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PLAST ECHO

POLISH MAGAZINE OF THE PLASTICS INDUSTRY

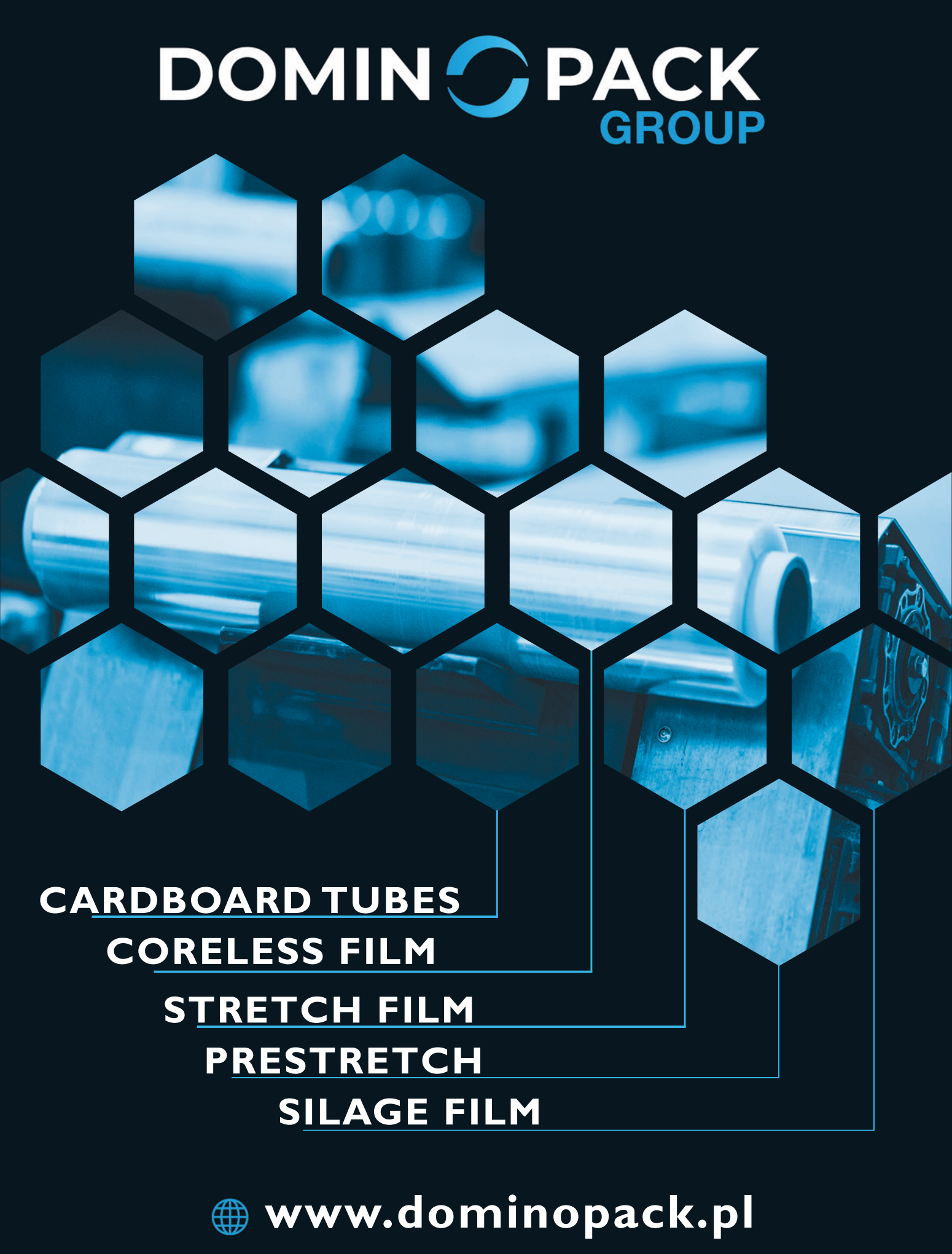
SEPTEMBER 2023



**Difficult year for Polish and European
plastics industry**

Standardisation of recyclates is a must

Polish packaging industry



CARDBOARD TUBES

CORELESS FILM

STRETCH FILM

PRESTRETCH

SILAGE FILM





Jacek Leszczyński
Editor-in-chief

The Holocene is still officially a contemporaneous geological epoch. However, this may soon change. The Anthropocene Working Group, working under the direction of Dr Colin Waters of the British Geological Survey, has issued a report in which it proposes to carve out a new epoch – the Anthropocene. Its name although associated with humans is not a matter of pride, but of shame. Scientists have noted that the amount of concrete, aluminium and plastic left behind by humans is so great that it creates a whole new layer of sediment.

Dr Dan Parsons, professor of sedimentology at the University of Hull, goes a step further and talks specifically about the plastic age. According to him, the main feature of the geological footprint of our time will be the fossilised remains of plastic. But the most interesting thing is that, although we are only at the beginning of plastics processing, we are already facing such serious problems. And what will happen in a few years? Only a few visionaries can know.

The littering has already become a widespread problem that affects our environment on a daily basis. That's why we are increasingly boldly entering the age of recycling. We have turned out to be "swayed" by the wonderful properties of plastics, without paying any attention at all to the consequences of the development of this industry.

It is sometimes hard not to feel that we are behaving like primitive people who have been given access to the most advanced technology, but are using it mindlessly and greedily. As if there was no tomorrow...

That is why, in response to growing concerns about waste pollution, the European Union has taken decisive action to prevent the associated risks.

This is a good thing, because instead of talking about morality and national values (this is particularly evident in the Polish reality), politicians should get to work. I would like to add that we also expect industry to be proactive.

Does all this mean that we need to move from the age of plastic to the age of recycling?

If we define recycling as a fundamental change in the way we use raw materials, then yes. It is not just about an industry, it is about changing the way we think about how we use the goods the earth has given us.

To really tackle the problem of plastic waste and support the growth of the recycling industry, we need to take a broader view. While legislation is key, ensuring the availability of recycled materials is equally important. We need a comprehensive approach that includes research, development of innovative technologies, investment in recycling infrastructure and collaboration between government, business and consumers.

Among the many problems facing contemporary society (mainly due to the stupidity and greed of politicians), environmental and sustainability issues should always be at the forefront.

For this reason, the current international issue of "Plast Echo", the magazine of the plastics processing industry, is largely dedicated to the problems of plastics recycling. You will find contributions from specialists involved in the market, representatives of industry associations and recyclers themselves.

It is worth noting that the interviews suggest that the main factor driving the development of recycling will be the standardisation of recyclates. This is being talked about more and more, but still too little. Meanwhile, it seems to be the most important issue mentioned by my interviewees.

We also want to be your first source of information on the Polish plastics industry, which is developing very dynamically. It is a market that Europe has long since stopped treating as its younger brother. Therefore, it is worth knowing more about it, and in this issue you will find many articles on this subject.

Enjoy reading!



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The "Polish Recycling" Association

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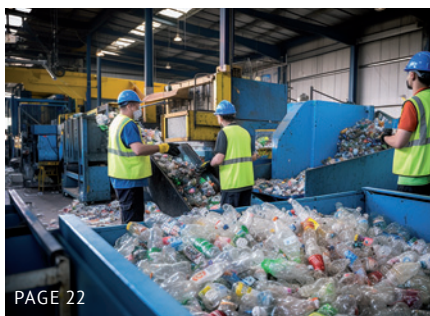
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Composites are revolutionising modern city construction and design. "At Kompozyt-Expo, we are proud to focus on cooperation for the reconstruction of Ukraine, a key topic that was initiated at a conference in Lviv in which we were pleased to participate. Now, we're excited to continue these discussions in Krakow, fostering stronger partnerships for the region's growth", says Barbara Płuciennik, Project Manager.

A Global Showcase: From Germany to South Korea

Krakow's allure attracts top composite companies worldwide. Building on our past success, this year's fair features a joint stand for the Polish Cluster of Composite Technology and the German Composites United cluster. The excitement doesn't stop there! We're thrilled to welcome exhibitors from Ukraine, South Korea and an Iranian National Pavilion. With participants from Poland, the Czech Republic, Italy, the Netherlands, and Moldova, it's an unparalleled celebration of international collaboration.



Sustainability and Energy Transformation: Pioneering Solutions

Kompozyt-Expo drives innovation and sustainability. Our platform is perfect for exploring composite material recycling and its role in the energy transition. Partnering with the forward-thinking Malopolska Region, we'll delve into cutting-edge hydrogen technologies and their synergy with composites.



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Mark your calendars for 4–5 October 2023 in Krakow. Be part of an exciting journey as we unite Europe and beyond at Kompozyt-Expo Trade Fair. Together, we'll shape a brighter, sustainable future. Don't miss out – join us for knowledge, creativity, and progress!

