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“The Indian market is well positioned to embrace AFR technology”

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Corning, one of the world's leading innovators in materials science, with a more than 165-year track record of life-changing inventions has launched Advanced-Flow Reactor (AFR) Education Platform on November 12, 2019 to enhance the academic curricula of chemistry-related majors. In less than three years’ time the company has installed over 600 AFR units across the world. Corning AFR is helping API manufacturers upscale production output by providing a continuous process production capacity of up to hundreds of kilograms per hour for pharmaceutical chemicals, base chemicals, and fine and specialty chemicals. This technology is being used by top 20 API manufacturers in India. In an interaction with BioSpectrum India, Divyanshu Gautam, Commercial Director, Gorilla Glass & Emerging Opportunities, Corning India shared the company's growth prospects in India. Edited excerpts;

What will be the latest innovations by Corning AFR in the pharma API market?

Driven by market demand, Corning continues to innovate and broaden its portfolio of products. In 2021, Corning launched a flexible and versatile new system suitable for pharmaceutical production – the G1 production system. This new system is FDA compliant (subject to customer certification) and includes control software. Corning created this system to offer the pharmaceutical market a tool that fits the requirements of a production system and allows for a faster transfer to production which helps enable a more competitive time to market.

For larger API production, Corning's higher-throughput G4 and G5 reactors continue to gain momentum. Keeping the focus on its customers' needs to have a robust technology that helps enable a fast and reliable transition from experimental tests to real production.

More than 600 AFR units have been installed around the world in a variety of chemical processing segments with more than 30 per cent of these installations occurring within pharmaceutical API R&D and industrial production.

Recently the government has sanctioned three bulk drug parks in India. How will you tap this opportunity?

We believe it is an industry-friendly initiative by the Ministry of Chemicals and Fertilisers to encourage domestic manufacturing of bulk drugs to reduce import dependence and establish a significant position in the global market by providing easy access to standard testing and infrastructure facilities.

With the growing focus on local manufacturing, India is strengthening its production capabilities. It also presents a great opportunity for Corning to showcase its Advanced-Flow Reactors which are an inherently safer technology that can drive higher-quality chemical processing and reduce the risk of process hazards.

The Indian market is well positioned to embrace AFR technology. Over the last decade, several AFR units were installed at some of the most important pharmaceutical companies in India that remain interested in continued collaboration with Corning.

Corning has been working closely with IIT Delhi to establish a centre to educate industry participants and provide experience with flow reactors. Tell us more about the centre and how much will be spent to set up the centre.

Our partnership with IIT Delhi is one of our important initiatives to help drive AFR awareness and the flow of chemistry education in India. The centre not only helps the industry participants to touch and feel the reactors and work on chemistries themselves but also educates future generations of chemists and chemical engineers to be aware of this technology so that they can consider this as a tool for their applications.

The AFR team also remains committed to education initiatives. In 2021, the AFR team launched the Corning Advanced-Flow Technology Academy in Changzhou, China to deliver leading-edge, interactive live training on Corning's flow chemistry education platform, Corning Nebula Education Kits. The new academy is helping to educate the next generation of students to realise the value of flow chemistry and AFR technology, which has become one of the most important technologies in the chemical, pharmaceutical, and new materials industries.

How Corning AFR technology is enabling seamless scale-up from lab to production?

Corning's AFR are specially designed to integrate heat transfer and mass-transfer into a single piece of equipment, enabling the conversion of batch chemical processes to continuous flow processes with a much smaller footprint. This leads to increased efficiency, scalability, yields, and higher quality chemical processing for our customers. Compared to traditional batch reactors, Corning's reactors enable at least 100 times enhancement in mixing, 1,000 times improvement in heat transfer performance, and seamless, efficient scale-up from the lab to full-scale production of chemicals with an inherently safer technology for the pharmaceutical, speciality, and fine chemical industries. In addition to adopting an inherently safer technology, customers that choose AFR technology also benefit from energy savings, lower production costs, and reduced environmental impact.

AFR's global team offers customers cost-effective products and solutions while providing specialised engineering support and unparalleled process development expertise. It's our goal to help our customers design systems for a variety of utilisations from lab applications to pilot processing and industrial product development.

How energy efficient and safe are your products and how can pharma manufacturers benefit from them?

As environmental and safety regulations become more stringent, the chemical manufacturing industry is increasingly looking to continuous flow processing as an inherently safer technology that also offers a more efficient and less costly alternative to traditional batch processing. Long used in other trades such as petroleum refining and petrochemical industries, continuous

flow methods have gained steady adoption in the production of fine chemicals, agrochemicals, and active pharmaceutical intermediates (APIs).

Corning Advanced-Flow Reactors are an inherently safer technology in that they use a small number of chemicals in the reactor process which is intended to reduce the potential impact of process excursions. This is particularly important when manufacturing plants are located in highly populated residential areas. In addition, they provide substantial economic benefits, including improved quality of the final product, reduced manufacturing costs, less use of initial material, lower energy use, less waste generation (less waste to dispose of or recycle), scalability which minimises risks associated with scale-up, improved yields, less impact to the environment, and slower adverse reactions in multi-purpose plants and single purpose plants.

What potential does the Indian market hold for Corning?

Today, India is increasingly called “the pharmacy for the world” and is home to a rapidly growing pharmaceutical market, placing it at the forefront of the global life sciences industry. Corning’s AFR technology provides a variety of solutions to help meet the needs of small and large laboratories as well as industrial-scale manufacturing. For example, we are working to integrate our larger-scale industrial product, the G5 reactor, into the region. The G5 can support large-scale industrial production by offering a substantial annual flow throughput of 10,000 metric tonnes per reactor while maintaining the seamless scale-up standards of our other industrial reactors.

What are your plans for the Indian market?

While the Indian market has been slow to adopt continuous flow technology, in recent years, India has witnessed a promising surge in investment in pharma and life sciences research and development, signalling evolution and highlighting the potential of the Indian pharmaceutical market – from generic drug development to advanced medicines and biotechnology.

Corning’s AFR team believes that India is positioned to be one of the most important hubs for flow chemistry. Leaders within India’s pharmaceutical industry want to promote India as one of the main producers of key starting materials (KSMs) & API. Utilising AFR technology will help enable these pharmaceutical companies to deliver new APIs. Corning is well established in India and works closely with industry experts to help make this vision a reality.

Sanjiv Das

sanjiv.das@mmactiv.com