargo temperatures in real time and get alarms on deviations.

Thermal covers: Containers with pharma shipments often spend hours waiting at airport runways or exposed to high temperatures on a loading dock. Thermal covers have been around for many years for all such temperature-sensitive shipments. These covers help in maintaining temperature even when the shipments are placed on loading docks and airports. There are a variety of sizes available for different kinds of packages like cartons, pallet etc. Different covers have varied efficacies and there has to be a proper research to find the right cover according to the needs of the product.

Digitising workflows: Some companies offer solutions and platforms to easily review and approve the checklist and Bills of Lading online, auto-generate and manage required shipping documents, get alerts on follow-up actions etc. This helps to cut out manual tracking and follow-ups and helps saves time and costly mistakes that arise as a result.

Rate discovery: The regular method of getting rates from forwarders by sending emails with the trade lanes mentioned could prove to be time consuming. Some companies like Freightwalla have a portal that offers instant rate discovery from many different shipping lines. This enables the customer to make decisions instantly with all the cut-offs, sailing schedules and transit time. It saves a considerable amount of time in the whole process.

Documentation: It is possible that finalizing documents via email or manually could take time and even result in errors sometimes after finalization. This could mean additional charges by the shipping line. To avoid this, some companies offer finalization of Bill of Lading and Shipping Instructions via tools on their portals making the whole process less prone to errors while maximising cost and saving time.

Track and Trace: Offline forwarders are often known to skip tracking and tracing containers once they have left the port of loading (POL). This service is extremely important especially in cases where the container is being transhipped. In many instances, the container may get stuck at the transhipment port due to several reasons which could lead to delays by weeks in reaching the port of destination (POD). This could result in the shipment being rejected or penalties being laid on the exporter. It helps to have facilities where the containers can be tracked until they reach the POD. Some freight companies offer services where even during transhipment delays, near real time updates are provided enabling a proper information flow.

Invoicing: Offering invoices on freight company portals is a great way to save time during financial audits.

Conclusion

Since manufacturers invest billions of dollars in lifesaving drug products, they rely heavily on supply chain stakeholders to deliver these packages on time and in their right form. Leveraging the right digital freight solutions in the process can greatly help in preserving the quality of the product and protecting the safety of the patients.

Pharmaceutical products are the most vulnerable ones for in-transit excursions. An estimated USD 35 billion worth of pharma products are being destroyed in each year due to temperature deviation, improper handling, and other associated factorials during transportation.

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Sustainability & Environmental Footprint Management: Glenmark's Initiatives

This article narrates the practices being followed by one of the key players of Pharma industry – Glenmark Pharmaceuticals – in order to implement Sustainability and Environmental Footprint Management.

Mapping the Key Thrust Areas to Environmental Components

ATMOSPHERE
- Reducing carbon emissions
- Energy efficiency
- Responsible supply chain
- Waste management

WATER
- Water management
- Waste management

ECOSYSTEM
- Managing carbon emission
- Energy efficiency
- Waste management
- Water management
- Responsible supply chain
- Impact of climate change on health

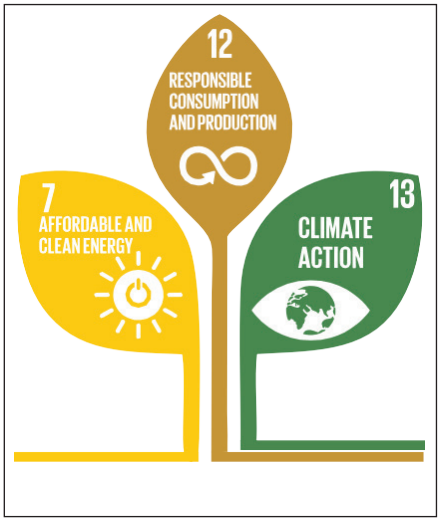
SOIL & LAND
- Waste management

Glenmark has recognized the gravity of the rising environmental concerns and therefore has been striving to actively contribute to the pursuit of rescuing humanity from the impending vortex of disasters which could be imminent in the absence of global action. Being a pharmaceutical company, the core purpose of Glenmark is to contribute to the good health & wellbeing of people and communities at large. As the quality of natural services play a vital role in maintaining good health of people, the company believes that it is their responsibility to ensure that operations don't impair the quality of natural resources in any way. The company recognizes that environmental management bears far-reaching impacts beyond the mere operational boundaries. Having operations in over 80 countries, the company pursuits the commitment of being a responsible global citizen.

Their commitment to the well-being of the planet is engrained in their code of conduct. It ensures that the operations are compliant to environmental laws & regulations, and aligned to the international best practices. Glenmark ensures that their strategies take cognizance of deficiencies in their sustainability practices to aid in stepping continually up to their standards. They have a comprehensive Environmental Health and Safety (EHS) policy in place which focuses on the overall wellbeing of the environment with an emphasis on natural resource conservation, waste minimization, pollution prevention, and de-carbonisation of operations. The company has adopted ISO 14001:2015 (Environmental Management System) and 75 percent of their facilities are ISO certified. They have set a target to achieve ISO certification in 88 percent of their facilities by 2021. In the current reporting period, they have had no instances of non-compliance to environmental laws and regulations, which is in line with the ethos of their code of conduct and EHS policy. Additionally, in this reporting period they have made a capital investment of INR 19.06 Million in energy conservation projects. Their operations closely interact with various components of the biome including air, water, soil, and the natural ecosystem. They are conscious of their environmental footprint and at the core of their sustainability strategy lays the vision to minimize their consumption of natural resources, while maximizing

the productivity by leveraging cutting edge technologies. Keeping in mind the influence on the biome and the economy, they have identified their key thrust areas of action. Those thrust areas touch all the aspects of the biome they interact with – including air, water, and soil. The atmosphere, water resources, and soil in turn interact closely, polluting one resource tantamount to polluting the other one, which then culminates in having far reaching impacts on the ecosystem. Hence the sphere of strategic influence spans from specific resources to cover the whole biome.

Managing Carbon Emissions

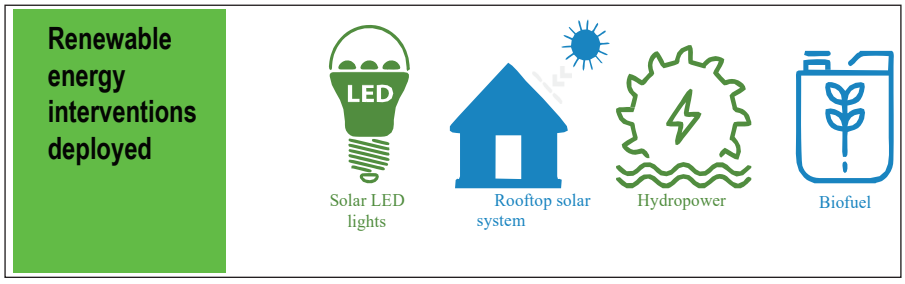


Company's climate strategy is centered on the carbon emission management. This is the key component of carbon management strategy and is being used to monitor the energy consumption & the greenhouse gas emission. The initiatives have been rolled out to reduce the carbon emissions and to mitigate the impact of already emitted carbon. Company's approach to manage the carbon emission encompasses:

- Shifting to renewable energy
- Creating carbon sinks through tree plantation
- Enhancing energy efficiency

The company tracks the scope-1 emission which is direct emission arising from the sources/assets owned or controlled by the company, and also the scope-2 emissions which are the indirect emissions arising from the purchased energy. In this reported year, Glenmark has embarked on the journey of tracking their Scope-3 emission. They believe that tracking scope-3 emission is important to discern the avenues for further greenhouse gas reduction. In the current reporting period, their scope-3 emission was found to be 770.23 tCO_2 equivalent in aggregate.

Operation Decarbonization with Renewable Energy

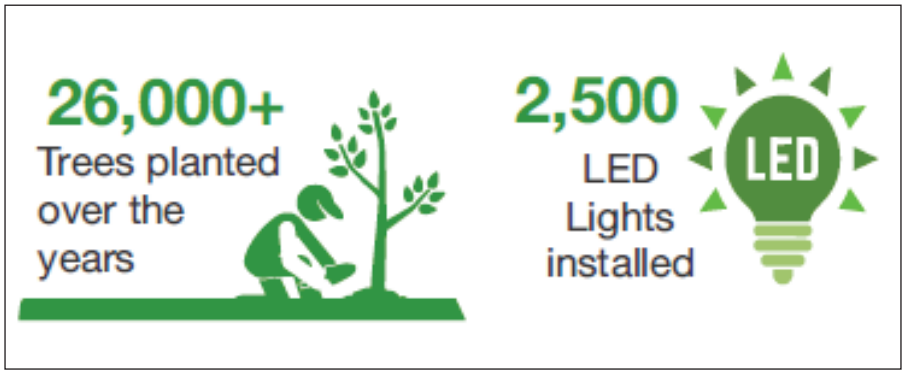


Glenmark is cognizant of the continually changing regulatory landscape in context of climate change. During the course, they have identified that for their organization scope-2 emission is significant. Scope-2 emission is attributed to the purchased energy from non-renewable sources. To reduce the scope-2 emission, they are in the process of shifting to alternative forms of energy. The company aims to decarbonize their operations by adopting to renewable energy sources. In this effort, they have been using hydropower from open access sources in their Taloja and Mahape operations; installed a 100 kWp roof top solar system at Mahape and also the solar LED lights in Kurkumbh & Mohol operations, which successfully generated 1,18,550 kWh power in FY 18-19.

Further, in terms of fuel utilization, Glenmark has been gradually shifting to more sustainable options. Natural gas is widely regarded as a transition fuel. Hence we have increased our reliance on natural gas in the quest to shift to more sustainable fuel options. We have sifted to using Biofuel in our Nashik, Kurkumbh, and Mohol facilities instead of traditionally used diesel.

Planting Trees and Creating Carbon Sinks

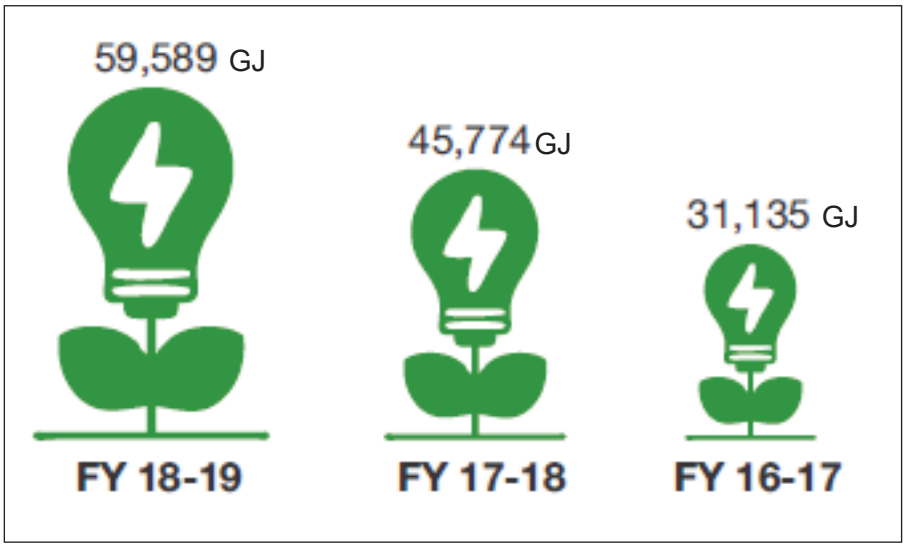
Rapid urbanization and industrialization have had a detrimental impact on the green cover. Glenmark recognizes the important role the trees play in maintaining air quality and acting as carbon sinks. The Company hence conducts tree plantation drives to plant trees and to contribute in increasing the green cover.



Approach to Energy Efficiency

The company has been committed to enhancing their energy efficiency. They believe that the source minimization of energy usage plays a pivotal role in energy usage optimization. Towards this effort in the mentioned reporting period, they have made a capital investment amounting to INR 19.06 million towards energy conservation efforts. This investment resulted in a net cost savings of 46.44 million and energy saving of 59,589 GJ.

In the reported fiscal year, Glenmark has rolled out more than 30 initiatives across their manufacturing facilities in India that deploy clean technological interventions to enhance energy efficiency. Some of the key initiatives are:



- Replacement of conventional lighting systems with energy efficient LED lights
- Variable frequency drive (VFDs) installation in Air Handling Units (AHUs), air compressor, utility pumps and other utilities
- Use of power factor controller to maintain power factor >0.99
- Installed Air Compressor at centralised location and modified air network for effective operation and utilisation of air compressors (Goa)
- Installed Heat Recovery System on 10 TPH Gas fired boiler (Ankleshwar), Economiser on condenser for boiler (Dahej), and Installed Steam Condensate Recovery System to reduce fuel consumption in boiler (Indore)
- Installed Natural Day light system in utility sections (Baddi)
- Installed Electrical Heaters for water storage tanks of Injection section (Baddi)
- Installed Air Compressor at centralised location and modified air network for effective operation and utilisation of air compressors (Goa)
- Conducted compressed air audit to arrest air leakages of compressed air network (Indore and Baddi)
- Reduced power consumption by operating low capacity air compressor during lean compressed air demand (Sikkim)

Waste Management

Managing waste is imperative to avoid water, air, and soil pollution. Waste incineration has been noted as the 3rd largest contributor to GHG emissions in India. Additionally, it has been noted that at the reported rate of waste disposal the net area required to dump the waste will be equivalent to the area of the 5 most populous cities in India. Improper waste disposal could lead to toxic material leaching into groundwater. This can result in groundwater contamination which can have far-reaching impacts on the ecosystem. In recognition of these serious risks of improper waste handling, the Indian Government has laid out various rules and regulations to ensure safe handling and disposal of waste.

