# Statement by the Exhibitor Advisory Board of K 2025

## Part 2: Technology and trends

From a market perspective, the plastics industry has been facing a global crisis since the last edition of K in autumn 2022. This is unsettling and unpleasant for companies in the sector. Nevertheless, crisis phases like this usually also have positive impacts on the development of the industry as a whole. Well-trodden paths and processes are scrutinised and reassessed at all levels, and the risks of introducing innovations are more readily accepted. The focus on customer needs rises once again and new solutions aim to bring successful improvements.

For this reason, K 2025 will be showcasing a plethora of new and further technological developments. Especially because digitalisation and the development of artificial intelligence are opening up new areas that were previously inaccessible. In addition, the industry has been undergoing a global transformation process towards a circular economy since the middle of the last decade. Many discussions and solutions around this topic were already in evidence at the last K.

The new opportunities offered by digital developments also hold great potential for a successful circular economy. These two technology topics set to dominate the plastics industry in the medium term go hand in hand and are mutually beneficial. In Europe in particular, there are also many regulatory developments that support this process. The trade fair will reflect the leading role the region has thus assumed.

### Raw materials: compounds with recycled content very much on the rise

A clearly noticeable trend in the raw materials sector is the increasing range of high-quality compounds made from virgin material with a significant proportion of recycled content. Behind these developments are EU requirements which, in future, will stipulate a recyclate content of 10% in the packaging sector, for example, and 25% in the automotive sector. PET is already being recycled in any case, and PS suppliers are now trying to catch up. In the case of PP – partly also in polyolefin blends with PE – there are signs of movement. Here, post-consumer recyclates (PCR) are increasingly



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Öffentliche Verkehrsmittel: U78, U79: Messe Ost/Stockumer Kirchstr. Bus 722: Messe-Center/Verwaltung being successfully utilised in new compounds. Ever more attempts are also being made to include PCR in engineering plastics compounds, which have long been enriched by many post-industrial recyclates (PIR). Those interested in this topic can look forward to many new presentations at K 2025.

The issue of sustainability has also made its mark in the rubber sector. Material suppliers are developing more and more organic-based alternatives to previously synthetic reactive substances and fillers so as to significantly reduce the materials' carbon footprints. These suppliers often utilise residues from other production chains, such as lignin from wood processing or husk residues from rice processing. There are also intense further developments towards improving the quality of powders recovered when recycling used tyres. Furthermore, thermoplastic elastomers (TPEs) are increasingly proving a favourable alternative with technical products that use less material, fulfil at least the same function and are also much easier to recycle. Many of these new developments will be on show at "Rubber Street" in Hall 6 at K 2025.

The chemical recycling of plastics is in its infancy. Without final utilisation via the chemical manufacturing processes of polymers, full closed-loop recycling ultimately cannot work. At the same time, this could make European plastics production less dependent on countries and regions rich in fossil resources and thus secure the future viability of local sites. Despite all the technical discussions within the industry, there is no mistaking the efforts being made by producers with a strong focus on Europe. Pilot plants are in operation in some places, and initial feedback will probably be available by K 2025.

However, the path to chemical recycling can only be seen as accessible in the medium to long term. We are talking about highly complex large-scale chemical plants here, which involve correspondingly long planning and construction phases. It will therefore require a great deal of effort on the part of industry and the public sector to turn the existing potential into economic reality. However, if society supports the circular economy for good reason, there must also be a willingness to provide economic support for long-term projects. In this respect, K 2025 will certainly see more important



discussions taking place on the subject rather than showcasing actual tangible plants or resulting materials.

This also applies to alternative raw material sources and manufacturing processes for polymer hydrocarbons. Concepts such as carbon capturing utilisation (CCU) or the large-scale production of polymers based on renewable resources offer fascinating prospects for future opportunities. However, they still depend on basic research on the one hand and, on the other, very much on the question of which primary energy sources can be utilised instead of fossil resources. The topic is not limited to the question of energy production. It could also entail very fundamental changes to the process management of industrial production. This is demonstrated, for instance, by the direct use of solar energy in chemical synthesis processes using heliostat technology, for which basic research is currently underway at the Jülich Research Centre. Such topics are usually discussed against the backdrop of the trade fair and often individually among experts. However, these discussions also often provide important, albeit not necessarily directly measurable, development impulses for the industry.



The increasing use of recyclates in the manufacture of new products also requires answers from the mechanical engineering sector. Processing windows must be extended to accommodate the changed material properties, and the merging processes for different materials must be developed and optimised. In many cases, this means a detailed rethink of the process control and lots of small changes, from material preparation and quality assurance to the feed zones of machines and the pressure and temperature conditions during melting. At K 2025, the plastics processing experts involved will discover many new detailed and complete solutions to successfully fulfil their tasks.

In the field of rubber processing technology, the focus is currently on improving the production and energy efficiency of processes. Automated end-to-end solutions for specific areas of application, like those widely used in injection moulding technology for thermoplastics for some time now, are becoming increasingly popular. After thermoplastics, simulations of material



behaviour in production processes are also beginning to penetrate the rubber segment.