PLASTICS RECYCLING EXHIBITION IN APRIL 2024 IN POLAND

The Innoform trade fair the only one trade fair in Poland addressed to the moulding industry, organised in the heart of the Polish Tool Valley – Bydgoszcz. Visited annually by the owners, management and technical staff, using technologies of tooling and processing of plastics in plants production.

Previous editions have confirmed the huge demand for such a fair event among Polish entrepreneurs. The biggest advantage of the trade fair is the wide offer of exhibitors who present their latest products and services for the industry. The substantive program is equally important. The Industrial Services Zone is very popular, which will accompany the fair also during next year's edition. This is a proposal especially for companies that provide

services in the field of mould production, material processing, tool repairs or machine repairs and have spare production capacity and... are ready to accept new orders! 3 years. Only that time was needed by the Innoform Trade Fair to become a recognised brand and permanently appear in the calendar of representatives of the tool and processing industry.

The topic of circular economy and recycling of plastics was featured during the past editions of Innoform. Due to the fact that the development of the moulding industry is related to the processing of plastics and their recycling, the organizers decided to separate the Plastics Recycling Exhibition in part of the exhibition. In order for the production and use of plastics not to have a negative impact on the natural environment, continuous efforts are needed to process and reuse as much plastic as possible. The organizers invite entrepreneurs who offer machines, tools, materials and services for the development of recycling to participate in the event.



The next edition of Innoform will take place from 16–18 April 2024 in Bydgoszcz, Poland.

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- casing

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- fencing elements
- fittings



MAPRO: DYNAMIC DEVELOPMENT AND PERSEVERANCE IN PURSUING GOALS

INTERVIEW WITH AGNIESZKA KULISIEWICZ, CEO OF MAPRO POLSKA

According to the "Moulded Plastics Market by Type, Application and Region – Global Forecast to 2027" report, the market for plastic injection moulded products is projected to reach 676 billion US\$ in 2027, with a simultaneous value of 499 billion US\$ in 2022 and a compound annual growth rate (CAGR) of 6.2% during the forecasted period.

We discussed the changing role of trade fairs for the machine industry and the assessment of the current situation of the entire plastic processing industry in the country with Agnieszka Kulisiewicz, CEO and Member of the Management Board of Mapro Polska, the sole distributor of Haitian and Zhafir injection moulding machines in Poland.

The last time we had the pleasure to talk to each other was at the beginning of the K-Show Fair in Düsseldorf. So, allow me to start with a question about your evaluation of this event?

Last year's edition of the fair was undoubtedly an especially anticipated meeting of the plastics industry from around the world, not only because of the 70th jubilee edition of the K-Show, but also because of the political and economic situation. It was obvious to almost everyone that those fair trades would have a unique character and atmosphere, nevertheless, I think that the opportunity to meet together was exceptionally joyous. This, in turn, created an excellent introduction for constructive and very substantive discussions based on innovative and energy-saving solutions aimed at future-oriented investments, although with a certain degree of caution and definitely greater rationalism in decision-making.

Do you mean to say that manufacturing companies have recently changed their approach to investment?

Without a doubt, yes. Throughout the whole fair, we could not complain about a lack of interest in the machinery halls (injection moulding machines), which were in my opinion dominated by several leading manufacturers of this type of solution. The machines are undoubtedly the "heart" of any exhibition event. The forward thinking approach of the companies in the plastic industry is noticeable and gives grounds for an optimistic view of the future and in a way balance out the uncertainty related to the costs of raw material and energy. It is worth noting that the latter topic connected with "energy saving" together with two-component (2K) injection moulding solutions were the most common areas of interest of guests who were visiting our stand.

“The forward thinking approach of the companies in the plastic industry is noticeable and gives grounds for an optimistic view of the future

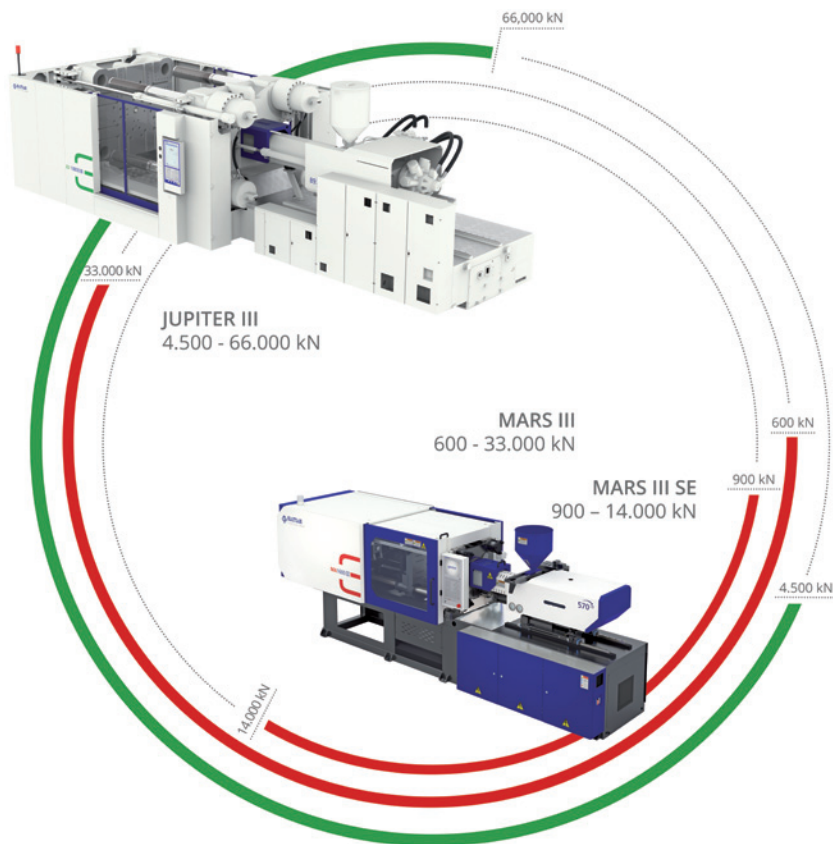
So optimisation of the cost process and building competitive advantages are the main directions for the conscious development of Polish injection moulding plants?

In my opinion, during the latest edition of the K-Show there was an overwhelming

influx of visitors manifesting a desire to discuss not only cost optimisation of the production process, but also issues related to the operation of the companies and crisis management methods. Undoubtedly, the experience of the pandemic and the current political situation has radically changed the ways in which the owners and management of companies in our sector think and act.

Another extremely important event for the plastic processing industry in Central and Eastern Europe was this year's Plastpol fair. Taking into account the two most important trade fairs in the industry's calendar that took place in the last six months, in your opinion, will the role of trade fairs as a tool for the development of one's own business continue to change in the coming years?

The only thing that is certain is a constant change, which, in my opinion, such events as Plastpol fair hasn't avoided. The key role for any trade fairs has always been to create optimal conditions for establishing new business contacts and enabling buyers to meet many suppliers in one place. For suppliers, on the other hand, it is a great opportunity to present their products, solutions and services. Over the past few years and changing external factors, we can observe a major generation change. The dynamic development during the recent years in terms of modern IT solutions and technologies mean that both entrepreneurs and exhibitors have to adapt their trade fair presentations to the expectations of recipients faster than before. In other words, we are undergoing a continuous and multi-stage evolu-



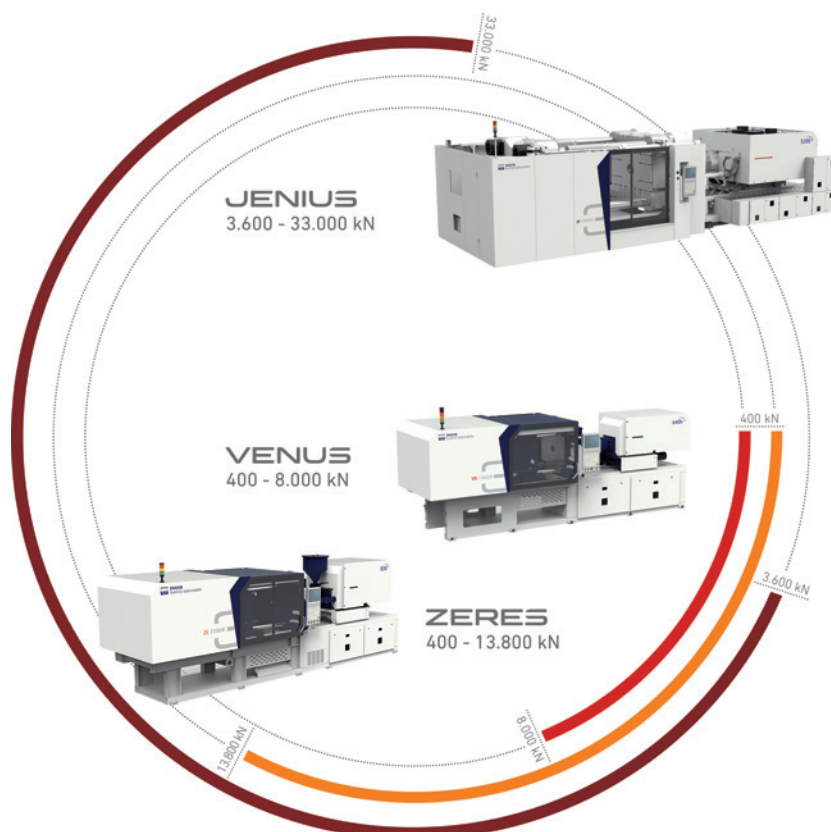
tion, the understanding of which requires a proper look from a greater perspective of time.