At Glenmark, effective waste management is very important and they strictly abide by all the rules and regulations around waste management. They are committed to ensure the waste minimization at source. Their

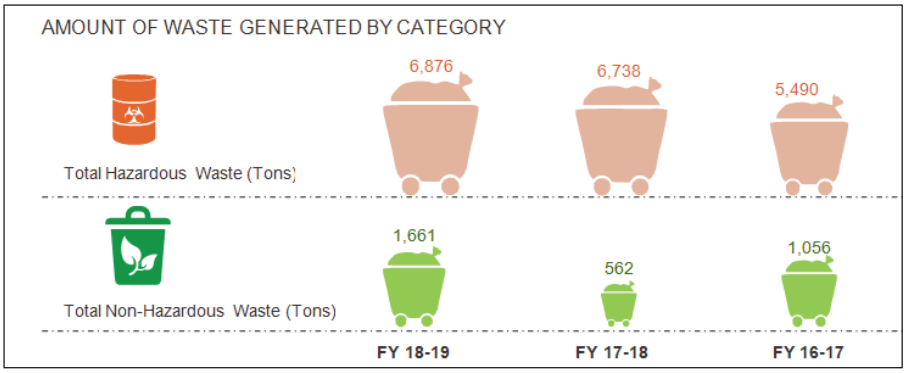
waste management strategy encompasses the waste categorization, segregation, minimization, handling, and safe disposal along with process monitoring, regulation, and control therein. We believe, having a good understanding of the nature of the waste so generated is of key importance in enabling effective waste management. The Company has strict internal policies in place to ensure that the waste collection is being done only through authorized third parties registered with the regulatory authorities. Glenmark ensures that the waste is to be disposed safely without causing any harm to the environment or to the ecosystem.

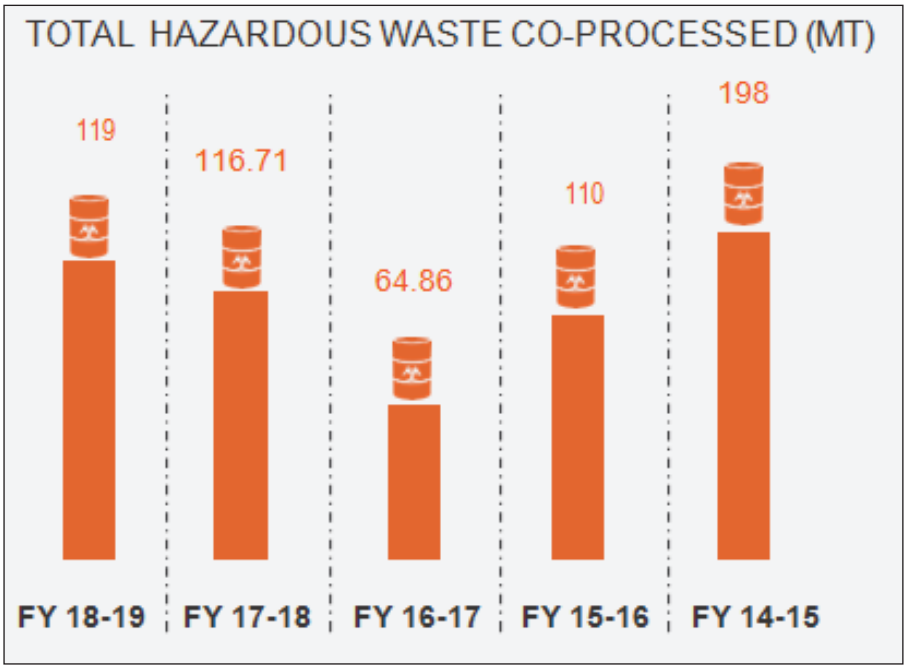
The employees are at the forefront of waste management strategy. The Company thinks – as they are the executors of the strategy, raising awareness amongst them on waste handling, segregation, and disposal is vital. The Company inculcates the value of "My Waste My Responsibility" in their workforce to ensure every employee involved with waste handling takes complete responsibility of its safe disposal. On the occasion of waste management week, the Company organized a campaign, including events, initiatives, games, etc. which were aimed at educating employees on their approach to waste management with an objective to build awareness on themes of sustainable waste management and environment protection.

Glenmark has rolled out multiple initiatives. Their waste management strategy encompasses initiatives around:

1. Prolonging the lifespan of products such as electronics by ensuring judicious use and regular maintenance
2. Recycling
3. Packaging waste minimization
4. Innovative waste disposal strategies such as co-processing

The Company is committed to adopting sustainable means of disposing waste. Being a pharmaceutical company, they take utmost care in handling hazardous and biomedical waste. A part of the hazardous waste is treated by co-processing it in cement factories. In the mentioned reporting period, the Company have co-processed 119 MT of hazardous waste. The organic waste produced in their facilities is subjected to vermicomposting. The manure generated subsequently is being used in the upkeep of their gardens.■





Source: Glenmark Sustainability Report FY 2018 – 19, published by Glenmark

For More Information:
https://glenmarkpharma.com

Life-cycle Approach to Pharmaceutical Packaging: One Step Closer to Sustainability

Keeping environmental hazards in mind, sustainability and circular economy are today's axioms as well as the boons for any manufacturing sector. And Pharma packaging sector is also of no exception. Here, in this article, the authors narrate how sustainability can be achieved by taking a life cycle approach to packaging.

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Sustainability legislation is being tightened all around the world and consumers are demanding the products and packaging that are better for the planet. It is no different in the pharmaceutical world as well, where environmental considerations should not supersede the safety or accessibility of a package.

While pharma industry - in terms of innovation in packaging - falls generally a bit short of other industries viz food-and-beverage (F&B) and consumer goods because of the stricter process-validation that's prevailing and applicable to medicines, the sector can still borrow tried-and-tested concepts and tools from these other industries. Something that can be more easily implemented in the heavily regulated pharma sector is: to take a life cycle approach to packaging and using a Life Cycle Assessment (LCA) tool to meet consumers' expectations towards sustainability. But with different products requiring different packaging solutions, brands don't always know the best approach. In fact, there is no 'best'

To improve the sustainability and environmental impact of the packaging being used, it's necessary to assess every stage of the packaging life cycle starting from sourcing of raw materials, their harvesting or production methodology, the energy usage for transforming them into the final packaging material, the water consumption, the emission factor, the transport, and last but not the least – end-of-use of the packaging material viz. recycling, landfill, incineration, etc.

packaging type. And where some materials have clear benefits, they may not be the right choice when the full life cycle of the product is being considered. In other words - there could be other, more sustainable options which haven't been explored and considered by the brand yet. This is why an LCA tool such as Amcor's Advanced Sustainability Stewardship Evaluation Tool (ASSET) is so useful. It cuts through the noise and gives brands data-based facts about the environmental impact caused by different packaging solutions.

Benefits:

1. **LCA assesses the environmental impact of packaging at every stage:** To fully and accurately understand the sustainability and environmental impact of the packaging being used, and also to understand how this can be improved, it's necessary to assess the every stage of the packaging life cycle. An LCA tool considers each of the steps. It starts with the source of raw materials and how they are harvested or produced, the energy used to transform them into the final packaging material, the water consumption, the emissions into the environment, the transport and last but not the least - end-of-use of the packaging material viz. recycling, landfill, incineration, etc. Process points to improve the environmental performance are to be identified and necessary recommendations are to be made. In this way, companies can achieve their sustainability goals by making necessary changes viz smarter material use or simplifying the production processes which in turn would result in reduction in waste, greenhouse gas emissions, or improved disposal opportunities.

2. **LCA helps you meet sustainability expectations:** The environmental impact of packaging is an important global topic. As consumer habits change and expectations rise, global demand for more sustainable packaging increases. And as a result - consumers, retailers, and policy makers around the world are taking steps to drive sustainable outcomes across all the stages of the value chain, which includes packaging too. As a brand owner, an LCA tool gives you all the facts you need to support your decisions, to prove your environmental actions, and to explain them in a compelling way for consumers.

3. **LCA helps you to avoid unintended consequences:** Brands may feel that there are simpler options available than going through an LCA, such as switching to paper or glass packaging, due to their perceptions towards sustainability credentials. However, the benefit that LCA offers is: it identifies the right solution depending upon the circumstance (which is not always the most obvious choice). A move towards the wrong packaging materials may have practical or environmental drawbacks, such as - increased waste, loss of product protection, or increased carbon footprint. A common misconception about packaging material is their must-have property of compostability. While this could be the right choice for some products, LCA takes the individual packaging needs into account and shows the alternative options. Careful

A move towards the wrong packaging materials may have practical or environmental drawbacks, such as – increased waste, loss of product protection, or increased carbon footprint. The benefit that LCA offers is: it identifies the right solution depending upon the circumstance. Careful assessment of the right solution is needed on a case-by-case basis to find the most effective packaging solution, free from unintended environmental consequences.

The pharma industry is increasingly focused on the need to improve the sustainability of its packaging along with other issues, such as green chemistry. Major global brands especially are setting ambitious sustainability targets.

assessment of the right solution is needed on a case-by-case basis to find the most effective packaging solution, free from unintended environmental consequences.

4 **LCA makes it easy to prove sustainability credentials to consumers:** A good LCA tool is fact-based and audited by a third party. It provides proven measurements and evidence of the sustainability benefits of the different packaging options a brand is considering. You can then convert this data into consumer-friendly messaging about a brand's commitment to sustainability.

For example, Amcor's ASSET tool is Carbon Trust-certified so that means it is grounded in internationally recognized standards and best practices in environmental life cycle assessment. Once a brand has launched a new pack with a carbon footprint reduction, you can demonstrate your sustainability actions to your end consumers by printing a Carbon Trust-certified claim on-pack.

5. **LCA isn't a complex or expensive process:** The pharma industry is increasingly focused on the need to improve the sustainability of its packaging, along with other issues such as - green chemistry. Major global brands are into setting up of ambitious sustainability targets. Packaging life cycle assessments play a big role in helping the brands to prepare for these challenges by providing rapid feedback. And the good news is: LCA is not a very complex and expensive process if you work having the right expertise and tools. You may even save on the costs if you involve this partner from the very beginning of the process, e.g. the raw material selection stage, up till the end i.e. a quick sustainability report generation enabling faster and better-informed decision making.

Why should pharma companies use LCA? To create a truly circular economy and to protect the future of our planet, we all need to work together. This only will enable us to achieve our sustainability goals. In a highly regulated industry, LCA is a low hanging fruit which will have relatively easy implementation. By using the already established tools - which were initially developed for other industries - pharma companies would be able to create a truly sustainable pharma packaging culture to meet the stringent industry demands. ■

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Promising Future for Indian Pharma at Global Biosimilar Landscape

The global market for Biosimilars is on the cusp of exceptional growth and presents attractive opportunities for domestic pharma companies in the years to come. According to ICRA research, the biosimilar global market – which stood at USD 5.9 billion in CY2018 – is expected to grow to USD 23.6 billion by CY2023, backed by several biologicals that have been losing their patent protection globally. Select Indian pharma companies with strong research and development capabilities will now be in a position to exploit these opportunities in the key markets of USA, Europe, and the Rest of the World (ROW).

Leading companies such as Biocon Limited and Intas Pharmaceuticals have already launched their products in developed markets, while companies such as Lupin, Cadila, and Dr. Reddy's have been preparing their pipeline. Currently, Biocon is the only Indian company having USFDA approval for two of its products – Pegfilgrastim and Trastuzumab. The company is presently the largest biosimilar player in India. Most Indian companies have a tie-up with the MNC generic players with an aim to have support on regulatory approvals and commercialization, while extending their R&D and manufacturing competencies. The co-development model also supports the sharing of failure risk as the cost of successfully launching biosimilar is in a range of 10x – 20x normal generics.

The US market is expected to see significant traction from CY2020 onwards, as the biologicals of more than USD 30 billion are being losing their exclusivity over the period of CY2019 – CY2025. For instance, the biggest blockbuster biological drug Humira (adalimumab) is expected to lose its exclusivity in CY2022, while Trastazumab and Bevacizumab have already lost their exclusivity in CY2019. These three biologicals – Humira, Trastazumab, and Bevacizumab – generated USD 13.7, USD 7.0, and USD 6.8 billion US sales in 2018 respectively.