In addition to these daily, "classic" detailed tasks, the digitalisation of machines and processes has become the predominant megatrend in mechanical engineering. On the one hand, digitalisation is the prerequisite for meeting the requirements of the circular economy; on the other, it is also a key driver here. Digitalisation opens up many previously unknown possibilities and is therefore a clear driver of innovation.

Machine-to-machine communication has long been an issue for mechanical engineering. Connected machines have been available on the market for several years now, providing a considerable volume of data on the processes. At the last K, one of the topics of discussion between machine manufacturers, processors and end customers was who ultimately owns this generated data. The so-called "EU Data Act" has now provided clarity in this regard. The new Data Act obliges machine manufacturers to make the data generated during operation available to the user of the machine in a simple and comprehensible machine-readable form. The OPC UA standards, which have already become widespread in mechanical engineering in recent years now, are ideal for this purpose. The advantages of such connected machines are also increasingly being recognised by customers. Developments in this area go hand in hand with increasing demands of this kind.

This development is being given a further boost by Artificial Intelligence (AI), a topic that is currently omnipresent in technology. A large number of AI solutions and products can already be expected at K 2025: automatic design and process optimisation, predictive maintenance and optical quality control are but a few examples here. Numerous start-ups are expected to present their first solutions to the industry.

Further technical innovations will be presented at K 2025 in the field of "digital twins". These make it possible to store machine data and information in a structured and machine-readable manner over the entire service life. They are particularly suitable for fulfilling the requirements of the "Digital Product Passport" (DPP), which was introduced with the EU Ecodesign for Sustainable Products Regulation (ESPR) coming into force in July 2024.



The DPP is considered a very important component of a functioning circular economy. At the same time, these functions will give rise to new products, business models or entire companies. The fields of application are diverse: product identification includes such things as material composition, the manufacturing processes carried out including the machines used, carbon footprint and condition monitoring through to maintenance as well as service and after-sales organisation.

### European processors now fighting on many fronts

There are many items on the plastics processing agenda. At the top of the list in Europe are the new EU regulations on the path to a circular economy. Manufacturers of technical parts are also working intensively on converting production to e-mobility without neglecting conventional products. At the same time, all processors are under pressure to get a grip on energy costs, which tend to be excessive. The search for energy-saving process solutions is now part and parcel of day-to-day operations.

Many companies have already been working intensively on the use of recyclates at a local level in recent years. Many smaller initiatives are underway here. Meanwhile, major materials manufacturers are offering more and more integrated virgin/recycled compounds. This also applies to many recycling and material compounding companies operating in the mechanical processing sector. Some processing companies see the inhouse production of compounds and quality recyclates as an opportunity to diversify their material sourcing.

European processing is increasingly able to provide recycling solutions if the customers of the products accept and want this. All too often, there are still conflicting procurement guidelines and standards from both public authorities and large customers. These obstacles will need to be overcome. With the introduction of recyclate quotas for new products and the Digital Product Passport (DPP), at least the framework conditions of the EU circular economy for processing are now clearly defined. This is a basic prerequisite for planning corresponding investments.

However, the EU's industrial policy must not focus exclusively on environmental concerns. The "Green Deal" should be complemented by a



pragmatically orientated "Industrial Deal" in order to ensure the industry's competitiveness on a global scale. This is the only way to fully leverage the innovative strength of small and medium-sized enterprises, which in turn can fulfil sustainability requirements. The removal of bureaucratic hurdles and the establishment of a stable energy policy are therefore usually high on the list of demands made by the plastics processing industry on policymakers. There are encouraging signs that the EU Commission and its agencies are increasingly taking this on board.



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### Next gen skilled labour: a global challenge for the industry

In key economic zones around the world, recruiting the next generation of skilled workers is becoming an increasing challenge for all sections of the plastics industry, as it is for industry as a whole. Although the rapid development of AI could provide some relief, the number of trainees is still precariously low. This is because even AI-controlled machines can only be developed, but also operated with complex, trained expertise.

In China and Europe, demographic trends are the main cause for concern. Both regions are suffering from an ageing population. Their societies need a sufficient influx of suitable labour from other regions in order to cope with future tasks. In North America, the lacklustre appeal of so-called blue-collar jobs is a worry for industry. The pool of sufficiently trained skilled labour is therefore also low there, despite all the waves of migration.

It is obvious that the plastics industry alone cannot be called upon, and is not in a position, to solve these comprehensive social issues. But what it can do is present the solution to its upcoming tasks and underline the great relevance of this for the future of mankind in a transparent and comprehensible manner: It is important to convey the strong sense of purpose and sustainability of this industry. At the same time, it is also essential to familiarise young people with the technological fascination of polymer materials and get them excited about them, be it in production, process and machine technology or in processing, application and recycling.

The trade fair will therefore be accompanied by a number of activities organised by the various industry associations. Be it at the official special show "Plastics Shape the Future" by Plastics Europe, in the VDMA forum "The Power of Plastics", at "Rubberstreet" or in the "Young Talents Lounge": there will be no shortage of exhibits, demonstrations, presentations, discussions and guided tours for interested visitors. The industry wants to and will live up to the motto of K 2025: "The Power of Plastics: Green – Smart – Responsible".