According to analyst data, the size of the global plastic injection moulding market is expected to grow by 6.2% over the next 5 years. I suppose this is a very good information for your company?

This is very good news not only for our company but, above all, for plastic processors who, due to the changing circumstances in the last three years, have had to face numerous challenges. Many entrepreneurs took advantage of the pandemic times to improve the competence of their staff. The high level of organisational development is credited, above all, to competent managers and a committed team. Personally, I am pleased that the private sector in Poland is constantly and very dynamically developing and we can not only witness this transformation but, primarily, co-create it as a reliable and proven business partner.

In the quoted report it was concluded that the main factors driving the demand for injection moulding in the market will be the increase in the use of this technology in automotive applications and the growing demand from the packaging industry. In addition, increased demand for consumer goods and electronics is expected to further strengthen this demand. Would you agree with this statement regarding the Polish market?

Of course. The increase in demand for plastic components in various industry sectors will undoubtedly have a huge impact on the development of the entire industry. The consumer market, the electronic and electrical industry and, of course, the automotive industry as a whole are branches of business that will determine, in the near future, the increase in the use of elements produced by injection moulding, and therefore the consumption of plastics. Recently, we have been observing the introduction of newer solutions to the market in those industries with a need



to produce elements by injection moulding. That is why I believe that the increase in demand for consumer goods will further strengthen the development of this technology, also on the Polish market. The increasing requirements of particular sectors regarding the optimisation of production processes towards efficiency, repeatability or cost-effectiveness result in the need for machine manufacturers to use solutions in their products that will not only meet these requirements, but also be "characterised" by elements of harmonious cooperation between man, economy and the environment. The solutions used in the Haitian and Zhafir machines, which meet all assumptions of sustainable development, perfectly fit into this trend, thanks to which we obtain the optimal use of all resources.

As I assume, all this together will also result into a growing demand for electric machines and therefore create excellent conditions for further business development for Mapro Polska?

In recent years, we have observed a great interest in these solutions from our western neighbours. Nowadays, electric injection moulding machines are becoming more and more popular in Poland too.

Favourable conditions of government subsidies contributed to the replacement of older, energy-intensive solutions with very quiet, precise and, above all, energy-efficient Zhafir injection moulding machines. Haitian International fits perfectly into the current trends of sustainable solutions, often exceeding the expectations of plastic processors. This year, during the Open Days for European visitors in October, the 5th generation of injection moulding machines will be presented, which will undoubtedly result in even greater interest in these products in Europe, including Poland. In the long term, it will create excellent conditions for further development. Year by year, we are delivering more and more injection moulding machines, expanding the group of satisfied users.

At this point, I think it is worth saying a few words about the next milestone on your road in the sphere of your activities in Poland since 2011.

This may not sound modest, but I think we definitely have something to be proud of. In June this year, we completed a key investment for our operation and further development, as a result of which we moved to our new headquarters in July. Currently, Mapro Polska is located at Le-

gionów Street in Częstochowa. We have a very modern and well-equipped facility at our disposal, which in turn creates new business opportunities for us. Soon, our business partners will be able to see it for themselves by taking advantage of the wide range of solutions introduced by us, which will have their premieres this autumn. Large storage areas mean even more machines, spare parts and peripherals available "off the shelf".

“ We have a very modern and well-equipped facility at our disposal, which in turn creates new business opportunities for us

This is probably also a reason for great joy for the entire Mapro Polska team and your own satisfaction. Dreams come true?

The new headquarters is the result of the work of the entire Mapro Polska team, which would not be possible without the hard work, perseverance in pursuing goals and commitment of all our employees. Mapro is made up of people who create a unique atmosphere with smiles on their faces every day and make the impossible possible. With such a team, any project, even the most demanding, can be realised. Taking this opportunity, I would like to thank all my co-workers for their contribution to such a dynamic and spectacular development of our company.

So what can I wish you and the whole team?

When it comes to private life: always good health. In business – further dynamic development, only satisfied customers and co-workers and over 4,000 Haitian and Zhafir injection moulding machines installed and working in Poland by the end of 2024. •

Interviewed by Jacek Leszczyński





STANDARDISATION OF RECYCLATES IS A MUST

INTERVIEW WITH TOMASZ MIKULSKI, CEO OF ML POLYOLEFINS

Despite the rapid growth of the recycling industry, the use of virgin polymers will not be abandoned. It will be necessary to use virgin polymers, which will ensure that the necessary technical parameters are maintained. Recyclates will be the “green” additive.

Recycling is an essential tool for a circular economy, helping to protect the environment and limited natural resources. An important driver of this business is demand, which today is mainly driven by EU legislation. However, it is still a very young market and therefore subject to dynamic changes. What do you think these changes are?

The changes that the recycling sector is experiencing today are due to market reasons – these are issues of price differences between virgin materials and recyclates. However, as you mentioned, EU legislation is having an increasing impact on the price of regranulates, as it is forcing their use while their supply is still relatively low. Of course, we don't feel this as much today, as it will take some time for the legislation to come into effect, but slowly the users of recyclates are being joined by companies that have not used recycled materials before.

So who are the real users of recyclates?

As I mentioned earlier, we are seeing a growing presence of companies that have not previously used recyclates in their operations. This is all the more important for recyclers, because companies that have previously used virgin pellets expect to receive a product with exactly the same technical parameters...

It seems that will be quite difficult...

I will say more. It has not been possible in the past and it will not be possible in the

future, at least not in the near future. So it will be up to plastics processors to simply adapt to what they are going to get.

I do not expect recyclers to expand their offering, but rather to reduce it. The demand in the market will result in a limited supply due to a strong increase in demand, while at the same time there will be a rather slow increase in supply in the form of recyclers' capacity. As a result, recyclers will have to make maximum and efficient use of their capacity to produce as many products as possible in uniform batches.

Repeatability is key, so it is a matter of selecting a few key types of material. What I am saying is that standardisation of recyclates and therefore specialisation of production will be necessary. As a result, recyclers capable of producing recyclates of the highest quality will have to limit their portfolio to a few key products that will be key to their offering.

But how can this be done?

The amount of good quality waste is limited and the sources of waste are of varying quality. In fact, we do not know what is in the waste. The best example of this is post-consumer waste – we may find inclusions of minerals or other plastics that are not useful in production. On the other hand, the market demands that we make a substitute for the original.

The only method left is to standardise the end product within the tolerances of the technical parameters. We simply have to

stay within a reasonable quality range to satisfy the customer and at the same time achieve product repeatability.

It will therefore be necessary to use virgin polymers, which will be responsible for maintaining the quality requirements – by which I mean the relevant technical parameters – and recyclates will only be an additive, let's call it “green”. Nevertheless, I believe that using recyclates as an additive will be a major challenge for many plastic processors.

“It will be essential to use virgin polymers, which will be responsible for maintaining the necessary technical parameters – and recyclates will only be an additive, let's call it “green”

And what, in your opinion, are the most important parameters to obtain reproducible results? What do recyclers need to pay attention to?

One of the key indicators for classifying thermoplastics is the melt flow index (MFI) – an important guide for selecting processing parameters. In the case of polypropylene, for example, the Young's modu-



lus should be at an appropriate level as it indicates the amount of the desired plastic in the final product. Similarly, the ash content indicates the degree of contamination of the regrind. Figuratively speaking, it is a question of how much polypropylene is in the polypropylene.

And is the recycling sector technologically ready for these new challenges?

This is a very difficult question, because there is a great deal of diversity in the technological sophistication of recyclers. Certainly, smaller companies are not in a position to meet certain requirements, if only for reasons of investment capacity. More important, however, is the question of how many medium and large companies we have in the market that are already willing or able to make the necessary investments and join the ranks of those that can meet the growing demands of customers.

At the same time, it should be noted that these are customers whose requirements are based on a lack of experience in processing recyclates. As a result, their machinery and personnel are not prepared to use recyclates as a raw material in their production.

Customers expect to get recyclate at a lower price than virgin pellets. With, as you said, comparable quality...