The US has been a late entrant due to lack of regulatory pathway, prior to the Biologics Price Competition and Innovation Act (BPCIA) with the first biosimilar approval in 2015 leading to revenues of less than USD 0.5 billion in CY 2018. Till November 2019, 24 biosimilars for 9 biologicals have been approved by USFDA. The Biosimilar Interchangeability Draft Guidelines were issued in January 2017 specifying the data and information required for switching the studies by sponsors to establish interchangeability (vis-a-vis innovator). The same has been finalized and approved by USFDA in May 2019, which is expected to provide a strong push – especially for the simpler category of biosimilar approvals going forward, for e.g. insulin, hormones, etc.

The global market which stood at USD 5.9 billion in CY 2018 is expected to grow to USD 23.6 billion by CY 2023.

Among the developed countries, Europe has been at the forefront of biosimilar adoption with harmonious rules and guidelines since 2006. With an introduction of the first approval of monoclonal antibody (mAB) biosimilar in 2013 (infliximab), the trail of several such approvals of biologicals viz adalimumab, rituximab, trastazumab, etanercept, pegfilgrastim, etc amongst the others have been initiated. It's of note that biosimilar revenues in EU stood at ~USD 2.5 billion in CY2018.

The Rest of world markets (including India) also represented an attractive opportunity for generic companies having biosimilar revenues of approximately USD 3.0 billion in 2018, in spite of

"Domestic players have evolved from low cost manufacturer of plain vanilla generics to complex/specialty pharma products including biosimilars. While only a few Indian companies have been able to launch biosimilars in developed markets of the US and Europe; ROW has seen much better participation. Several factors such as lack of clarity on regulatory guidelines, large investment requirements and uncertainty associated with successful commercialization, has led to slower progress in the past in the developed markets", says Gaurav Jain, Vice President, Corporate Ratings, ICRA

several persisting challenges viz different regulatory regimes, time consuming approval processes, and the development costs without corresponding volumes.

ICRA's analysis indicates that the developed market has seen price erosion of 30-60 percent for various biosimilars over the lifecycle, which is much lower than that for the small molecules where the price erosion could be as high as 90 percent. The competition in the biosimilar space is less than the small molecule space as development capabilities and investments in commercialization for such biosimilars are significantly higher. Biosimilars are expected to generate an EBIDTA margin in excess of 25 percent on an average. So far, biosimilar has been the limited player market with moderate competitive intensity, though the large set of competitors (> 4 – 5) in a single market like US may exert pressure on margins, thus making ROI questionable for late entrants.

"ICRA believes that only select Indian companies based on joint development model with MNC Generics will be able to successfully launch several biosimilars over the next 3-5 years. Economies of scale in manufacturing and ability to allocate adequate R&D resources on product development would be key differentiators going forward. This will be credit positive for such select successful players though at an aggregate sector level, it is unlikely to materially impact credit profile owing to limited participation from Indian players", says Gaurav Jain Regarding opportunities for Indian players.

Addenda

i. What is a Biosimilar

A Biosimilar medicine is a biological medicine, similar to another biological medicine, which has already been authorized for use. Biological medicines contain active substances from a biological source, such as living cells or organisms (human, animals, and microorganisms such as bacteria or yeast) and are often produced by cutting-edge technology.

ii. Is Biosimilar a generic version of original biological?

A biosimilar is not regarded as a generic of a biological medicine. This is mostly because of the natural variability and more complex manufacturing of biological medicines, which do not allow an exact replication of the molecular micro-heterogeneity. Since they are not the exact copy of the original drugs, interchangeability remains a key concern and has to be proven through appropriate clinical trials.

iii. Are Biologicals complex to manufacture?

Biologicals can differ in size and structural complexity, from simple proteins like insulin or growth hormone to more complex ones such as coagulation factors or monoclonal antibodies.

iv. Do Biologicals have patent expiry?

Biosimilars can only be authorized for use once the data exclusivity period on the original reference biological medicine has expired. In Europe and US, the period can be up to 10 years and 12 years respectively. Biologicals have their granted patent period of 20 years from the date of filing.

v. Cost of developing Biosimilars versus other drugs

It can cost anywhere between USD 100 – 250 million & 5 years for developing a biosimilar, in comparison of up to USD 1 – 5 million & 2 years for small molecule generic drug owing to stringent clinical trial requirements.■

For more information

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Staying Compliant and Profitable in the Pharmaceutical Packaging Process with Checkweighing

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High demand in the pharmaceutical industry is a constant. Manufacturers, both large and small, must look to optimize their production lines in order to ensure that the production quotas are met in a timely, profitable, and above all in a safe manner. Larger producers, running single product batches, seek outstanding reliability and accuracy in checkweighing, whilst smaller contract packagers – who are likely servicing multiple clients – need the flexibility to effect quick changeovers in order to keep throughput to a maximum.

As manufacturers need to remain certified in order to produce pharmaceutical products, compliance is also critical. Products, entering the supply chain that do not meet the required standard, threaten patient safety, retailer confidence, and in the worst case scenario – a company's ability to continue production. All are damaging to profit margins to varying degrees and the risks can be mitigated with a well-executed product inspection programme.

Automation is a given in such environment and it is universally recognized that checkweighers play an instrumental role in day-to-day production. A checkweigher's main function in a pharmaceutical environment is to check the package for missing components such as the leaflet or complete blisters. This is a vital part of the package, as a box of tablets for example will not be considered safe or compliant without it. End-of-line applications are also in commonplace, where systems are used to check the completeness of secondary and tertiary packaging, ensuring that what is sent into the supply chain is exactly what is expected.

Checkweighers automatically inspect 100 percent of products on the line which is highly recommended compared to random off-line sampling, as the latter gives a sample size that is now considered to be of little statistical significance.

Checkweighing solutions can help pharmaceutical manufacturers to maximize productivity

Downtime is the enemy of any manufacturer, therefore identifying areas that affect this directly is important when looking at Overall Equipment Effectiveness (OEE). System setup is one such area that can be optimized, and checkweighing features such as digital position control help to verify this is carried out correctly, otherwise the batch cannot be run at all. Running a batch with incorrect inputs can be very costly to correct due to the wastage involved. Also, should these products enter the supply chain, it could have significant consequences – both in terms of consumer safety and brand reputation.

Another feature that increases OEE is In-Process-Testing. The test procedure, which is to be followed step by step, is normally written down on a separate instruction document and the results are manually entered on separate documents. Such testing procedures are very labour intensive, cause operational downtime, and rely heavily on the operator, thus consistently testing for reliable results.

In-Process Tests significantly reduce the risk of errors during test procedures and are highly flexible, so are able to adapt to customers' specific requirements. They are easy to operate, generate automatic reports for each test scenario, and – most importantly – require no production shutdown. In-Process Tests are carried out with the help of special screen prompts, which guide the operator through the complete procedure and automatically record the results, which can then be saved & printed. Clear guidance during testing reduces the labour time as well as possible operator errors. With this in place, manufacturers do benefit from more consistent, reliable results, and higher operational uptime. In-Process Tests enable the several configurable test scenarios.

In addition, there is an easy to operate and intuitive Graphical User Interface (GUI) that helps the user to make changes easily. Mettler-Toledo also offers ProdX, a product inspection data management software application, which can significantly increase OEE as it enables nearly all processes on the line to be monitored from a central point.

Compliance with Good Manufacturing Practice (GMP) guidelines

Pharmaceutical checkweighers in particular are designed to meet the regulatory requirements of the pharmaceutical industry. First of all, GMP offers a broad guidance. Although GMP regulations are not the prescriptive instructions, these do consist of guidelines based on general principles that include process validation, record keeping, operator training, cross-contamination prevention, etc. It is always up to the manufacturer to design the production process and quality programs in accordance with GMP principles, to interpret the guidelines and to asses the process risks accurately. Mettler-Toledo, in order to maintain process safety, offers equipment qualification which is

a huge benefit to users as it reduces the qualification and validation time in order to comply with FDA or CGMP (Current Good Manufacturing Practice) requirements. Equipment qualification comprises of all aspects of design, installation, operational, and performance qualification.

Minimizing changeover downtime with checkweighing technology

Minimizing changeover downtime is critical. Advanced checkweighing systems offer useful features such as digital positioning control. Due to a plausibility check, the system does not the allow users to enter false parameters. Users are immediatley alerted if settings are entered incorrectly and the system will not start if the parameters are wrong. Another factor that influences the usability of the GUI also helps users to save time and therefore minimizes changeover times. These are the key factors when looking to increase productivity.

Statistical Process Control (SPC), in addition, is possible via software functions that can be utilized to predict issues on the line. SPC measures and refers to industry standard values of process capability CP and CPK. Standalone or integrated systems allow users to access the statistical data needed to understand, and to document & to control the profitability along with production efficiency. This way, early detection of problems can be achieved ahead of any major issues that may have a significant impact on uptime. The ability to monitor performance is directly linked to OEE, and the net effect of reduced machine downtime is that higher production levels can be achieved using the same amount of resources. This leads to a faster return on investment with regard to capital purchases such as checkweighers.

Tracebility of Process Changes

Individual boxes, for blister packs of pills for example, are lightweight; and therefore the load cell of a checkweigher has to be very precise. The checkweigher helps to check for product completeness, to reject falsely produced products and to ensure the process safety complying with FDA requirements. Another demand is the legal compliance with CFR 21 Part 11, which describes the way access-to-information is managed and changes made to the checkweigher. Everything has to be traceable and logged. This is integrated into the audit trail feature of a pharmaceutical checkweigher. A local audit trail operates completely automatically in the background and usually requires no user intervention.

Another useful feature is the domain login server which enables the manufacturers to use accounts, passwords, and rules issued and administered by the company's IT department for the checkweighers. Operators, maintenance personnel, supervisors, and quality managers can use their normal network log-in name and password for tasks at the checkweigher just as they would with a network PC. This is not an FDA requirement, but is a very valuable addition to the system.

Regulations: looking to the future

A challenge for pharmaceutical manufacturers will be the European Falsified Medicine Directive (EUFMD), that is expected to be implemented by the first half of 2018. Two years may sound like a long time, but depending on how many products the manufacturer has, how they are produced, and whether they are produced using internally owned facilities or with external partners, it really isn't a great deal of time at all. Manufacturers generally deal with multiple facilities that all will have to be enhanced with hardened serialization software to comply with these regulations.

Overall serialization is the key to success here and the EUFDM will require a unique serialization number on every salable unit of drug product intended for dispensation to a patient. So, for instance, a batch of 60 boxes of blister pack pills will have 60 different identifiers, not just one at the lot level. During production, every aggregation level will have to be integrated into the serialization process and can be supported by checkweighing technology. Added value can be generated either by checkweighers with integrated serialization functionality, with tamper evident sealing, or with aggregation solutions for the secondary & tertiary packaging at the end of the line.

If a pharmaceutical manufacturer works together with contract packagers, which is quite common in Europe, it should keep in mind that those contractors may not be ready for serialization when it needs them to be.

In addition to upcoming regulatory requirements, the US Drug Supply Chain Security Act (DSCSA) is in development for the pharmaceutical industry, which is to be applied in three phases for the US market up until 2023. At the first, it is to ensure lot traceability followed by unique serialization; and last but not the least, a combination of the two. As in EUFMD, this act will involve an increase in work and systems such as checkweighers will be instrumental in helping manufacturers to remain both compliant and profitable as the regulatory landscape continues to evolve.

About METTLER TOLEDO

METTLER TOLEDO is a leading global supplier of precision instruments and services. The company has strong leadership positions in a wide variety of market sectors and has positioned themselves as number one at the global market. Specifically, METTLER TOLEDO is the largest provider of weighing and analytical instruments for use in laboratory and in-line measurement in demanding production processes of industrial and food retailing applications.

The Product Inspection Division of METTLER TOLEDO is a leader in the field of automated inspection technology. The Division incorporates the Safeline Metal Detection and X-ray Inspection, Garvens and Hi-Speed Check-weighing, the CI Vision, and PCE Track & Trace brands. The solutions provided by the business increase process efficiency for manufacturers while supporting compliance with industry standards and regulations. Systems also deliver improved product quality which helps to protect the welfare of consumers and reputation of manufacturers. ■

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Clariant Partners to Bring New Biotransformation Technology to India

The team at the signing ceremony with Shri P. Raghavendra Rao, Secretary, Department of Chemicals & Petrochemicals.

Photo Courtesy: Clariant

Mumbai, India: Clariant, a focused and innovative specialty chemical company and Polymateria, has been developing a new standard in biodegradation of plastics, signed a partnership agreement with the Central Institute of Plastic Engineering & Technology (CIPET), Department of Chemical and Petrochemical, Ministry of Chemicals & Fertilizers, Government of India. This partnership entails bringing Polymateria's Biotransformation technology to market in India through Clariant's Masterbatches.

Clariant's Masterbatches and Polymateria will work with CIPET's world class testing facilities to apply the biotransformation technology to the local brands and packaging companies, who want to validate solutions for the most highly littered forms of plastic.

At the signing ceremony, Shri P. Raghavendra Rao, Secretary, Department of Chemicals & Petrochemicals, said, "India has world leading ambitions to tackle plastic waste. With new innovations such as Biotransformation emerging, we can work with the industry to address these issues."

