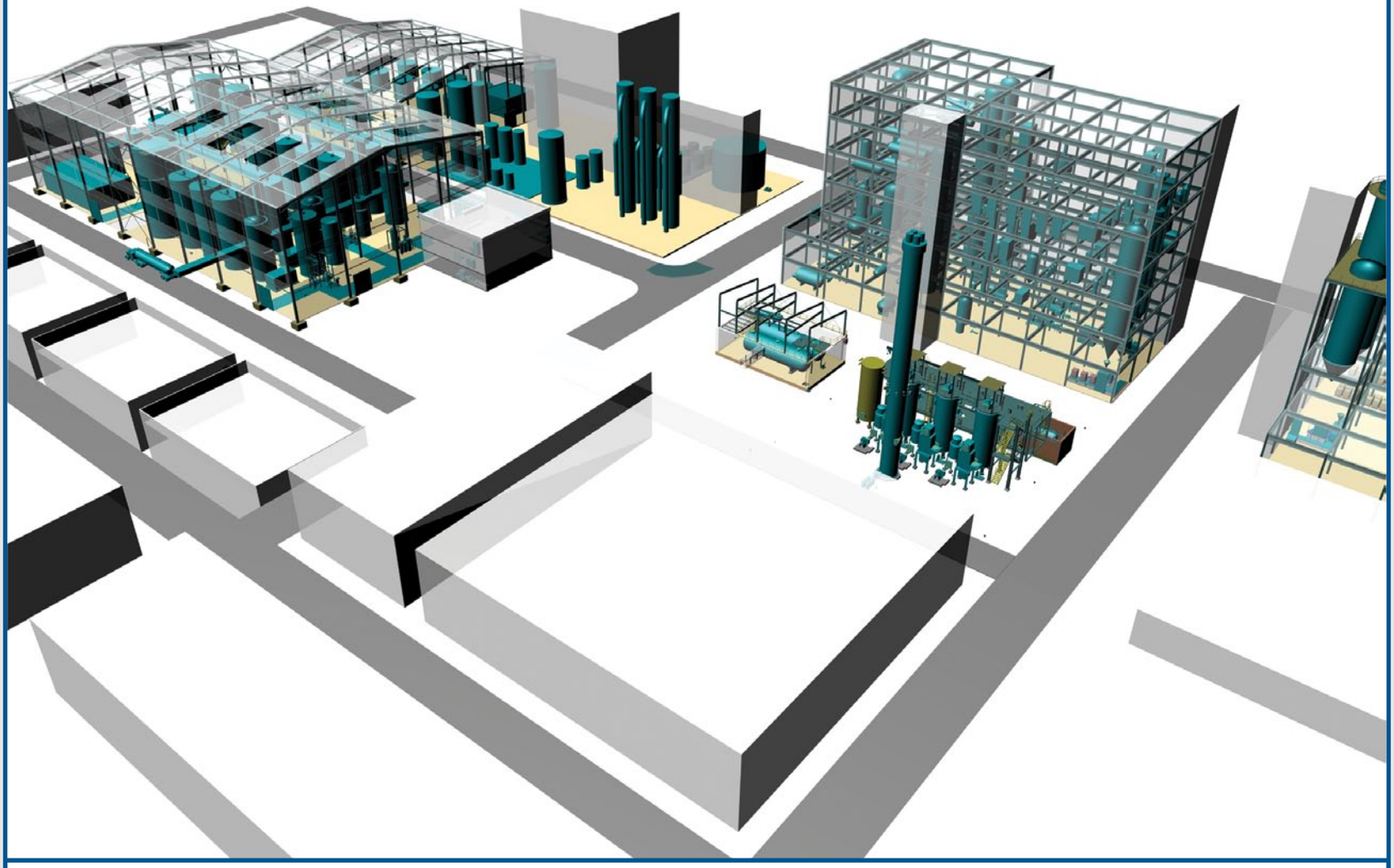

PIONEERING PLA TECHNOLOGY

Uhde Inventa-Fischer is a global market leader in the design and construction of state-of-the-art polymerisation plants and a division of thyssenkrupp Industrial Solutions of Germany. Philip Yorke talked to Udo Mühlbauer, the company's PLA Product Manager, about its latest PLA technology and how this can make a significant difference to both performance and cost-savings for converters.

Uhde Inventa-Fischer (UIF) specialises in the design and construction of state-of-the-art polymerisation plants that produce high quality polyesters and polyamides as well as polyactide (PLA).

The company offers a range of technologies that combine engineering expertise, specialist know-how of polymers and applied experience in a broad range of industrial applications worldwide. Innovation, flexibility and customer orientation are central to the company's business model.