Indeed, until a few years ago, the market could expect recyclers to sell their products at prices very competitive with the original polymers. Today, this is no longer realistic. Firstly, as mentioned above, customers expect recyclates to be of close quality to virgin polymers – why should such a commodity be significantly cheaper? Secondly, the recycling business has to be profitable like any other. Just like the original polymer producer, the recycler has to buy the raw material and the ap-

propriate additives to stabilise it to a certain standard.

To make these visions a reality, the recycling industry needs to speak with one voice. Is the sector aware of these challenges, are recyclers talking to each other about these issues?

Certainly, parts of the industry are aware of the big challenge ahead of us and are preparing to meet it. We are also trying to communicate with each other, share experiences and work together to educate and promote the circular economy. The industry is maturing and consolidating, even though it is still relatively new to the plastics sector. Later this autumn, I will be attending a meeting of leading recyclers from Central and Eastern Europe, where we will discuss the challenges ahead and share our experiences. •

Interviewed by Jacek Leszczyński



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THE EREMA GROUP DRIVES A NEW ERA IN PLASTICS RECYCLING

INTERVIEW WITH MANFRED HACKL, CEO EREMA GROUP GMBH

How does the Erema Group see the future?

In the past business year 2022/23 alone, the extruders supplied by the companies within the Erema Group deliver an additional 1.6 million tonnes of recycling capacity. Our vision is that by 2030 the circular economy in plastics is a reality. That is why the recycling industry needs to continue developing and evolving. This will require new technologies and innovations to set positive signs for the future, even in the current challenging times for our customers.

The whole industry is working on solutions, including a reduction in the use of raw materials, plastic packaging that is designed for recycling, traceability standards for packaging, more efficient collection and sorting processes, and innovative technical solutions for higher recyclate quality. As a result, people in the value chain are gaining an ever better overall understanding of the market. This is accel-

erating the developments towards more recycling and a better circular economy. With our group of companies, we would like to play a central role in this, actively shaping the future as a real driver in the new era of plastics recycling.

What do you mean specifically when you talk about driving a new era of plastics recycling?

Circular economy and plastics recycling are key topics in politics, day-to-day life and business. Only once the circular economy has been properly implemented will it be possible to fully utilise all the positive properties of plastics. And that is what the Erema Group has been striving for since it was founded 40 years ago.

In recent years, we have become a pioneer in recycling technologies, and we have worked very hard to bring together stakeholders in the plastics industry for discussion and interaction. At the Erema Group

we have also broadened our product portfolio for our customers. We are well integrated into networks and can rely on long-term partnerships and research co-operations. This means that we are able to understand even better what it is that our customers need. At the same time, however, it is essential that we take the entire value chain into consideration. We need to include the whole picture to create better recycling technologies and optimum solutions for our customers.

What does that involve?

We will continue to expand our group of companies. Our next goal is to further increase the extent of added value with a clear focus on the polyolefin sector and to set further industry benchmarks. To get from waste material to recycled pellets, potential new raw materials need to go through several different recycling processes. The processes range from sorting, shredding, washing and drying to extrusion including filtration and compounding as well as odour optimisation. The challenge lies precisely in the optimum fine-tuning of all the individual recycling steps – especially when high quality recyclate and consistent stability as well as energy efficiency are to be achieved.

With our company Keycycle GmbH, we already offer turnkey solutions for the entire recycling process including sorting, washing and extrusion. We see the next step as an important stepping stone in perfectly matching the washing process and the recycling extruder. This will enable us to offer all-in-one packages that are custom-built to meet the requirements of the market and the needs of our customers. •



Manfred Hackl (Photo: Erema/Wakolbinger)

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CHINAPLAS 2023: CHINA REOPENS TO THE WORLD

INTERVIEW WITH ADA LEUNG, GENERAL MANAGER OF ADSALE EXHIBITION SERVICES LTD.

This year's edition of Chinaplas recently came to an end. Until a few months ago, China had remained closed due to the pandemic situation, but you still decided to organise this exhibition. What are your first impressions after that?

Amazing. I think everything has been absolutely amazing. As you know, in China, the pandemic was put under control within a very short period of time. Daily lives and businesses went back to normal very quickly. During that time, in our contacts with our exhibitors and visitors, we could feel that most of them were longing for the physical show of Chinaplas. Despite the fact that, in recent years, there has been an increasing trend towards digitalisation, we can see that it cannot replace face-to-face meetings and contacts between people. Everyone was looking forward to the show, and we are very happy that Chinaplas was successfully held in Shenzhen this April. We have heard a lot of good responses and feedback from the participants. Now, we are still very happy and very excited about the show. We are very glad that Chinaplas has provided a platform for international trade and technical exchange to resume the industry's activities.

Then let's move on to the numbers. How many exhibitors presented their products, and, the most important thing, how many trade visitors were there?

This year, we had 3,905 exhibitors from 40 countries and regions. When it comes to visitors, this is a new record for Chinaplas. We had nearly 250,000 international guests, which is an increase of more than 52% over Chinaplas 2019 in Guangzhou,

and about 63% over the last Chinaplas in Shenzhen in 2021. For us, it's a new record in Chinaplas's history.

There were obviously global brands at Chinaplas, but I also saw many smaller companies from Europe. This time, I did not see any companies from Poland, but maybe in the future... Can we say that Chinaplas has become international in scale again?

Yes, indeed. Chinaplas is the international exhibition for the plastics and rubber industries, which are global industries. The international aspect is very prominent. Just now, I have mentioned that we had 3,905 exhibitors from 40 countries and regions. In fact, among them, there were 9 country or region pavilions organised by Austria, France, Germany, Italy, Switzerland, the United States, the United Kingdom, Japan, and the Taiwan region.

On the visitor side, we had about 30,000 visitors from overseas. Although this number has not yet returned to the pre-pandemic level, it has already superseded 50% of the past figures. We also had 40 overseas buyer delegations representing industry associations and end-user associations from Malaysia, Vietnam, Indonesia, the Philippines, India, Pakistan, Russia, South Korea, Thailand and Turkey. You can say that the international aspect was very prominent at this year's Chinaplas.

Which sectors of the plastics industry were the most represented at Chinaplas?

At Chinaplas, you can find all kinds of items and technologies from across the industry's entire supply chain, ranging

from raw materials to machinery to semi-finished and finished goods. Out of our 3,900 exhibitors, 65% were machine makers, and more than 30% were raw material suppliers. This year, for the first time, we set up the Innovative Products Zone, where more than 120 exhibitors from the semi-finished and finished goods segment displayed their offerings at the show. So, you can see this is roughly a fraction of the plastics technology suppliers and other suppliers participating in the show.

At the fair, you could see all kinds of machinery for injection, extrusion, blow-moulding or smart manufacturing. And when it comes to materials, we had all sorts of items, including general plastics, engineering plastics, bioplastics, recycled plastics, and even thermoplastic elastomers, composites and high-performance materials. As for the products, you could find different kinds of high-performance products, functional films or eco-friendly products. This year, we had over 200 technologies make their global or Asian debuts at the show.

The number of companies and the range of solutions presented at the fair were really impressive. How would you assess the Chinese plastics industry nowadays?

Trade fairs speak for the industry. They represent it. It is from trade fairs that one can know the latest developments, market needs or future trends in the industry. As far as the Chinese plastics industry is concerned, I think its condition is clear from this year's show. For example, when you look at visitor attendance in the first two days of Chinaplas, the number of visitors



already superseded the total figure for our last event in Shenzhen in 2021. The overall number of visitors was almost 250,000. Looking at the visitor attendance figures, you can see the vitality of the market, or even the huge demand that it generates. Also, as I have just noted, you can see all kinds of technologies at the fair, and these technologies can actually be applied in many different sectors such as the automotive, electronics, medical, packaging, or even aviation and railway industries. From here, you can see the market itself and the demand from it.

In China, we always need to understand the Chinese government's policies. The Chinese government continues to promote high-quality development, upgrade and transformation of the manufacturing industries. These efforts will drive further demand for smart solutions and advanced

technologies. At the same time, there are also dual carbon policies being put forward by the Chinese government, and in the future, eco-friendly, green and low-carbon solutions will be the concerns of the market, which means that the demand will also be high. You are probably familiar with the country's Greater Bay development strategy, which aims to develop the Greater Bay Area into a high-end innovation research centre. All these points tell you that internally, within China's market, the prospects for future development are very good, and we can predict a significant demand for high-end technologies. Externally, since this year is the 2nd year of the RCEP (Regional Comprehensive Economic Partnership) initiative, the trading relationship between China and RCEP member countries will continue to grow in the future with the lowering of trade tariffs. All these factors will give a lot of confidence

to the Chinese market and to the Chinese plastics industry.

I would like to thank you for organising this impressive event. Hopefully, the pandemic will not return, and the political situation in the world will calm down. What are your plans for next year's Chinaplas?