Niall Dunne, CEO of Polymateria, said, "This partnership agreement reflects that the only way to solve global problems is to accelerate the impact of disruptive technology through meaningful collaboration."

Sambit Roy, Head of LBL India, BU MB, Clariant, said, "We are happy with this agreement and keen to support our clear strategy towards Sustainability. Clariant has an important role to play in creating solutions for recycling and now with this new technology we will also be able to offer biodegradation solutions for fugitive plastics which are left over in recycling stream. This agreement gives us access to the global technology from Polymateria to bring the biodegradation capabilities to the Indian market; while working with CIPET's testing facilities."

Metropolis Healthcare Ltd signs binding agreement to acquire lab in Ahmedabad

Ahmedabad, India: Metropolis Healthcare Ltd, the leading pan-India pathology specialist, has recently signed a binding agreement to acquire Ahmedabad based Shraddha Diagnostics Pvt Ltd.

With this acquisition, Metropolis has expanded its lab footprint from 17 to 20 in nine cities and towns of Gujarat; Ahmedabad, Surat, Baroda, Mehsana, Rajkot, Navsari, Jamnagar, Bharuch and Gandhidham. Besides, presently, the company has 300 patient service network centers across Gujarat and services over 1500+ clients through its robust B2B network.

Ameera Shah, Promoter and Managing Director, Metropolis Healthcare Ltd said, "Gujarat has always been an important market for us. In October 2019, we acquired 4 laboratories in Surat that increased our market share and we are now leaders in the region. With the Ahmedabad acquisition, we are aiming to gain profitable market share by building better leadership, operational capabilities, and expanding our test menu. Our immediate focus would be to fully integrate and modernize these laboratories and in terms of diagnosis, deliver on our promise of integrity, empathy, and accuracy."

Shraddha Diagnostic Pvt Ltd was started by Dr. Hiren Shah and Dr. Dushyant Patel. With these two young and dynamic pathologists joining the Metropolis Family, it is the right launchpad for modern and integrated laboratory services in Ahmedabad.

Metropolis has a track record of acquiring and successfully integrating companies by bringing in industry best practices to these acquired businesses including standardized machines and standard operating procedures, in a phased manner, resulting in efficiency and quality enhancement. Metropolis, since 2002 has successfully used its brand strength to established large networks through acquisitions in Chennai, Rajkot, Surat, Bangalore, Pune as well as outside India.

Indian Society for Clinical Research (ISCR) to Host 13th Annual Conference in Mumbai

Mumbai, India: Beyond new regulations, increasing participation and enhancing patient safety is the theme of the 13th Annual Conference of Indian Society for Clinical Research (ISCR) to be held in Mumbai from January 24-25. Held against the backdrop of the New Drugs and Clinical Trials Rules, 2019 launched around a year ago, the event will bring clinical research professionals from academia, healthcare institutions, not for profit organisations and the industry together to deliberate on the road ahead for clinical research in India, as well as new and emerging areas in clinical research. Dr. V G Somani, Drug Controller General India, CDSCO, will deliver the Chief Guest address. Dr. Gagandeep Kang, Executive Director, Translational Health Science Technology Institute (THSTI), an autonomous institute of the Department of Biotechnology (DBT), Ministry of Science & Technology, Govt. of India, will deliver the late Prof Ranjit Roy Chaudhury Oration.

"This year's Conference provides the right opportunity for clinical research professionals to reflect on the year that has gone by and look forward at what more we need to be doing to move the clinical research agenda in the country forward so that our patients have access to treatment for the many unmet medical needs in our country," said Dr Chirag Trivedi, President, ISCR. "India has 16% of the world's population and 20% of the world's disease burden and yet less than 1.2% of global clinical trials are done in India (source: www.clinicaltrials.gov)." The Conference has four tracks covering Clinical Operations, Medical Writing, Biostatistics and Data Management.

Leading up to the annual conference, six pre-conference workshops have been scheduled for clinical researcher professionals, investigators and students on January 23rd. The workshops will cover Real World Evidence, Risk-based Implementation Strategy, PV Audits and Inspections and Enhancing Site and Investigator Capability among other topics.

Wockhardt: 1st Indian Company to Achieve Approval for Newly Discovered Antibiotics

Mumbai, India: Indian drug regulator, DCGI has approved Wockhardt's two new antibiotics, EMROK (IV) and EMROK O (Oral), for acute bacterial skin and skin structure Infections including diabetic foot infections and concurrent bacteraemia based on the Phase 3 study involving 500 patients in 40 centres across India. The new drug will target superbug like Methicillin resistant Staphylococcus aureus (MRSA), which is a leading cause of rising antimicrobial resistance (AMR).

The size of Indian Antibiotic market is approx. 16,000 Crore, growing at 7 percent and is one of the largest therapeutic segment, with a 12 percent market share of the Indian Pharmaceutical Market1.

"By virtue of its broad spectrum activity against widely prevalent pathogens including MRSA, superior safety over the currently available anti-MRSA agents and its unique properties, I believe EMROK/ EMROK-O has a strong potential to effectively address the unmet medical need of the clinicians in the country thereby helping to reduce the morbidity and mortality"- said Dr. Habil Khorakiwala, Founder Chairman, Wockhardt Group.

Antimicrobial Resistance is a medical challenge with 38 percent resistance in India. AMR is a major public health problem globally. India carries one of the largest burdens of drug resistant pathogens worldwide. Infections caused by drug-resistant organisms could lead to increased mortality and prolonged duration of hospitalization, causing a huge financial burden to the affected persons, health-care systems, and hinder the goals of sustainable development. Two million deaths are projected to occur in India due to AMR by the year 2050[2].

World Health Organisation (WHO) in 2017 has listed Methicillin resistant S. aureus (MRSA) as a 'high' priority pathogen due to high prevalence of resistance, mortality rate, burden on community and health care settings[3]. In 2018, a national study conducted by the Indian council of Medical research (ICMR) and Anti-microbial resistant surveillance network (AMRSN) group highlighted the high prevalence of 38.6% of MRSA in India[4]. A recent Indian study reports that 1 in 6 patients infected with multidrug resistant Gram positive infections die in intensive care units[5].

Currently available anti-MRSA agents have multiple side effects such as kidney damage, decrease in platelet cell counts, muscle pain, to name a few[6]; which limits their use for a longer period and compromise the safety of critically ill patients in the ICU. The patient management is further complicated due to increasing resistance to these agents and drying antimicrobial pipeline.

EMROK / EMROK O are the modern gram positive antibiotic against methicillin resistant Staphylococcus Aureus infections. EMROK and EMROK-O are the first novel chemical entity antibiotics researched and developed in India with various international collaborations across globe. While the non-clinical and Phase 1 studies have been undertaken in U.S. Europe and India, the Phase 2 and Phase 3 clinical studies have been successfully completed in India. More than 50 international publications/posters in top-notch journals/scientific conferences and studies by leading international experts have established that EMROK/ EMROK-O represents a truly multi-spectrum MRSA drug with potent bactericidal action against Gram positive, quinolone susceptible Gram negative, anaerobic and atypical bacteria.

Clinical and non-clinical studies have established advantageous safety features of EMROK/EMROK-O compared to older MRSA drugs vancomycin, teicoplanin, daptomycin and linezolid which are beset with unfavourable features of nephrotoxicity, bone-marrow toxicity and muscle toxicity therefore cannot be given in patients with impaired kidney/liver function and seriously ill patients requiring for longer duration therapy.

After a significant gap of 14 years, a new anti-MRSA agent will be made available by Wockhardt as 'EMROK' for the management of resistant superbug.

Due to the combination of complexity of resistance mechanisms expressed by bacteria as well as lack of financial resources to fund antibiotic research, many major pharmaceutical firms have steered away from the antibiotic research in the last 30 years. In such challenging scenarios, Wockhardt Ltd. has invested for more than two decades in developing a strong antibiotic pipeline catering both multi drug resistant Gram positive and Gram negative pathogens and is the only company in the world having five antibiotics against superbugs in the late phase of clinical development. All these antibiotics, because of their promising activity against MDR pathogens, have received US FDA-QIDP status for expediting the drug development cycle. Out of the five, the first two antibiotics - EMROK and EMROK-O have been approved by DCGI recently and will be launched soon.

Glenmark Pharmaceuticals Receives ANDA Approval for Deferasirox Tablets

Mumbai, India: Glenmark Pharmaceuticals Inc, USA has been granted final approval by the United States Food & Drug Administration (USFDA) for Deferasirox Tablets for Oral Suspension, 125 mg, 250 mg and 500 mg, the generic version of Exjade®1 Tablets for Oral Suspension, 125 mg, 250 mg and 500 mg, of Novartis Pharmaceuticals Corporation.

According to IQVIATM sales data for the 12- month period ending November 2019, the Exjade® Tablets for Oral Suspension, 125 mg, 250 mg and 500 mg market2 achieved annual sales of approximately $106.4 million*.

Glenmark's current portfolio consists of 165 products authorized for distribution in the U.S. marketplace and 43 ANDA's pending approval with the U.S. FDA. In addition to these internal filings, Glenmark continues to identify and explore external development partnerships to supplement and accelerate the growth of its existing pipeline and portfolio.

Bosch Packaging Technology is Now Syntegon

Dr. Stefan König
CEO
Syntegon Technology

Waiblingen, Germany: Syntegon Technology is the new name amongst the market leaders in the processing and packaging industry. Known as Bosch Packaging Technology until late 2019, the former Bosch division has recently presented itself as an independent enterprise at the company headquarters in Waiblingen (Germany). Syntegon Technology's business focus is on intelligent and sustainable technologies for the pharmaceutical and food industries. Extending the service range is a priority for the company. Syntegon Technology employs 6,100 people at more than 30 locations worldwide. It posted 1.3 billion euros in sales in 2019. Bosch disclosed its plans to sell the packaging machinery division to a newly incorporated entity managed by CVC Capital Partners, a leading private equity and investment advisory firm, in July 2019. The transaction was completed according to plan, with the company gaining full independence at the turn of the year.

Transaction wrapped up on schedule as business development remains stable. The sale of Bosch Packaging Technology was completed on January 2, 2020, as envisioned. Bosch had announced in June 2018 that it intended to sell its packaging division, finding a buyer a year later in CVC Capital Partners (CVC). Bosch Packaging Technology then expanded its headquarters in Waiblingen, Germany, augmenting it with new departments required for the switch. Business developments remained stable in the interim, bucking the trend in the sluggish machine engineering sector. Sales in 2019 came to 1.3 billion euros, matching the previous year's figure.

The new owner, CVC, aims to vigorously develop the company as a whole and expand intra-group synergies. Commenting on the closing of the sale, Marc Strobel, a partner at CVC Capital Partners said, "CVC is delighted to see the transaction completed on schedule. Syntegon Technology has a strong presence in many market segments, great technological know-how, and innovative power. We want to build on these strengths jointly with management and the entire workforce."

Into the future with a new brand : "Processing and packaging technology for a better life!" This is Syntegon's mission statement. The company is determined to improve the lives of consumers and patients with intelligent and sustainable processing and packaging solutions. A new corporate brand was developed over the past few months. The name Syntegon stands for synergy, technology, and focus on the future. The new corporate color green underscores the importance of sustainability and health. The square in the newly designed logo symbolizes a package as well as packaging technology's ability to protect products.

The entire workforce will celebrate the independent company's launch with management on January 16, 2020. The ceremony at the Waiblingen headquarters, broadcasted live around the world, will be followed by events held at the individual locations. Syntegon Technology will share the news with its business partners today. Chairman of the Executive Board Dr. Stefan König takes this opportunity to send an emphatic message: "We are building on 150 years of experience and the 64,000 machines deployed by our customers, and pursuing new avenues of business. Now, more than ever before, we are working on intelligent and sustainable technologies and embracing the collaboration with our business partners in the true spirit of partnership."

Greater flexibility and focus on caring partnerships: This newly gained independence enables Syntegon Technology to be even more flexible. And newly added departments at the headquarters such as Purchasing and IT shorten the distances between in-house units and facilitating interaction with customers and suppliers. Whereas the company had been part of a large corporation with diverse divisions, it can now create a business framework that is an even better fit for the industry. This new setup will enable the company to enhance its profile as a leading processing and packaging company.

Syntegon Technology aims to set new priorities for services. Impelled by the spirit of partnership with its customers, the company is striving to improve its processes. One goal is to reduce response times to customer enquiries; another is to further increase the availability of service technicians. Syntegon Technology is also investing in a customer and technology center at its Waiblingen headquarters. The processing and packaging technology company collaborates with global corporations and regional market leaders, and is determined to offer even more attractive services for medium-sized enterprises and startups.

Intelligent and sustainable technologies: Syntegon Technology has intensified its efforts to develop intelligent and sustainable technologies. Drawing on a deep well of experience in developing and integrating software solutions, the company uses connected components as well as components enhanced with artificial intelligence to this end. It puts a premium on ensuring sophisticated technologies are simple to use. The greater goal is to collect and evaluate data to avoid machine downtime, maximize product quality, and optimize overall plant efficiency.