Uhde Inventa-Fischer was founded in Germany in 1924 and in 2004 the company joined the thyssenkrupp Uhde Group, which has now become part of thyssenkrupp Industrial Solutions AG. This strong global network creates valuable synergies and enables the company to cooperate internationally and efficiently within the thyssenkrupp Group.

In addition, it allows the company to offer specific and bespoke services to its customers including authority engineering, construction services and local sourcing of equipment.

Today the company offers excellent technologies in its core competence in the design and construction of state-of-the-art polymerisation plants for polyesters, polyamides and polylactic acid (PLA). These plants are based on proprietary, patented process technologies and key equipment developed, tested and optimised at its proprietary pilot plants and laboratories.

New biodegradable polymers

Uhde Inventa-Fischer is located at two sites, with one based in Berlin, Germany and the other in Domat/Ems in Switzerland. They employ a team of more than 200 specialists that include process engineers, chemists, design engineers, CAD experts and professionals in the field of international procurement. The company also cooperates closely with many prominent scientific and industrial partners.

The latest company developments include its processes for the production of specialised biopolymers such as polyactic acid (PLA) and polybutylene succinate (PBS).

These new biodegradable polymers are based on renewable raw materials and are a sustainable alternative to plastics based on petrochemicals. Thus they offer a huge potential for replacing conventional polymer applications, especially for the packaging industry.

A large number of PLA applications are already in the market: Examples are thermoformed articles of the Huhtamaki Group sold under the brandname of Bioware™, Danone's Activia joghurt cups or Sant'Anna's Bio Bottle for still water.

Being a new biodegradable and biobased polymer, PLA has all the while to compete with standard, petrochemical based polymers like PET, PS and the polyolefines – and this not only on a technical, property-related basis, but also and not at last pricewise.

In this regard the efficient use of the raw material is very important, as raw material cost has a huge impact on production cost. Here lies the main advantage of Uhde Inventa-Fischer's PLAneo® process. The conversion of lactic acid to PLA is close to its theoretical minimum thanks to the unique purification and polymerisation technology of meso-lactide. Meso-lactide, being a side-product of the PLA process usually has to be separated and hydrolysed back to lactid acid, thus reducing the overall efficiency and increasing raw material conversion cost. In UIF's PLAneo® process, meso-lactide is polymerised and blended with standard, crystalline PLA, without affecting adversely the properties of the PLAneo® PLA. In contrast, some properties like elongation at break are even improved. Uhde Inventa-Fischer's PLAneo® process is able to produce all PLA grades available in the market: from fast crystallising types to nearly amorphous ones.

Integrated technology

Uhde Inventa-Fischer has been integrating its knowledge about equipment manufacture and plant engineering as well as polymer production for almost a century, making it well equipped to meet the modern challenges and demands of today's polymer industry. To date the company has gained unrivalled experience in the construction and engineering of more than 400 polymer production plants throughout the world. These include polymer and chemical plants for the manufacture of polyesters such as PET, PBT, PEN and PTT as well as co-polyester for textile bottle and film grade, and engineering plastics.

In addition to its range of polyamide and co-polyamide plants, the company is also able to construct plants for the manufacture of polyactic acid (PLA) which is ideal for packaging, textiles and compound applications. Furthermore, the company offers reactors and a range of specialised process equipment.

Mühlbauer said, "We develop our own technologies in our workshops and pilot plants and have been focused in the past 10 years on our new PLA technology. The PLA process fits perfectly into the company's product portfolio as it can be seen as a combination of the Polyester and Polyamide technology. Hence, reactor design and process set up of the PLA technology are based on proven technology. " In addition to that, UIF is in the position to offer technology for the production of lactic acid out of sugar or glucose. UIF's sister company, the biotechnology division of thyssenkrupp Industrial Solutions, has developed the fermentation process on its own industrial scale pilot plant. The 3D-layout plan of such an integrated plant, starting from sugar and producing PLA pellets is shown in the picture on previous page.

Mühlbauer added, "Differentiating us from our competitors, I would say that we are the world's technology leaders in polyamides and polyesters and have the most advanced PLA technology. With our presences in China, Russia, Saudi Arabia, India, the CIS countries, as well as the Far East and the additional expertise of the thyssenkrupp Group we are able to handle complete turnkey projects all over the world. We are also a very flexible company and are able to licence out our processes and patented technology for production and can provide the complete recipe for our special process technology. What is more, our many ISO certifications guarantee high product quality." □

For further details on the products and engineering expertise Uhde Inventa-Fischer is offering, please visit: www.uhde-inventa-fischer.com