Next year, Chinaplas will return to Shanghai on 23–26 April. I think that both exhibitors and visitors will have big expectations for the event, because finally, after 6 years, we are returning to Shanghai. At this year's Chinaplas, we already received a very good response and a lot of space bookings for Chinaplas 2024 from our exhibitors. We have already started to feel excited about the event that is coming in a year's time. •

Interviewed by: Jacek Leszczyński

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RECYCLING INDUSTRY PROMOTES QUALITY

The properties that make plastics so versatile make them too valuable to discard after one use. One of the properties of plastics is that they can be recycled again and again. This process is the key to a circular economy.



**JACEK
LESZCZYŃSKI**

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slogan: produce, use, throw away.

And we keep doing it. Littering is a widespread problem that affects our environment daily. Millions pieces of litter are dropped in the Europe each day. In response to the growing concern over litter pollution, the European Union has

Without the development of recycling technologies, we would remain in a linear economy, no longer fashionable but so close to our bad habits, based on the consumerist

taken decisive action to prevent the risks involved.

In turn, plastic recyclers are the frontrunners in improving waste management and the quality of recycled plastics. Being one of the most environmentally sound waste management options – plastic recycling has also proven to work in practice and on an industrial scale. By saving up to 90% of CO2 emissions compared to the use of virgin plastics, recycling is also an important contributor to mitigating climate change.

Of course, any European who cares about the environment will certainly support EU efforts. But what does the recycling industry think about this issue? At the Plastics

Recycling Show Europe 2023 in May this year, I asked Ton Emans, President of Plastics Recyclers Europe, for his thoughts on the European Union's actions.

Plastics Recyclers Europe (PRE) is the voice of Europe's plastics recyclers, who turn plastic waste into high quality materials for new products. Ton Emans also believes that recyclers have an extremely important role to play in facilitating the plastics cycle and the transition to a circular economy.

"Recycling is heavily dependent on regulations – the whole process is driven by them. The European Commission felt it was necessary to set a minimum level of

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Ton Emans, President of Plastics Recyclers Europe

recycling. This has been done by setting mandatory recycling levels, which are 50% for packaging by 2025 and 55% by 2030. However, we should not only focus on packaging – it only accounts for 40% of our total consumption. We should also address the remaining 60%, which is often discarded. I would like to see the implementation of an extended producer responsibility scheme for all plastic products to increase recycling. In addition, it would be beneficial to set recycling content standards for all products. While packaging accounts for 40% of our consumption, the remaining 60% is often thrown away or incinerated.

To remedy this, I suggest implementing an extended producer responsibility scheme for all plastic products. This would encourage recycling. In addition, setting recycling standards for all products would be beneficial in promoting sustainable practices”, says Ton Emans.

Ton cited the example of the Netherlands, which recently announced a plan to to have 30% of recycling content in all plastic products produced within or imported into the country. He believes that the European Union should adopt this goal, but with an even more ambitious target of 50%. By

maintaining the current rate of progress, we can achieve a recycling capacity of more than 26 million tons in Europe by 2030, and create over 50,000 new jobs.

According to the President of PRE, discussing the creation of jobs is one good aspect of recycling. Additionally, recycling helps to reduce CO2 emissions and limit the use of plastic. Therefore, we should set a target to create a more sustainable future for future generations. Overall, he believes we should thank the plastic recyclers for their efforts.

Like the plastics processing industry as a whole, plastics recycling is a relatively new industry, dating back to the 20th century. However, it wasn't until the second half of the last century that recycling experienced explosive growth. This development brings with it new problems.

“Plastics recycling in Europe is a rapidly growing industry representing over €8.7 billion in turnover, 11.3 million tonnes of installed recycling capacity, more than 730 recycling facilities and over 30.000 employees

“In my opinion, the most important challenge that the plastics industry faces is related to its past growth. In 2019, the industry had a capacity of about 8.5 million tons, which increased to 9.6 million tons in 2020 and 11.3 million tons in 2021. Additionally, the industry invested more than €1.8 billion in the last four years and more than €4.7 billion overall. This growth is simply due to the fact that the European Commission introduced a strategy for plastics in the circular economy in 2018. I believe that this was the starting point



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Paolo Glerean, chairman of Recyclclass

for creating a demand for recycled materials, which has been a boost for our business”, states Ton.

The fundamental question is how to accelerate the growth of the recycling industry. How can we improve the quality of recyclates to increase their use in new products? I addressed this question to Paolo Glerean, chairman of Recyclclass.

“The high quality and reproducibility of recyclates is a guarantee for the growth of the recycling industry”, says Paolo. “This is why the Recyclclass platform was established. It is a comprehensive, cross-industry initiative that advances plastic packaging recyclability while promoting the traceability of plastic waste and recycled plastic content in Europe. Our aim is to assess the recyclability of plastic packaging using a scientific approach. We have several technical committees where we develop all the packaging testing methods and also develop design guidelines for recycling based on the results of some laboratory tests”, explains Paolo.

WHY IS CERTIFICATION IMPORTANT FOR THE RECYCLING INDUSTRY?

According to Paolo, product certification is about confidence. Not just in the recycling industry itself, but throughout the value chain. We give the very real message that with certification you can show that recycled materials are proven and traceable, and that their quality is based on reliable scientific testing procedures, not just empty words. If we can increase the quality of the plastic packaging design, this will lead to a higher value of the waste material at the end of the product's life.

These small examples show that it is not only legislation that is important. What is important is a comprehensive and forward-looking approach that covers the entire lifecycle of plastics. By changing legislation, investing in research and development and fostering collaboration, we can make a significant difference and create a sustainable future for the industry. And it is good that the recycling industry is moving in this direction. •

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RUBBER WASTE MANAGEMENT: A CHALLENGE TO THE CIRCULAR ECONOMY

Whenever the question of polymer waste is raised, the main source of concern is usually thermoplastics, that is, the popular polymers such as polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC) or polyethylene terephthalate (PET), which can be processed and moulded at higher temperatures. However, there is also a group of macromolecular compounds which, as a result of the chemical processes that occur within them, permanently retain the shape imposed on them by way of high-temperature treatment. This group includes rubbers, that is, natural rubber (NR) and a variety of synthetic rubbers, which are used to produce rubber goods.



**KAROL
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Rubber products have been with us for more than 180 years. Their unique properties – such as elasticity, resilience, mechanical strength and chemical resistance (depending on the type of rubber used) – make them indispensable in a wide range of machines and mechanical systems. Indeed, the transport

industry and extractive industries would certainly look different today if adequately designed vulcanised materials were not available.

Over the years, the demand for rubber goods has been steadily increasing, especially in the automotive industry. Global annual consumption of natural rubber obtained from rubber tree (*Hevea brasiliensis*) plantations is now greater than 13 million tonnes, and the consumption of synthetic rubbers has exceeded 14 million tonnes. The latter include general-purpose large-volume synthetic elastomers used in the

manufacturing of tyres and most rubber goods, such as polyisoprene, polybutadiene, and styrene-butadiene copolymers. In addition, various medium-volume and low-volume special-purpose synthetic rubbers are made.

It needs to be emphasised that unlike products made from paper, glass, metals or plastics, rubber goods are not easy to recycle because they cannot be defibred or remelted. This is due to the fact that the rubber compound contains a number of other substances in addition to natural rubber: soot and fillers (silica, kaolin,

chalk, etc.), plasticizers, anti-aging agents, flame retardants, and vulcanising agents (sulphur-based or peroxide-based).

Vulcanisation creates strong chemical bonds which are expected to be permanent and generally irreversible. After all, we expect rubber goods to resist the effects of various chemicals and retain their properties across a wide range of temperatures for extended periods of time. It is therefore clear that defective or worn-out rubber goods are difficult to reuse in the manufacturing cycle (unlike, for example, thermoplastic manufacturing waste, which can be a valuable addition to virgin plastic pellets).

Another consideration is that rubber goods such as tyres, conveyor belts, drive belts, fan belts, and pneumatic and hydraulic hoses are often reinforced with fabric, polyester cords, and/or steel components such as wires, braids or spirals to ensure the required rigidity and strength. Considering the above factors, it becomes obvious that rubber waste recycling is a time-consuming and costly process.

The earliest technologies for the reuse of vulcanised rubber were developed back in the 19th century. Historically, the first solution to the problem of rubber waste was to produce devulcanised rubber: a plastic material containing all the components of the rubber product from which it was obtained. This method was pioneered in the 19th century by Thomas Hancock, Alexander Parkes and Charles Goodyear.

Devulcanised rubber was typically obtained using one of three methods – the oil-steam method, the steam method, or the thermal method – by heating scrap rubber to 190–290°C with the addition of degrading agents. The resulting product was homogenised by means of refining and/or filtering. A variation of the thermal method was the later thermo-mechanical method, which used specially designed high-speed mixers or, for continuous processing, extruders. Devulcanised rubber

was then added to virgin rubber compounds as a substitute for the more expensive natural rubber, and was also used to facilitate processing (i.e., calendering or extrusion). Typically, it could replace 1/3 of the natural rubber. With the introduction of radial tyres to the market, the evolution of manufacturing processes, and the drop in the prices of styrene-butadiene rubber (SBR) and polybutadiene rubber (BR), interest in devulcanised rubber essentially ceased.