The enterprise is pursuing two approaches to produce sustainable packaging – one is to use mono materials rather than conventional multilayer films, and the other is to use paper packaging as an alternative to plastic. Syntegon Technology supports its customers on the path to a sustainable future with material testing, machine applications, and innovative packaging designed to meet the requirements of products, transport modes, and regional circumstances. The company has also significantly reduced its machines' energy consumption.

The numbers speak for themselves : A campaign to train the spotlight on Syntegon Technology's new brand is underway. The company is letting the numbers tell the story. Featuring prominently on the website at www.syntegon.com/numbers, these persuasive figures show what Syntegon is all about. The next highlight on the agenda is the Düsseldorf interpack trade fair, where the company will present its fresh, new brand identity to customers in May 2020.

Transgene and NEC Start Two Clinical Trials with TG4050, an AI-Powered Cancer Vaccine for Ovarian and Head & Neck Cancers

Tokyo, Japan: Transgene is a biotech company that designs and develops virus-based immunotherapies for the treatment of cancer, and NEC Corporation is a leader in IT and network technologies. They both has recently announced that the first patients have been enrolled in the first-in-human trials evaluating TG4050, a therapeutic vaccine based on the myvac technology and powered by NEC's cutting-edge AI capabilities. In these Phase 1 trials, TG4050 is being administered to patients with head and neck cancer who have a high risk of relapse after surgery and patients with ovarian cancer after surgery and adjuvant therapy.

Transgene's highly innovative myvac technology allows the generation of virus-based immunotherapy within a very short time frame while encoding patient-specific mutations identified and selected by NEC's Neoantigen Prediction System. TG4050 has been designed to target up to 30 patient-specific neoantigens (cancer cell mutations). They are selected using NEC's Neoantigen Prediction System, an advanced AI technology that has already been applied in the field of oncology. The prediction system is based on more than two decades of expertise in AI and has been trained on proprietary immune data, allowing it to accurately prioritize and select the most immunogenic sequences.

Transgene uses its expertise in viral vectorization via myvac to incorporate the selected neoantigen sequences in the genome of the Modified Vaccinia virus Ankara (MVA) viral vector. The Company has also set up a unique in-house good manufacturing practice (GMP) unit dedicated to the manufacturing of the individualized batches of TG4050 needed for the clinical development of this novel therapeutic vaccine.

"As each patient's cancer is unique, we have developed a therapy that turns their solid tumor's genetic signature into a powerful highly specific anticancer weapon. TG4050 is based on an MVA viral vector that has proven biological activity and has the ability to elicit an immune response against tumor antigens. Our partnership with NEC ensures that TG4050 is benefitting from its world-leading expertise in artificial intelligence and its unique algorithm that is used to select up to 30 patient-specific antigens that allow this novel vaccine to induce a strong immune response. We are convinced that TG4050, which is at the crossroad of immunotherapy and big data sciences, will herald the start of a new era in the fight against cancer," explained Philippe Archinard, Chairman and Chief Executive Officer of Transgene.

"We are excited to enroll our first patients in these trials and see TG4050 advance to the clinic. This is another step closer towards the realization of an AI-driven individualized immunotherapy for each patient. Our unique partnership with Transgene enables us to leverage its significant clinical development know-how and proven viral vector delivery platform. We are hopeful that TG4050 will make a significant difference for patients throughout the world," commented Osamu Fujikawa, Senior Vice President, NEC Corporation. A Phase 1 clinical trial of TG4050 is enrolling patients with ovarian cancer after surgery and first-line chemotherapy. This multi-center, one-arm trial will recruit patients in the USA and in France. Endpoints of the trial include safety, feasibility and biological activity of the therapeutic vaccine. Dr. Matthew Block, MD, PhD, immunologist and medical oncologist at the Mayo Clinic, is conducting the trial in the USA; in France, the trial will be conducted by Dr. Martinez at Toulouse-Oncopole and by Pr. Le Tourneau at Institut Curie.

Another Phase 1 clinical trial of TG4050 is enrolling patients with newly diagnosed, locoregionally advanced, HPV negative, squamous cell carcinoma of the head and neck (SCCHN) that have received an adjuvant (first-line) therapy after surgery. This multi-center, open-label, randomized two arms trial will include patients in the UK and in France. Patients will receive either TG4050 monotherapy after completion of the adjuvant therapy or in combination with the standard of care at the time of recurrence. Endpoints of the trial include safety, feasibility and biological activity of the therapeutic vaccine. In France, the trial is being conducted by Pr. Delord at Toulouse-Oncopole and by Pr. Le Tourneau at Institut Curie; in the UK, the trial is coordinated by Pr. Ottensmeier from Southampton University. Both studies are sponsored by Transgene and are co-financed by Transgene and NEC.

Change in Management in Sanner Group: Ralf Tiemann is the New CEO and Dr Johannis Willem van Vliet is the New CTO

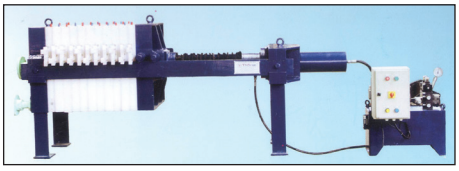
Bensheim/Germany: Sanner – the international supplier of high-quality plastic packaging and components for pharmaceutical, medical and healthcare products – renewed its organizational structure. Ralf Tiemann was appointed as the CEO of the entire Sanner Group. He is supported by a three-member team consisting of the new CTO and Managing Director of Sanner GmbH, Dr. Johannis Willem van Vliet, the vacant position of CSO and the long-standing CFO Claudia Tonhäuser.

Sanner is set for further growth. Accordingly, the Bensheim-based company has decided to reallocate responsibilities within the organization. Ralf Tiemann, who has headed the subsidiary Sanner Pharmaceutical & Medical Packaging Materials Co. Ltd. based in Kunshan, China since 2008, took over the newly created position of CEO of the entire Sanner Group on January 1, 2020. "Sanner is in an excellent international position to continue on its growth path," says Tiemann. "In addition to investments in the different locations, we will also successively expand our portfolio in the coming years. This includes intelligent solutions for greater therapeutic adherence as well as sustainable, biobased plastic packaging".

Dirk Mähr, member of the management board of Sanner GmbH since August 2015, left the company at the end of 2019. Therefore Sanner GmbH appointed Dr. Johannis Willem van Vliet to the management board last summer. As CTO, he is responsible for production, development and quality. Until the position of CSO is filled, van Vliet will also temporarily assume responsibility for sales, marketing, product management and personnel. As Vice President of Ottobock healthcare products GmbH, van Vliet most recently headed the development department for 2 medical products in Vienna. He holds a PhD in mechanical engineering and has many years of experience in research and development as well as production and automation. "This is ideally in line with Sanner's strategic orientation: we want to further strengthen the company in international competition with higher investments in development activities, Industry 4.0 and the expansion of the medtech portfolio," says van Vliet.

Claudia Tonhäuser will continue to be responsible for finance, controlling, purchasing and IT. The business informatics graduate has been with Sanner GmbH for many years and has held the position of CFO since 2010.

Auto Forward & Reverse Type Filter Press



Electric powered hydraulic pumping units maintain the hydraulic pressure and if the pressure exceeds the relief setting this pressure is vented keeping the pressure within the specified range. For press sizes 610 through 2,000 mm, electric hydraulics are optional to decrease filter press opening and closing times. For added operator and equipment protection, the hydraulic power pack includes a high volume/low pressure pump to open and close the plate stack quickly and a low volume/high pressure pump that clamps the plate stack. Once the plate stack is closed, the high pressure hydraulic pump clamps the plate stack with a force, plus a safety factor to counteract the pressure of slurry feed.

For more information, please contact:
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Moisture Meter

Presto offers electronic moisture meter (Model PMM-10) for paper, wood and corrugated boxes. The thin pins make it easy to measure the moisture content of sawn timber; chipboard and fiberboard materials up to a max thickness of 25 mm. It has facility to store data hold, maximum, minimum readings.

It has electrical resistance based technology for checking moisture content; data display on LCD digital display; average of 100 test readings can be accumulated; in-built calibration facility; and 0-100 arbitrary scale, for obtaining relative moisture indications on other material.

For more information, please contact:
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E-mail: info@prestogroup.com

Motor-operated Burette

MICROLIT E-Burette offers 3 pre-set speeds for dispensing. The instrument comes with 3 individually calibrated pre-set speeds, including dropwise dispensing (high speed dispensing 1.517 ml/sec, low speed dispensing 0.491 ml/sec and dropwise dispensing at 0.010 ml/sec).

MICROLIT E-Burette offers motor controlled piston movement. In conventional digital burettes, dispensing is done manually with the help of a rotating wheel, whose speed of rotation is not fixed and varies from user to user. Any abrupt changes in the speed may result in inaccurate and imprecise results. The motor controller piston movement of MICROLIT E-Burette, at 3 pre-set speeds, rules out the effort invested in manual wheel operation and hence, any inconsistences arising due to the variations in its speed.

Built by their in-house team of product design engineers, it offers a host of features like motor controlled piston movement, a touch screen-enabled control panel with an intuitive graphical user interface and 3 calibrated pre-set speeds to perform highly accurate titrations. Designed with ergonomics and intuitive handling in mind, MICROLIT E-Burette is widely used in industries like pharma, environmental monitoring and food and beverages. It exhibits excellent chemical compatibility and helps in performing precise titrations with reliability in practical laboratory environments.

For more information, please contact:
MICROLIT
627 Pakramau, Kursi Road
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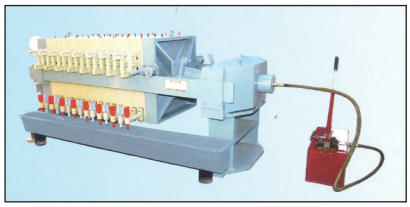
Hydraulic Lock Nut Hand Pump Filter Press



The hydraulic cylinder is swung from the "up" to the "clamp" position and the hand pump is operated to build clamping pressure. At the end of the dewatering cycle, the hydraulic pressure is released and the cylinder is retracted by an internal spring. The cylinder is then lifted to the "up" position and the follower is manually pulled back to the end of the press. The filter plates are then manually shifted to discharge filter cake.

For more information, please contact:
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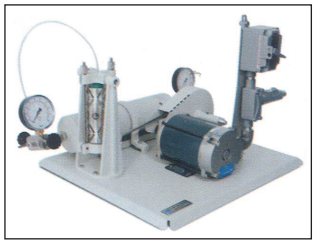
Shaker Hydrogenation Apparatus



Parr Shaker type hydrogenators provide compact and easily-operated systems for treating chemicals with hydrogen in the presence of a catalyst at pressures up to 5 atmospheres (6-psig) and temperatures to 80°C. They are used primarily for synthesizing or modifying organic compounds by catalytic hydrogenation, reduction or condensation but they are equally suitable for any other laboratory procedure in which a liquid and gas must be mixed vigorously in a glass reactor at pressures up to 5 atm.

For more information, please contact:
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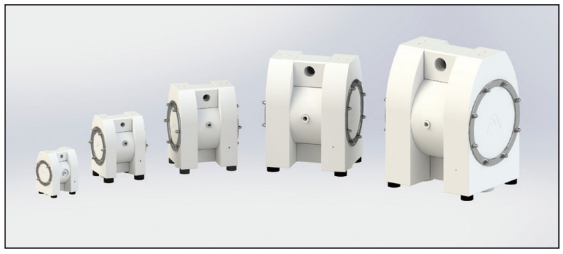
AODD Pumps with New C 40 and C 50 Models



Almatec, part of PSG, a Dover company has extended its line of solid plastic C-Series Air-Operated Double-Diaphragm (AODD) Pumps to include new C 40 (1-1/2") and C 50 (2") Models. Engineered to be a more cost-effective alternative to similar plastic pumps, Almatec C-Series pumps feature an industry-leading design that increases bolt torque to improve pump safety when compared to competitive pumps. What further separates the C-Series is the incorporation of Almatec's exclusive Perswing P air control system, which offers superior efficiency to optimize production rates and lower energy costs.

Ideally suited for the most difficult pumping applications, C-Series pumps ensure the suction and discharge ports are available as separate housing parts with different footprints. This feature allows the C-Series to be quickly and easily matched to existing installations. C-Series pumps do not have any mechanical seals, drives or rotating parts that cause wear over time, which improves reliability and extends product life. C-Series pumps feature self-priming and dry run capabilities, critical considerations for most pumping applications.

The C-Series pump line now consists of five pump sizes – C 10 (3/8"), C 15 (1/2"), C 25 (1"), C 40 (1-1/2") and C 50 (2"). The wetted housing parts are made of either abrasion-resistant polyethylene or chemically-resistant PTFE. For applications in explosive atmospheres, C-Series pumps are available in versions that conform to ATEX requirements according to the 2014/34/EU directive.

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Energy Saver

Emotron FDU 2.0 helps you to save energy and draw max efficiency from your processes. Emotron FDU with modular concepts allows cost-optimisation and is a perfect choice for tailor-made requirements. It offers simplicity in its most advanced form, which makes it easy to program and is user-friendly.

Operation parameters can be set in your process units. Robust and certified IP54 metal construction as standard (up to 132-kW) offer cost-efficient installation close to the application. One Emotron FDU can control up to seven units without external control system. Speed controlled fans assures less noise, a more even drive temperature and higher efficiency. 6 pulse and 12 pulse configurations are also available.

For more information, please contact:
CG Power and Indl Solutions Ltd
Drives and Automation, Plot No: 9
MPAKVN, Phase 2, New Indl Area, Mandideep
Madhya Pradesh 462 046
E-mail: drives.mktg@cgglobal.com

Submersible Dewatering Pumps

MBH dewatering pumpsets are portable pump units with pump below and motor above construction. The motor is submersible squirrel cage, induction type and dry type with Class F insulation and IP-68 enclosure fitted with ball-bearings and mechanical seals. It is rated for 415 +/-10 per cent c/s AC supply. The pump motor unit of close-coupled and jacketed construction design provide effective water cooling of the motor by liquid flowing around the motor casing up into the discharge main.

It can pump out liquid from the lowest level; submersible installation, hence no need of foundation or pump house; cuts civil cost by nearly 50 per cent; can be installed in collection well; and being portable, it can be shifted/handled easily.

For more information, please contact:
MBH Pumps (Gujarat) Pvt Ltd
Plot No: 14, GIDC, Naroda Indl Estate
Ahmedabad, Gujarat 382 330
Tel: 079-22823066, 22821018
E-mail: marketing@mbhpumps.com

Ozone in Bottled Water

In bottled water treatment process, ozone plays a major role as a powerful disinfectant. It is hard to imagine a water bottling plant without ozonation process. Ozone improves the quality, consistency, aesthetics and shelf-life period of water. Ozone disinfects not only bottled water, also disinfects bottles, caps and bottling equipment.

Ozone enables environmentally-friendly clean treatment process. Ozone is a natural product formed by treating the oxygen in the air. It provides final treated drinking water which is safer, cleaner, colourless, non-standing, odourless, palatable and oxygenated. Ozone is very effective against essentially all taste and odour causing organic materials and oxidisable inorganic such as iron, manganese and sulphide ions. Ozone does not produce any undesirable secondary effects (generation of disinfectant by-products) like other oxidants. Ozone is effect over a wide pH range and inactivates micro-organisms such as bacteria, fungi, viruses, protozoa, bacterial and fungal spores in water.

Ozone enables rapid treatment and control of colour which affects the quality and safety of water. Residual ozone sterilises bottles in which the water is being packaged. Half-life of ozone pure water is 20 minutes.

For more information, please contact:
Faraday Ozone Products Pvt Ltd
106/4-A Revenue Nagar
Saravanampatty, Coimbatore
Tamil Nadu 641 035
E-mail: sales@faradayozone.com

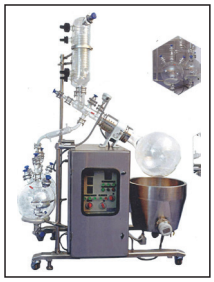
Ozone in Swimming Pool

Ozone is the only powerful oxidising agent for swimming pool. The natural and biodegradable ozone completely reduces the consumption of chlorine. Ozone provides clean, odourless and healthier pool, which do not cause red eye or skin irritation.

Ozone provides 3,000 times more effective results in disinfection compared to chlorine. Ozone in water kills bacteria, moulds, fungus, spoers and viruses. Ozone reduces pool odour and destroys oil and other contaminations to improve the water quality of swimming pool. Ozone leaves no chemical taste or smell, will not cause eye or skin irritation and will not discolour or damage hair or clothing.

For more information, please contact:
Faraday Ozone Products Pvt Ltd
106/4-A Revenue Nagar, Saravanampatty
Coimbatore, Tamil Nadu 641 035
E-mail: sales@faradayozone.com

Rotary Film Evaporator

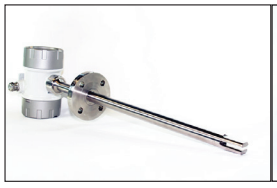


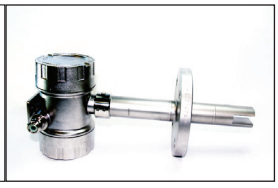
Ablaze's Series of rotary film evaporators are designed for pilot and industrial scale evaporation applications. Exclusive use of superior quality Borosilicate 3.3 glass and PTFE for all components coming in contact with product ensures complete chemical resistance against almost all mediums. It is primarily used for distillation of heat sensitive and volatile components, owing to its unique construction. It can operate under full vacuum and is essential equipment in chemical and pharma industries.

It finds application in distillation, concentration, solvent recycling, reflux process reactions, component purification, fine chemical synthesis and crystallization.

For more information, please contact:
Ablaze Glass Works Pvt Ltd
E-52 Sardar Estate, Ajwa Road
Vadodara, Gujarat 390 019
E-mail: srshah@ablazeglassworks.com

Explosion-proof Sensors





Often operators come to their limits when they are looking for an inline analyzing system that measures highly precise under harsh process conditions. SensoTech is a specialist for those measuring tasks and supports many applications that cannot be measured with standard solutions. Every branch has its own demands and SensoTech GmbH offers a variety of solutions for special applications. Especially in the chemical and pharma industry is a high demand of small and robust inline analyzing devices. To solve these applications also in hazardous areas the LiquiSonic explosion-proof sensors are now available in a smaller dia. A perfect fitting solution for every application even under difficult installation conditions: free choice of the length of the sensor, of the material and of process connection. The sensors are certified as FM, ATEX, IECEx and NEPSI. Under harsh process conditions it is hard to find a robust inline measurement system. In the fields of phase separation, concentration measurement and reaction monitoring the sonic velocity measuring devices from SensoTech GmbH are setting standards for decades. The maintenance-free LiquiSonic measuring devices record the absolute sonic velocity, a traceable and proven physical quantity, as well as the temperature and determine the temperature-compensated concentration of fluids with high precision. A special electronic housing made of stainless steel was developed for harsh process conditions, as in off-shore applications with a constantly high-concentrated salty atmosphere. Commonly used housings made of aluminium are normally not allowed here. Furthermore, the housings of the LiquiSonic sensors can be manufactured with a separated electronic. This housing is tailored for customers with difficult installation conditions especially in chemistry, off-shore, mining and semi-conductor industries.

For more information, please contact:
SensoTech GmbH
Steinfeldstr 1
39179 Magdeburg-Barleben, Germany
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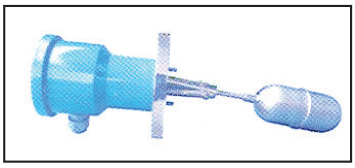
E-mail: info@sensotech.com

Side-mounted Level Switch



The float lever carries a permanent magnet, which is repelled by similar magnet mounted in the switch housing. The magnet having the same pole directed towards each other are separated by a non-magnetic diaphragm. The glandless construction offers excellent sealing. It finds application in hydraulic oil, boilers, and chemical and pharma industries.

For more information, please contact:
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Kamakshipalya,
Magadi Main Road
Bengaluru, Karnataka 560 079
Tel: 080-23286463
E-mail: sales@filprosensors.com

Colour Matching Cabinet

Colour matching cabinet spectrum Asia is a consistent tool useful for visual assessment and evaluation of colours. Used in various industries and laboratories to maintain quality and colour consistency of a sample to detect the phenomenon of metamerism.

For more information, please contact:
Presto Stantest Pvt Ltd
I042 DLF Indl Area, Phase I
Delhi Mathura Road
Faridabad, Haryana 121 003
Tel: 0129-4272727
E-mail: info@prestogroup.com

Analyzers

AMETEK Process Instruments has broadened its line of Thermox WDG-V Series flue gas analyzers to include the WDG-V UOP/RP for oxygen measurement in continuous catalyst regeneration (CCR) platforming/catalytic reforming processes. Building on the legacy of performance and high reliability of its predecessor, the WDG-IV UOP/RP, this analyzer uses industry-proven zirconium oxide technology, incorporating the latest WDG-V electronics and an improved enclosure for servicing.

By leveraging the WDG-V electronics platform, the analyzer offers advanced diagnostics, predictive maintenance algorithms, proactive alarms and digital communications. Designed for SIL-2 safety systems, the upgraded electronics provide an additional layer of safety to ensure reliable operation. The electronics also connect to the AMEVision HMI Host Display for an easy-to-navigate graphical user interface and additional digital communications.

In addition, the WDG-V UOP/RP is designed with an enhanced enclosure for improved ingress protection and easier servicing. The refined design uses floating hinges on the doors to give end-users more accessibility for servicing and increased sealing for ingress protection.

Building on the field-proven design of its predecessor, the analyzer brings upgraded electronics and enhanced ingress protection for robustness, reliability and serviceability in the challenging CCR platforming/reforming process. This latest version is now available for European and International projects with ATEX and IECEx Zone 2 area classification requirements with CE marking and RoHS compliance.

For more information, please contact:
AMETEK Process Instruments
150 Freeport Road, Pittsburgh
PA 15238, U.S.A.
Tel: 412-828-9040
Fax: 412-826-0399

Double Cone Blenders

Double cone blenders are most often used for the intimate dry blending of free flowing solids. The solids being blended in these units can vary in bulk density and in percentage of the total mixture. Materials being blended are constantly being intermixed as the double cone rotates. Normal cycle times are typically in the range of 10 minutes, however, they can be less depending on the difficulty of blending.

Ross double cone blenders are in stock in 5, 10 and 15 cu ft capacity. A full range of sizes from 1/2 to 80 cu ft working capacity is available. Each is constructed of type SS-316 and is internally polished to a 240 grit sanitary finish. The exterior is polished to an easily cleaned 150-grit finish.

All Ross double cone blenders are supplied with intensifier bars to permit de-agglomeration as needed. Discharge is accomplished through a manually operated butterfly valve. The valve is positioned 24" from the floor when in the bottom position. All units are provided with appropriate safety railings and appropriately interlocked safety interlocks. Stop-Start and E-Stop Pushbuttons are included with all blenders.

For more information, please contact:
Ross Process Equipment Pvt Ltd
Plot No: D-233/3, Chakan Indl Area
Phase II, Village: Bhamboli, Tal: Khed
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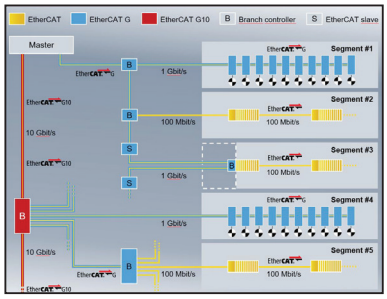
Tel: 02135-628400, 628401, 628402, 628403

EtherCAT G



EtherCAT G was introduced by Beckhoff Automation as an extension of the EtherCAT Standard. Beckhoff recently presented the gigabit technology addition to the ETG, and after thorough review, the organization's Technical Committee accepted it. Right now, the ETG is working to add EtherCAT G to the corresponding technology specifications.

The well-known 100 Mb/s EtherCAT technology remains the proven solution for the majority of applications. However, EtherCAT G offers additional user advantages, especially in applications where particularly large amounts of process data must be transported per device. This can include, for example machine vision, high-end measurement technology or complex motion applications that go beyond the scope of classic drive control. As an extension of standard EtherCAT technology, EtherCAT G is fully compatible; existing devices designed for 100 Mb/s can be seamlessly integrated into an EtherCAT G system, and EtherCAT G devices in a 100 Mb/s EtherCAT system behave like classic EtherCAT devices.

The central element of EtherCAT G is the use of EtherCAT Branch Controllers, which essentially fulfil two main functions: On the one hand, they act as a kind of node for the integration of segments from 100 Mb/s devices; on the other hand, they enable parallel processing of the connected EtherCAT segments. This significantly reduces the propagation delay in the system, which increases system performance many times over previous levels. The integration of EtherCAT G is simple, as the extension is fully compatible with the IEEE 802.3 Ethernet Standard and no software adaptions in controllers are required for the standard mode. The advantages of EtherCAT are well known and include processing on the fly, comprehensive diagnostics, simple configuration and integrated synchronization. These attributes are of course fully retained when EtherCAT G is used.

For more information, please contact:
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Suyog Platinum Tower, 9th Floor
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Pune, Maharashtra 411 001
Tel: 020-67064802, Fax: 91-020-67064899
E-mail: a.phatak@beckhoff.com

Vacuum Leak Tester Touch Screen

Vacuum leak tester is a consistent tool to check the seal integrity, pressure decay, seal performance of specimen like foiled cups, gels, pouches, pharma pouches, sealed tubes, food pouches, etc. Presto vacuum leak tester is manufactured under various test standards ASMD 4991-07 (2-15), ASTM F 2338-09 (2013).

User can create product identification, set vacuum, hold time, retention time, etc.

For more information, please contact:
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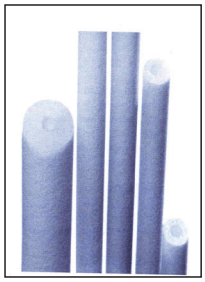
E-mail: info@prestogroup.com

Spun Bonded Filter Cartridges



Spun bonded filter cartridges are made of 100 per cent polypropylene fibres. The fibres have been carefully spun together to form a true gradient density from outer to inner surface. Filter cartridges available with core and without core versions.