Over the course of more than a hundred years, many research projects have been completed and hundreds of articles have been written on the subject of rubber waste management, and in particular on the disposal of tyres by regeneration, retreading, incineration, pyrolysis, and biodegradation. The papers have cited statistics, dealt with the legal aspects of scrap rubber disposal, presented ideas for shredding, and explored the uses of waste rubber in civil engineering and transport. The search has also been on for chemicals capable of selectively breaking sulphur bonds to facilitate the devulcanisation process. And yet, rubber waste and waste tyre management continue to pose a global environmental problem and re-

main a challenge for researchers. One of the reasons is the constantly increasing number of vehicles, with an estimated 1.5 billion of them being driven around the world – a figure that is unlikely to decrease. Multiplying the number of vehicles by four provides a rough estimate of how many tyres are now in use.

The tyre market has already reached a significant level of saturation, but it continues to be driven by the sale of replacement tyres, which are purchased at a far greater rate than those installed in new cars. It is estimated that approximately 2 billion new tyres are sold globally each year, whereas the number of decommissioned tyres varies from fewer than 1 billion to 1.8 billion. On a global scale, this translates to more than 31 million tonnes of scrap rubber.

Now, let's have a look at how rubber waste is handled around the world, focusing particularly on waste tyres as the main source of the problem. As shown in Fig. 1, the majority of tyres (42 per cent) are directed to material recycling, with a further 15 per cent going to energy recovery and only 2 per cent of end-of-life tyres being used in civil engineering. Non-recovered

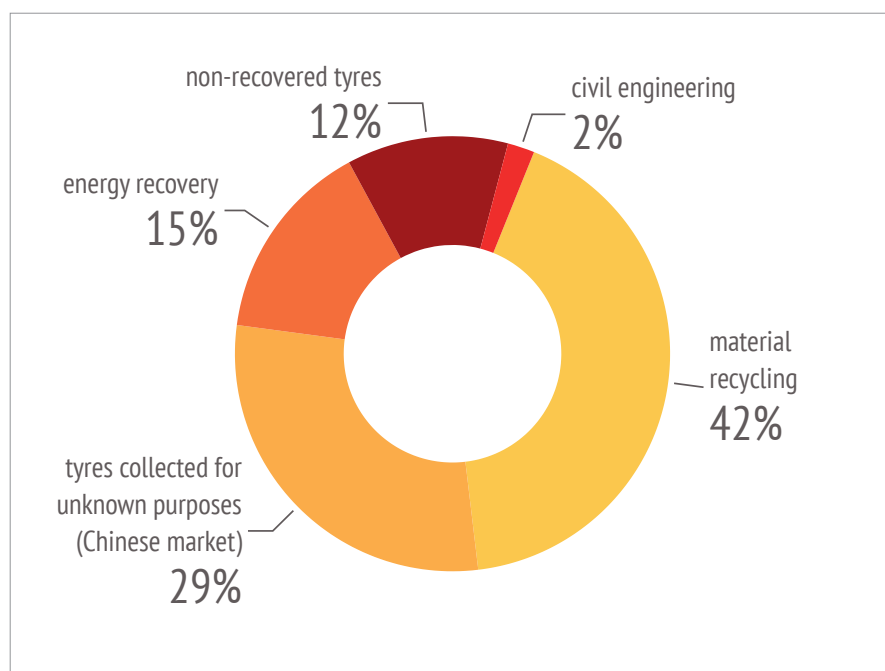


Figure 1. End-of-life tyre management methods worldwide [source: WBCSD]

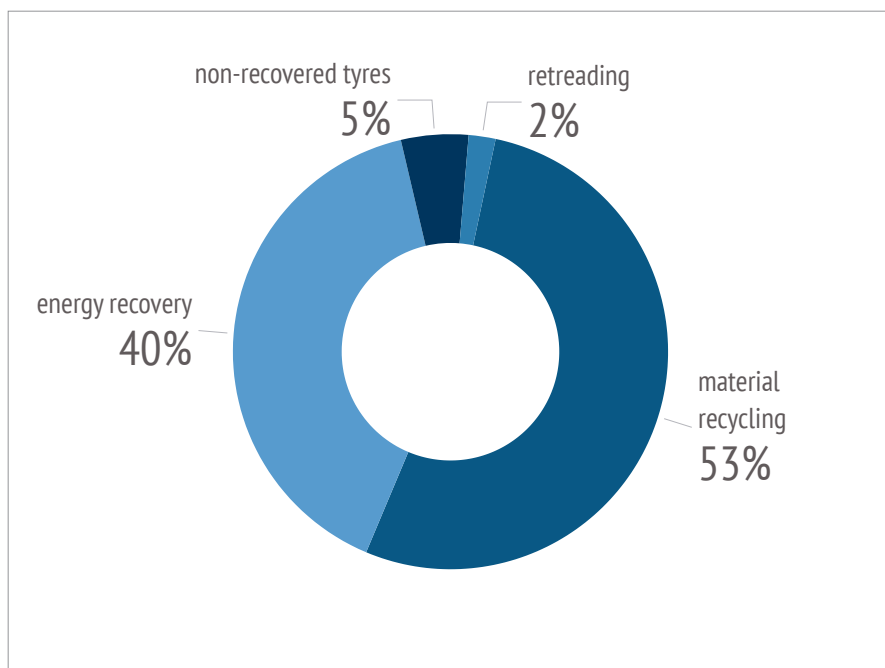


Figure 2. End-of-life tyre management methods in Europe [source: ETRMA]

tyres account for 12 per cent of the total, and as many as 29 per cent waste tyres are collected for unknown purposes (Chinese market).

In Europe, more than 3.4 million tonnes (95 per cent) of end-of-life tyres were recovered in 2019, making it one of the world's best-performing regions in that respect. According to data collected by the European Tyre & Rubber Manufacturers' Association (ETRMA), 53 per cent of tyres undergo material recycling, 40 per cent are used for energy recycling, and 2 per cent are retreaded (see Fig. 2).

The last 25 years have seen a growing interest in material recycling from processing companies, accompanied by a slight increase in energy recovery, whereas the share of retreaded tyres has been dropping.

While regeneration by replacing the old worn-out tread with a new one can extend the lifecycle of a tyre and is an "environmentally friendly" solution, its use is generally limited to truck tyres and special tyres. In passenger car tyres, the main component of the casing, the carcass, is designed for a specific mileage, limited by the wear of the original tread,

whereas truck tyres are designed so that they can be retreaded up to three times. Understandably, economic aspects also play a major role: a retreaded tyre can be purchased for as little as half the price of a brand-new one.

Now, I would like to look at some other methods of rubber waste management. Initially, after the introduction of Directive 1999/31/EC, which prohibited the landfilling of tyres, attempts were made to reuse them in geotechnical engineering. Whole tyres, pressed bales or other special structures were used to protect quays, build breakwaters and erosion barriers, or even construct artificial reefs. After all, out of sight, out of mind... Fortunately, this market is currently limited to isolated projects that are relatively small in scale.

The most important area is material recycling, which consists in reprocessing waste into useable products. In the case of used tyres and other end-of-life rubber goods, the primary processes that enable reuse are shredding and separation of steel and textile reinforcing materials. Shredding produces a number of different particle sizes: shreds (40–300 mm), chips (10–50 mm), granulates (1–10 mm) and rubber

powder (which comes in two size groups: 0–1 mm and 0–0.5 mm).

Rubber waste is typically shredded at ambient temperature using dedicated mills and granulators or ground using cracker-mills. Textile materials – such as tyre cord fibres – are separated pneumatically, and pieces of metal are removed using electromagnetic separators or drum separators. Naturally, the term "shredding at ambient temperature" is used figuratively since large quantities of heat are produced in the process, and rubber powder has to be cooled to avoid spontaneous combustion. It also needs to be emphasised that this method is extremely energy-intensive (with specific energy consumption in the range of 125–150 kWh/t) and generates a significant amount of noise. A modification of the above process is the cryogenic method, where pre-cut rubber waste is cooled with liquid nitrogen and then shredded using hammer-mills.

An additional source of recyclate is a by-product of tyre retreading known as crumb rubber, which has a particle size of 0–40 mm.