Free of surfactants', binders and adhesives; excellent flow with low pressure drop; high dirt holding capacity; high strength and pressure resistance; 100 per cent polypropylene for wide chemical compatibility; nominal and absolute filtration rating; one piece construction up to 1,016 mm and more.

For more information, please contact:
National Card Board Mill
Plot No: 140-2/B/2, GIDC Estate
Dist: Baruch, Ankleshwar, Gujarat 393 002
Tel: 02646-252569, 222569
Fax: 91-02646-253002
E-mail: ncbmfilter@gmail.com

High-density Pyrogenic Silica

WACKER offers the pyrogenic silica grade HDK N20P Pharma designed as an excipient for pharma applications. Even in low amounts, it improves the flow characteristics of powder blends, absorbs moisture from hygroscopic solids and serves as a tablet disintegrant. The new grade's special feature is its high tap density, which provides tangible logistics and handling benefits for pharma manufacturers.

The new product is a compressed version of the HDK N20 Pharma grade, which has been proving its merit as an excipient in the pharma industry for years. Both grades are hydrophilic pyrogenic silicas; their surfaces are thus wettable by water. Apart from the tap density, they possess the same physical-chemical properties. With a silicon-dioxide content of at least 99.8 per cent, both products are highly pure and meet the specifications of the European and the US Pharmacopeia.

Pyrogenic silicas are bulky white powders. In the manufacture of the new HDK grade, the flame process, in which the pyrogenic silica is made, is followed by a compression step. At approx 100 grams per liter, HDK N20P Pharma achieves a tap density that is slightly more than double that of its uncompressed counterpart.

The high degree of compaction has a positive effect on logistics and handling of the product. The media used to transport HDK N20P Pharma can now be filled with twice the amount of product. There is also significantly less dust produced when the bags are emptied and the compressed pyrogenic silica is processed. In addition, the product is easier to meter due to its compactness.

HDK N20P Pharma is used as a processing auxiliary in the manufacture of pharma powders, pellets and tablets. The pyrogenic silica enhances the flow characteristics of powders and can bind moisture. These effects make pharma powders easier to process. HDK N20P Pharma furthermore accelerates tablet disintegration. Amounts of less than one per cent are typically sufficient in order to achieve these effects.

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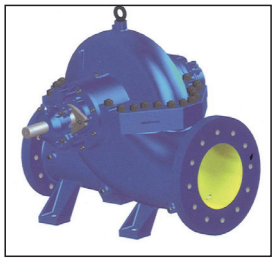
81737 München, Germany
Tel. +49 (0) 89 6279 1601
E-mail: florian.degenhart@wacker.com

Horizontal Axially Split Casing Pumps



These are horizontally split casing, single stage, double or single suction pumps with horizontal shaft and detachable stuffing box called insert. A variety of models are available to operate.

Pump casing is horizontal axially split volute type. Suction and discharge nozzles and supporting feet are cast integral with lower half casing. Impellers are double or single suction type accurately balanced. Hydraulic thrust is balanced automatically because of pressure equalisation on both sides of the impeller. Shaft is of high tensile steel accurately machined and ground is supported by anti-friction bearings. It is protected by shaft sleeves from wear in stuffing box area. Stuffing box can be sealed by gland packing or by mechanical seal and is suitable for liquids having temperature up to 100°C. Deep groove ball bearings are provided. Standard lubrication is grease. Drive is suitable for electric motor or diesel engine. Suitable for handling water with slight impurities in industries, water works, irrigation, sprinkler irrigation, fire-fighting, air conditioning plants, water circulation, processing plants, etc.

For more information, please contact:
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Udyog Bhavan, Tilak Road
Pune, Maharashtra 411 002
Tel: 020-24440770
E-mail: marketing@kbl.co.in

Submersible Sewage & Effluent Pump

MBH non-clog submersible sewage pumps offer the most reliable way of solving the pumping and disposal of sewage containing suspended solids. MBH non-clog submersible sewage pumps are of close-coupled compact design and having a pump below and a motor above, sump cleaning is possible to a max level. These are powered by squirrel cage induction dry motors suitable for operation at 400/440-V, 3-phase, 50-Hz, AC supply. They are also noise-free in operation. The bearing arrangements with double angular contact ball bearings with deep groove ball bearings give the best resistance to the radial and thrust load combination in a centrifugal pump. The life rating is over 40,000 hours. The bearings are lubricated for life with high temperature grease.

The housing is totally dust and waterproof for submersible duty. The cooling is done externally and the special insulation of the winding takes care of rise in temperature during intermittent operations. Special triple protection does not permit any liquid entry into the dry motor. The moisture detector indicates any moisture penetration into the motor. Built-in temperature sensors enable tripping of the motor if the temperature rises above 150°C and restarts at 80°C, giving complete dry run protection. Max permissible liquid temperature is 50°C. The guide rail system for lowering and lifting the pump is an outstanding feature. The pump slides down on to the duckfoot bend and engages with it without bolting. It is not necessary to enter the sump to carry out inspection and maintenance work.

All MBH pumps have as standard equipment double mechanical seals which seal off the motor from the pump section. The seal has seal faces made from silicon carbide for long life. The design of the oil chamber ensures efficient cooling of the seals. Depending on the liquid, impellers may be semi-open or closed, running against a wear disc or casing ring. For industrial sewage, single-, two-channels or vortex impellers can be used. A shaft with a die-cast rotor on the motor side and a shaft protection sleeve on the pump side ensures better life for the shaft. The compact seat arrangement has minimised shaft over-hang and consequently minimises shaft deflection. The motor portion is isolated from the pump by an intermediate casing with double mechanical seal in the oil chamber.

For more information, please contact:
MBH Pumps (Gujarat) Pvt Ltd
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Tel: 079-22823066, 22821018
E-mail: marketing@mbhpumps.com

Dry HCl Gas Generation Plant

Commercial Hydrochloric acid in the market is available as 30 per cent aqueous solution and is widely used in industry in large quantities. However, for certain application, such as hydrogenation reaction and in bulk drug/pharma industries, HCl is required in gaseous and anhydrous form. Different processes for HCl gas generation from commercial grade HCl acid are offered based on customer requirement. These processes are as follows: concentrated sulphuric acid route, distillation or boiling route, and calcium chloride route. HCl gas generation plants are normally available from 5 to 250 kg/hr capacity. Large capacity plants can also be provided on request.

Ablaze has a long and successful record of design and supply of several engineered systems for HCl gas generation. Being manufacturer and PTFE-lined components, Ablaze is well qualified to handle such systems, as these are the major material of construction (MoC) used in such systems, Ablaze also has in-house capabilities for instrumentation and automation, which is necessary for reliable and safe operation. It finds application in chemicals, petrochemical, electronics and textile, steel and metal, pharma and biotechnology industries.

For more information, please contact:
Ablaze Glass Works Pvt Ltd
E-52 Sardar Estate, Ajwa Road
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E-mail: srshah@ablazeglassworks.com

Dock Shelters

Sheltered, safe and secure materials handling is the concern of all the industry nowadays, in the logistics area of any industry where the material is usually prone to dust, rainfall, insects, etc; the need of sheltered materials handling is the top concern.

In order to facilitate sheltered materials handling, loading docks are equipped with the dock shelters and dock seal.

Dock shelters and dock seals are placed at the exterior of the doors openings and forms a shelter between the dock bay and the lorry while the loading or unloading of the material is taking place.

The vehicle reverses into the dock shelter which seals it off, giving weather protection during the loading and unloading. Their range of dock shelters is most suitable at sites when a tight seal is needed.

For more information, please contact:
Avians Innovations Technology Pvt Ltd
Gat No: 60/61, Dehu-Moshi Road, Chikhali
Pune, Maharashtra 412 114
Tel: 020-71400600, Fax: 91-020-71400654

Static Mixing System

Complete skid-mounted static mixing systems are designed to meet the needs of each user. The available mixer designs include the LPD, a low-pressure model typically used for low viscosity turbulent flow mixing of fluids and for gas-liquid mixing. This design is offered in many materials of construction and to 48-inch dia. These mixers are easily customized to include special feed nozzles and injectors for major and minor product streams.

The second design, the ISG includes specially machined elements with passageways that guarantee the mixing of any pumpable material. After passing through ten elements the ISG will layer materials over 2,000,000 times to provide a microscopically layered mixture. ISG elements are stackable in any quantity to provide mixing quality as needed in the process. The ISG is supplied in a range of cast or machined materials to suit the application through 12-inch dia.

For more information, please contact:
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Phase II, Village: Bhamboli,
Tal: Khed, Dist: Pune
Maharashtra 410 501
Tel: 02135-628400, 628401, 628402, 628403

Rotary Piston Blowers

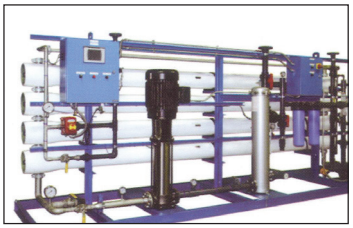
Beta blowers conform to the relevant parts of API Standard-619 (2nd Edition Mast 1985 Reaffirmed, May 1991) the International Standards for Refinery Services however, can be supplied in compliance with other National or International Standards.

Beta rotary piston blowers are precision machines designed and manufactured for use in different field of applications, such as petrochemicals, fertilisers, cement, steel, etc. It is also used in negative or positive pressure conveying of materials in bulk carrying vehicles, gas transportation equipment, pressurise aeration, digesting, gas supply of an effluent and sewage treatment plants. Some of the other utilities include: filter cleaning, backwashing and aeration blowers in water works, especially ordered/made high vacuum pumping station and rotary drum or belt filters used for toxic, aggressive and hazardous industrial gases.

Normally, beta blowers are tested in accordance with BS-1571 Part II but can be tested in accordance with ASME PTC-9 or DIN 1945 depending on customer's requirements.

For more information, please contact:
Beta Maschinenfabrik (P) Ltd
B-16, Sector 81, Phase II, G B Nagar
Noida, Uttar Pradesh 201 305
E-mail: info@betablowers.in / sales@betablowers.in

Reverse Osmosis



Reverse Osmosis is used to remove large majority of contaminants from water by pushing the water under pressure through a semi-permeable membrane. KEP has developed reverse osmosis technology with innovation at an optimised capital and operating cost.

Reverse osmosis is an effective and proven technology to produce water that is suitable for many industrial applications. It is currently considered one of the most economic and effective process for waste water treatment. RO is an effective method of reducing the concentration of total dissolved solids and many impurities found in water. Features low operating cost, low maintenance, easy to install and service, energy saving separation technique, high recovery and eliminates thermal degradation.

For more information, please contact:
KEP Engg Services Pvt Ltd
6-A-52, Opp: Park, Nr Vedant International School
Apurupa Colony, Jeedimetla, Hyderabad, Telangana 500 055
Tel: 040-23096275
E-mail: info@kepengg.com

Mechanical Vapour Recompression Evaporation System

Mechanical vapour recompressor is used to increase the pressure of the vapours, which are generated in the separator. An increase in pressure in compressor will increase the condensation temperature of the water vapour (steam) rendering it usable to heat the original mixture in a calandria. It is this resulting temperature difference produced by compressing the water that enables a highly-efficient heat transfer to occur. As the water vapours condense in the shell side of calandria, it releases its latent heat to further heat the original mixture, which in turn produces more steam. Found to be the most economical choice when there is no boiler available or when electrical power is priced competitively in comparision to steam.

Features gentle evaporation of the product due to low temperature differences; reduced load on cooling towers since no residual vapours, due to the complete recompression of the process vapour, cooling water consumption is negligible; easy capacity controlling through variable frequency drive; efficient vapour compression technology to minimise operating cost; due to absence of the recycled cooling water, electricity, water and maintenance costs are saved; high water recovery rate up to 98 per cent; recycling the latent heat of the steam and avoiding fresh steam consumption, makes MVR more energy saving.

For more information, please contact:
KEP Engg Services Pvt Ltd
6-A-52, Opp: Park, Nr Vedant International School
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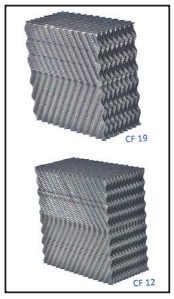
Tel: 040-23096275
E-mail: info@kepengg.com

Structured Fill Media for Efficient Water Treatment Process



Structured Fill Media for Efficient Water Treatment Process High-performance film media improve trickling filter efficiency to achieve the highest effluent standards for biological processes, eg, nitrification and other treatment applications. Multiple structural designs generate good biological growth and adjustable foil thickness supports all required loads.

Hewitech's film media made with a direct inline foil-forming and final thermo-welding assembly process grant a robust fill structure for a long lifespan. Controllable foil thickness and multiple media structure enables fills stabilities to be optimised to various plant designs, which also has a fill self-supporting character in case of high biological load on the film media surface. Cross fluted fill media has been used successfully over decades in highly efficient and energy saving water treatment plants around the world.