Recycled rubber granulate has many uses. In combination with an appropriate binding agent, it is used to build safe surfaces for sports fields and playgrounds (in the bottom layers in this case, since the top surface is made from virgin EPDM granules). Shredded EPDM rubber waste obtained from specific automotive or home appliance vendors can also be used as a supplementary filler for artificial turf on indoor and outdoor sports fields (I personally advise against the use of tyre granulate for that purpose due to its characteristic long-lasting odour that can be rather unpleasant, especially on sunny days when the artificial turf heats up significantly). In addition, the material can be used to produce vibration isolation pads, soundproofing materials, parking lane dividers and wheel stops, and safety barriers. The European Chemicals Agency (ECHA) and European Commission have introduced regula-

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tions concerning the chemical substances present in granulates and the chemical compounds that are leached into the environment under specific conditions.

Rubber powder can be added to rubber compounds intended for use in the manufacturing of vehicle mats, floor mats and carpets and roof panels, which are not expected to have high tensile strength or bending strength. In addition, it can be used as an additive for asphalt, giving it excellent properties and greater strength in comparison with asphalt produced using traditional methods. Unfortunately, for economic reasons, roads with this type of surface are few and far between.

Besides the above methods, pyrolysis is also used in various parts of the world to recycle rubber waste. Known since the 1960s, this process consists in heating whole or shredded tyres to 400–700°C in the absence of oxygen and produces gaseous, liquid and solid products. The gaseous phase mainly contains aliphatic hydrocarbons, hydrogen, and hydrogen sulphide. The liquid phase consists primarily of aromatic hydrocarbons that contain 1.2 per cent of sulphur. The solid phase is ash: char, zinc oxide, zinc sulphide, silica, and (potentially) steel.

In theory, the process seems rather simple, and it is easy to come across articles which suggest that running a pyrolysis plant is a recipe for success. The reality, however, is that the products of pyrolysis have a low market value and require further processing. Moreover, energy must be supplied to support the process at around 50 kWh per tonne of material, and if the technology being used relies on shredded tyres in the form of shreds or granulate, the energy consumption is even greater.

With the increasingly stringent environmental protection requirements, the gaseous and liquid products need further treatment, such as desulphurisation. Moreover, if the gas produced in the pyrolytic process is combusted, this constitutes waste incineration under the applicable regulations,

which means that the operator has to comply with the strict emission standards set for the different types of pollutants.

Pyrolytic oil may gain in value if commercially viable chemicals are extracted from it (in fact, it contains several dozen different compounds), but it cannot be used as heating oil due to its high sulphur content. Similarly, pyrolytic char also requires valorisation. Admittedly, it can be used as a filler in PVC or rubber compounds, replacing the N-600 and N-700 semi-active carbon blacks, or become an additive for asphalt. However, direct reuse as an active carbon or as a component in printing, writing or drawing inks is out of the question: for any of these purposes, pyrolytic char requires further processing. In the end, the valorisation and enhancement of pyrolysis products entails additional expenses. Certainly, energy can be reclaimed from scrap rubber by incinerating it in cement kilns, but this solution is not ideal and can hardly be seen as compatible with the concept of circular economy.

The increasing amount of rubber waste in the world continues to be a problem. Due to the unique nature of the manufacturing process, the rubber industry generates substantial quantities of both manufacturing waste and post-consumer waste. The recycling methods developed to date involve costly and energy-intensive mechanical or chemical processes that make it possible to decompose end-of-life products, albeit with the caveat that the properties of the resulting materials are inferior to those of the original ones. This is effectively downcycling (or cascading), that is, a process which produces goods suitable for less demanding applications and for sale at a lower price point. In addition, given the often complex composition of rubber compounds, direct reclaim of the raw materials used in the manufacturing process is not possible. This clashes with the core idea of circular economy, which is, after all, to ensure that materials can be reused for as long as possible without losing their original characteristics.

In short, the tenets of circularity continue to pose a real challenge to the tyre and automotive industries, which are responsible for generating the vast majority of scrap rubber in the world.

Naturally, tyre manufacturers strive to integrate recycled materials and renewables in their conceptual products, extend the lifespan of tyres, reduce fuel consumption by decreasing rolling resistance, etc. Furthermore, they invest in high-technology recycling, because – even if bio-based raw materials are used in tyre manufacturing – the end-products will ultimately be analogous to those made from synthetic, fossil or non-renewable materials. At the same time, they need to bear in mind that all the above initiatives must ensure that the processes required to meet the technological targets remain economically viable.

In summary, despite everything, sustainability and circularity have so far been losing the battle against economics in the field of rubber waste management. •

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TO WASTE

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DIFFICULT YEAR FOR POLISH AND EUROPEAN PLASTICS INDUSTRY

The plastics industry in Poland is subject to the same phenomena and factors that shape the overall economy. These include major disruptions in the energy carrier and natural gas market, as well as the challenges involved in maintaining a stable logistics chain for the supply of raw materials and the sales of products.



ANNA KOZERA-SZAŁKOWSKA
Plastics Europe Polska

I IN LINE WITH GENERAL ECONOMIC TRENDS

Despite the difficult geopolitical situation and disruptions in the supply of raw materials, Poland's GDP

grew by 5.1% in 2022 (compared to 6.9% in 2021). The estimates for 2023, however, indicate a sharp decline in the GDP growth rate to less than 1% (0.3% according to the IMF's forecasts), the main reason being that the economy has entered a state known as consumer recession. The available data clearly shows that consumers have begun to reduce their spending, and analysts predict that this trend will continue throughout 2023, directly affecting the situation of the plastics industry.

It is clear that the plastics industry in Poland is subject to the same phenomena

and factors that shape the overall economy. These include major disruptions in the energy carrier and natural gas market, as well as the challenges involved in maintaining a stable logistics chain for the supply of raw materials and the sales of products.

I SLOWDOWN IN THE SECOND HALF OF 2022

From a multiannual perspective, the plastics industry in Poland has been developing at an excellent pace. The compound annual growth rate (CAGR) of sold production (at current prices) in the 2011–2022 period was 8.7% (compared to 7.8% for the entire manufacturing industry), which means that the rubber and plastics sector has been growing at a faster rate than other manufacturing sectors. In 2022, the aggregate foreign trade balance of the Polish plastics industry was negative and amounted to 1,879,000 tonnes. Nonetheless, this result was an improvement over 2021 thanks to a 0.5 million tonne

reduction in the import of polymers and a steady increase in the export of plastic goods. The employment rate in the industry also remained stable or even increased slightly. At the same time, however, there are concerns about the declining growth rate of the entire industry after the momentary post-pandemic rebound, especially in 2022.

In the medium term, from January 2019, we can observe a reduction in the growth rate of sold production of rubber and plastic goods as well as chemical products. Deficiencies in energy markets throughout Europe have caused a noticeable slowdown in energy-intensive industries, including the chemical industry. In addition, for the first time in many years, imports of goods in the EU 27+3 states have been greater than exports.

Polymer production, which accounts for around one-fifth of all chemical industry in Europe, was hard hit by the crisis in the second half of last year. According to

Plastics Europe data, production began to decline in the second quarter of 2022, with a particularly pronounced drop in the third and fourth quarters (12.0% and 23.7% year-on-year, respectively). On an annual basis, the decrease from 2021 was 9.2%. Despite the above, Europe remains a net exporter of polymers. Nonetheless, a clear symptom of the present situation is the severe decline in production in Germany, the sector's market leader: 9.7% in comparison to 2021.

THE PLASTICS PROCESSING MACHINERY INDUSTRY

Harry Reichert, Technical Advisor at VDMA, notes that plastics and rubber processing machinery industry recorded good results in 2022, with an increase in exports of nearly 9.3%. The key players in this sector were the USA, China, Germany and Italy, with Poland ranking as high as 7th. However, while the plastics industry is in good shape, the image of plastics is under pressure. We need to work towards a circular economy and bear in mind that plastics are good for the climate. VDMA believes

that the only way to achieve these goals is to take advantage of new technologies and machines.