For more information, please contact:
Hewitech GmbH & Co KG
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Tel: +49 2553970260
E-mail: info@hewitech.de

Vertical In-line Pumps

TPE3 pumps have revolutionized the role of today's pumps. With its intelligent control modes and unparalleled energy efficiency, TPE3 pumps play an integral role in bringing hot water to your faucets and cool air to your ventilators. They are used primarily in commercial buildings such as hotels, airports, office buildings and hospitals, and have a host of heating and cooling applications. In industrial applications, these pumps can be used to control temperature and avoid overheating of heat intensive parts.

These vertical, in-line pumps have excellent built-in features and augmented communication capabilities. They are fitted with a permanent magnetic motor, integrated sensors, advanced control modes and multi-pump functionalities. TPE3 pumps are easy to install, monitor and deliver max efficiency. Their improved hydraulics have provided them with the highest Minimum Efficiency Index (MEI lesser than or equal to 0.70). Besides this, the TPE3 pumps are also equipped with a TFT colour display for an improved user interface. Features built-in high energy meter to monitor heat and energy consumption of the pump; integrated temperature and pressure sensors that eliminate the need for any external sensor installation; intelligent control modes that can customize temperature, flow and pressure based on requirements to optimize performance.

AUTOADAPT - helps continuously monitor and change pressure or temperature on the basis of external factors and consumption patterns; FLOWADAPT - this mode controls AUTOADAPT with a flow limiting function that monitors the flow rate and ensures that the max flow rate is not exceeded which will eliminate the need for a pump throttling valve to regulate the flow; uses a sensor to measure the differential temperature between the incoming and outgoing liquid; and uses a sensor to match flow to the actual demand, eliminating the need for a pump balancing valve to maintain a constant flow rate. It is one of the most energy efficient pumps on the market with a high MEI rating, capable of handling large volumes (from 5 to 80 m^3/h Quantity and 3 to 25 m Head), varying temperature range (-25°C to +120°C) and ambient temperature (-20°Cto +50°C), and ability to communicate the data from the sensors, other pumps, Grundfos GO remote management app along with BMS and CIM interfaces.

For more information, please contact:
Grundfos Pumps India Pvt Ltd
118 Rajiv Gandhi Salai, Thoraipakkam
Chennai 600 097
Tel: 044-45966800
Fax: 91-044-45966969

IC 2020: Frontiers in Biochemistry and Biotechnology: Strategies to Combat Human Diseases

Event Date: 12—13 Feb 2020

Venue: Shivaji College Auditorium, Raja Garden, New Delhi-110027, India

About the Event: The Department of Biochemistry, Shivaji College (University of Delhi), in association with the Department of Biochemistry, University of Delhi, has organized an International Conference on "Frontiers in Biochemistry and Biotechnology: Strategies to Combat Human Diseases".

This conference aims to bring together distinguished scientists, researchers, teaching faculty, post graduate, and under graduate students from around the world on one platform to discuss and debate new developments and scientific advancement that will impact future strategies to intervene with various debilitating human diseases, ranging from a mechanistic understanding to prevention, diagnosis, treatment, prognosis, and eradication. This conference will unfold, before the scientific community, the research trends in a repertoire of areas related to diseases that plague the humanity.

The scientific program includes keynote address, plenary lectures, invited lectures, oral and poster presentations in four sessions for better insight of human diseases like cancer, infectious diseases (viral, malaria, tuberculosis, leishmaniasis), blindness, genetic and liver diseases. The conference program will be designed to provide ample opportunities to network and establish scientific collaborations across the globe.

For More Information:
https://www.shivajicollege.ac.in/InternationalConference/

International Conference on Innovation in Drug Development and Clinical Pharmacy

Event Date: 17—18 Feb 2020

Venue: Hyderabad, India

About the Event: The event brings scientists and researchers from academia and industry together to share the newest research ideas and findings in the field of Pharma. Pharmacy is the science and technique of preparing, dispensing, and reviewing drugs and providing additional clinical services. It is a health profession that links health sciences with pharmaceutical sciences and aims to ensure the safe, effective, and affordable use of drugs. This conference mainly focuses on New Techniques and Innovations in this field, their effects on people and to improve patient care.

For More Information:
https://10times.com/drug-development-and-clinical-pharmacy

BioAsia 2020

Event Date: 17—19 Feb, 2020

Venue: Hyderabad

About the Event: Globally, the rise of more informed healthcare consumers, new technologies, and ubiquity of data and analytics continues to blur the traditional boundaries between therapeutics, medical technologies, consumer devices, and information technology (IT). This rapidly evolving superfluid market is putting pressure on the life sciences (LS) companies to change their business models and personalize their products and services. The question life sciences companies must address urgently is how they should be preparing themselves for the coming future. BioAsia 2020 explores the capabilities that Life sciences companies should invest in Today to thrive and create value Tomorrow.

Event Forecast: BioAsia 2020 will bring together the global industry leaders, researchers, policy makers, innovators, and investors together on one platform to deliberate on adapting business models today for catering to the changes of tomorrow.

For More Information: http://2020.bioasia.in/

Conference of Indian Society of Critical Care Medicine (ISCCM), the 26Th Edition

Event date: 28 Feb — 01 Mar 2020

Venue: Hyderabad

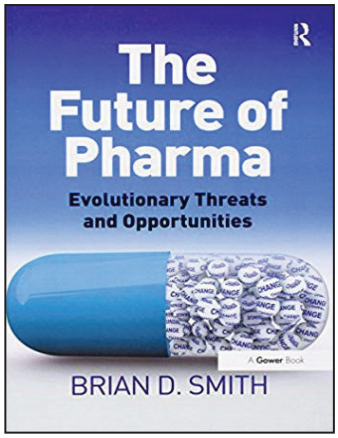
About the Event: The programme will feature streams with a wide variety of topics, taking into consideration of the conference theme, "Precision In Intensive Care", with an intent to enable to tailor the programme specifically to audiences' own interests and clinical practice, as well as information packed Pre Congress Workshops on 26th and 27th February 2020.

Research is on high priority of organizers' checklist and therefore they are committed to have their own original research papers and assimilate Indian ICUs data. Research committee under chairmanship of Dr. Subhash Todi is working hard to achieve this target. ISCCM under leadership of President Dr Subhal Dixit, is going to come up with the three practical reference manuals on NIV, USG & ECLS (including RRT & ECMO), with practical recommendations, which will be ready by the occurrence of CRITICARE 2020 at Hyderabad. Under leadership of President Dr Subhal Dixit & President Elect, Dr Dhruva Chaudhary, Society is going to have its 1st text book in Critical care medicine, which will be ready by 2021 at Ahmedabad CRITICARE. The 1st agenda for the conference is to develop a comprehensive mobile application, which can ease out most of the teething problems. This app will be the one point solution for everything related to all the future ISCCM congress.

The program is going to have more than ten interactive, standardized workshops to impart more practical insight and hands on training. The program will also revolve around to the theme base seminars on issues like communications, data analysis, MLC, consent, interpreting studies, and many other important issues which are missed very often.

For More Information: http://criticare.isccm.org/

The Future of Pharma – Evolutionary Threats and Opportunities



Author: Brian D. Smith

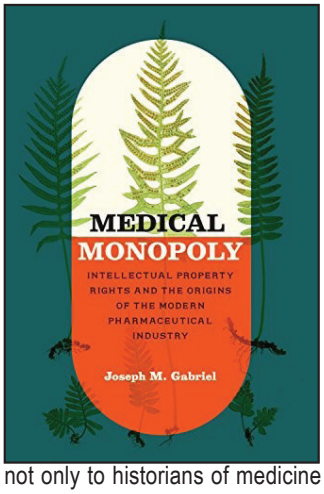
Price: ₹ 3743.00

No. of Pages: 194

Publisher: Routledge

About the Book: Pharmaceutical industry makes a notable contribution in Indian economy. Tracing back to history indicates its success so far. Owing to the profits-and-dividends this industry has added and also due to its counter-cyclical stock market trends, investors consider this industry as a relatively low-risk one. However with significant global implications for employees, shareholders, governments, and patients, this important contribution appears to be petering out due to economic crisis. There are numerous examples indicating the stalling of the pharmaceutical industry. This book – the future of Pharma – throws light on the reasons for this potential decline through an in-depth analysis. It speaks about the emerging landscape, changing marketplace of mass-market consumers, institutional healthcare systems, innovative therapies as the alternate source of commercial value, super-efficient processes, supply chains and operations, closer customer relations, and increasingly tailored health services. The book also has mentioned about various significant long-term and mid-term challenges. The author Brian Smith's insights are basically the wake-up call and a first step forward for all concerns with the future of this industry.

Medical Monopoly – Intellectual Property Rights and the Origins of the Modern Pharmaceutical Industry (Synthesis)



Author: Joseph M. Gabriel

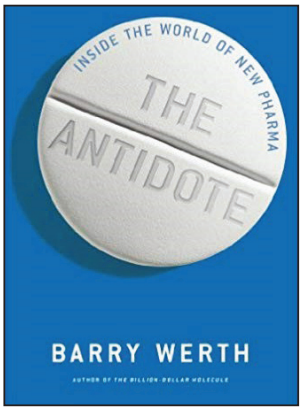
Publication: The University of Chicago Press

No. of Pages: 334

Price: ₹ 3286.00

About the book: With the changing requirements of making intellectual property rights in drug manufacturing legitimate, both scientifically and ethically, complex changes have been introduced in patent and trademark law in the decades following the civil war. By World War I, patented and trademarked drugs had become essential to the practice of good medicine, aiding in the rise of the American pharmaceutical industry and forever altering the course of medicine. Drawing on a wealth of previously unused archival material, Medical Monopoly combines legal, medical, and business history to offer a sweeping new interpretation of the origins of the complex and often troubling relationship between the pharmaceutical industry and medical practice today. Joseph M. Gabriel provides the first detailed history of patent and trademark law as it relates to the nineteenth-century pharmaceutical industry as well as a unique interpretation of medical ethics, therapeutic reform, and the efforts to regulate the market in pharmaceuticals before World War I. His book will be of interest not only to historians of medicine and science and intellectual property scholars, but also to anyone following contemporary debates about the pharmaceutical industry, the patenting of scientific discoveries, and the role of advertising in the marketplace.

The Antidote: Inside the World of New Pharma



Author: Barry Werth

Price: $ 30.00

No. of Pages: 448 pages

Publisher: Simon & Schuster

About the Book: This book is about a ground-breaking close-up of Vertex – an upstart pharma company. Here in this time-relevant book, the author Barry Werth has leveraged his experiential insights spanning more than two decades and explained the indispensable world of Big Pharma.

The book is about the rise of charismatic Joshua Boger after his leaving Merck, then America's most admired business. The book takes the readers to the olden days and narrates a real-life story about founding a drug-company, which eventually challenged industry giants and transformed health-care. The author described the tumultuous early days of the business, the bold endurance, and the eventual success.

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Oil & Gas World Conference 2020 Wednesday, 4th March 2020 Theme: "Revitalization of Mature Fields using Innovative Technologies"	GASTech World Conference 2020 Wednesday, 4th March 2020 Theme: "Unlocking Natural Gas Value Chain Potential in India"	Refining & Petro Chemicals World Conference 2020 Thursday, 5th March 2020 Theme: "Transformation of Refining & Petrochemicals: Vision 2030"
Power World Conference 2020 - Thursday, 5th March 2020 Theme: "Clean & Affordable Power: Innovation, Integration & Adoption"	Surface Engineering Paint & Coating Forum 2020 - 4-5 March 2020 Theme: "Surface Engineering & Corrosion Related Problems in Oil & Gas Industry"	

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Bio Pharma World Expo 2021

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24-27 February 2021

Venue: Bombay Exhibition Center, Goregaon (East), Mumbai, India

Concurrent Events: EPC 2021 Engineering Procurement Construction | Refining & Petro CHEMICALS 2021 | Industry AUTOMATION & Control 2021 | PVF Pumps, Valves & Fittings WORLD EXPO 2021 | WaterEX WORLD EXPO 2021

Scope for CHEMTECH + Biopharma World Expo 2021

- Refining & Petrochemical products
- Biotechnologies
- Chemical & Pharma Processing Equipment
- EPC Services
- Automation Technologies
- Environment Solutions
- Water & Wastewater Treatment Technologies
- Pumps & Valves
- Pipes & Fittings
- Packaging Solutions
- Material Handling Systems
- Analytical & Laboratory Technologies
- Consulting Services
- Equipment Fabricators

Scope for Specialty Chemicals World Expo 2021

- Agrochemicals Intermediates
- Adhesives & Sealants
- Agrochemicals & Crop Protection
- Bulk Drugs & Intermediates
- Enzymes
- Colorants, Dyes & Pigments
- Cosmetics & Personal Care Ingredients
- Hygiene & Cleaning Chemicals
- Laboratory Chemicals
- Surfactants
- Water Treatment Chemicals
- Catalysts
- Electronic Chemicals
- Flavours & Fragrances
- Contract Manufacturers

FACTS & FIGURES - CHEMTECH WORLD EXPO 2019

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