TOWARDS CIRCULARITY IN THE INDUSTRY

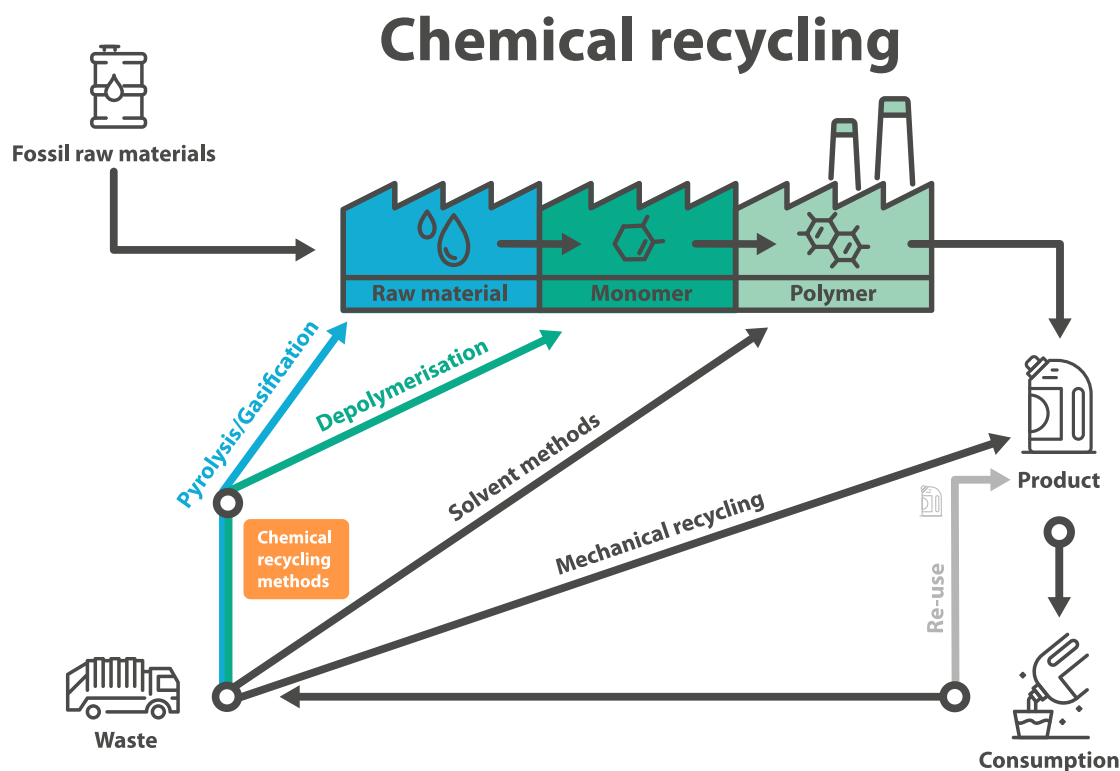
A comparison of sold production figures at current prices for the Polish plastic and rubber goods sector in 2022 and in the first months of 2023 shows that the downward trend which began in the second half of 2022 has carried over into the current year. As a result, it is reasonable to expect that the whole year will be a difficult one for the plastics industry in Poland and in Europe. In addition, forecasts indicate that the European plastics industry – which is one of the industries most affected by the energy crisis and, at the same time, most committed to complying with climate regulations – may continue to face serious challenges in the years to come.

The plastics industry has long been moving towards circularity and net-zero emissions goals. We believe that this is the way in which our industry can contribute to the

attainment of fundamental environmental objectives and deliver benefits to the society while continuing to grow. Therefore, it is important that we remain fully focused on our stated objectives, meet our commitments, and become involved in industry initiatives such as Operation Clean Sweep.

It will be necessary to use and develop all known recycling technologies to achieve circularity in the plastics industry. Without using chemical recycling, which is complementary to mechanical recycling, it will not be possible to meet the EU target of recycling at least 55% of plastic packaging waste by 2030. European manufacturers have already invested 8 billion euros in this technology, making it possible to introduce an additional 2.8 million tons of recycled plastics to the European market by 2030.

However, to achieve this goal, we will need coherent legislative solutions that account for the products of chemical recycling in the calculation of the mandatory recycle content and define the legal status of the mass balance. •





ARE THE EUROPEAN PLANS FOR THE MANDATORY RECYCLATE RATIO FEASIBLE?



LÁSZLÓ BÚDY
CEO, myCeppi

The plastics industry faces significant challenges in the coming years between 2025–2030. According to the commitments of the European Plastics Pact (<https://european-plasticspact.org/>), an average of 30% recycled plastic must be used in plastic finished products and packaging materials. Currently, according to

the report issued by the „European Plastics Pact”, in 2021, the proportion of recycled plastic used on average was still only 10%. For the time being, there is no legal obligation on the mandatory recycling ratio, it is clear that European decision-makers are also looking for reasons and opportunities. There are circumventing regulations, such as the End-of-life Vehicles Regulation, according to which it will be mandatory to plan 25% recycled plastic in projects starting in 2025 for newly manufactured cars. In practice, this will affect cars that will be produced in 2030–2031. By this time,

the regulations concerning packaging materials and other plastic products are also expected to come into force.

Plastic recycling is not new, many companies make their living from it all over Europe. Based on the experience so far, it can be seen that, on the one hand, there is a shortage of high-quality recyclate, and on the other hand, even high-quality regranulates can only be used to a limited extent. Until 2020, regranulates were mostly used to reduce material costs and to manufacture cheap, technically undeman-

MEET US!

161

Cluster Members

85%

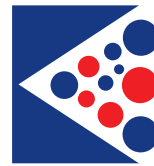
Companies
85% SMEs
15% Large Companies

10%

Other Members

5%

R&D units



BYDGOSZCZ
INDUSTRIAL CLUSTER
TOOL VALLEY

MISSION

The mission of BIC is to create optimal development conditions, stimulate cooperation and integrate processors and toolmakers of the plastics sector in the Kuyavian-Pomeranian Region.

VISION

By 2027, as an effective and dynamic organisation, Bydgoszcz Industrial Cluster Tool Valley will have created favourable conditions for the development of enterprises, especially those of the plastics processing industry, recycling and manufacturing of tools with the participation and involvement of mutually co-operating entrepreneurs, R&D units, business-related institutions and local authorities.

BENEFITS



industry integration
- exchange of information
and direct contacts within
a prestigious organization



**access to project
financing at national
and international level**



**collaborative
displays at
trade fairs**



**contacts within
international
networks**



**savings within
existing purchasing
groups**



**opportunity
to participate
in industry trainings**



**conjoint
implementation of
orders**



**access to cluster
laboratories
on preferential terms**



**impact on the
curriculum of training
newly hired staff**

STRATEGIC OBJECTIVES OF BYDGOSZCZ INDUSTRIAL CLUSTER TOOL VALLEY



- The development of the organisation of the Bydgoszcz Industrial Cluster Tool Valley
- The promotion of the cluster concept, cluster members, marketing activities
- The acquisition of a new workforce and increasing competencies and knowledge of the future and present staff of BIC's members
- The increase in the innovation level of BIC's companies and the stimulation of new investments
- Internationalisation of BIC's members into foreign markets and strengthening cooperation
- Promotion of technical knowledge on every level of education starting with visits in kindergartens, through visits of primary school pupils in companies and cooperation with vocational schools and universities

Bydgoszcz Industrial Cluster Tool Valley

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BYDGOSZCZ INDUSTRIAL CLUSTER



KLASTERBYDGOSZCZ

CONTACT US

We are open to business cooperation and joint projects in the field of R&D, innovation, knowledge transfer to the business sector, circular economy, industry 4.0 and vocational education.

WWW.TOOLVALLEY.EU

WWW.KLASTER.BYDGOSZCZ.PL

BIC LATEST MILESTONES

1st edition of the
INNOFORM fair

2017

Membership in European
Lightweight Cluster
Alliance network

2018

Obtaining the Silver Label
Certificate awarded by The
European Secretariat for
Cluster Analysis

2019

Implementation of the
first international project
from the Horizon2020
program

2020

I Report "Analysis of
tool industry regarding
polymer processing"

2021

Implementation of the
first international project
from the Horizon Europe
program

2022

Creation of the first
Cluster laboratory in the
formula of distributed
laboratories

2023

ding products. However, the situation will change now, the widespread use of regranulates will be both an expectation and an obligation as of 2030. In Poland alone, we have to count on the use of 3–400 thousand tons of high-quality regranulate. Is there that much? Will there be so much? Not yet.

Recognising this fact, a voluntary international project was launched under the umbrella of the Hungarian Plastics Industry Association, with the participation of Hungarian, Polish, Romanian and other Central European companies, the aim of which is to assess and define the industry's needs for regranulate. After that, with the help of recyclers, an ideal waste flow is determined. The participants of the project come from the domestic plastics industry, who carry out this task in their spare time. It is important to note that there is no client, no external funding, and therefore no external influence or pressure. The main goal is the professional public good, i.e. the creation of a broad consensus in the plastics industry regarding the use of regranulate and the mandatory recycling ratio.

The work is carried out by plastic type PP, PE, PVC, PS. We do not deal with PET, as this is mostly already resolved.

The polypropylene part has already been closed, we would like to present the result below:

Methodology

a) Compilation of a basic table, which includes the typical consumption areas Plastic processing method (Process type)/ Application/Typical flow index range (typical MFR) and PP grade (PPH, PPC, PPR, TPO) [1]. This structure shows how plastics conversion is broken down by "grade". The table contains typical virgin polypropylene consumption categories. The table contains 77 lines and 4 columns.

b) Asking converters what type of regranulate they need

- Polymer subgrade
- MFR
- Other technical parameters
- Colour
- Filler content
- Other expectations

c) Insertion of data received from converters in the appropriate line of the table.

d) Determination of waste requirements for the necessary regranulates. That is, what can be used to produce the desired granulate. It is important that the waste stream is continuously available, i.e. it can be collected and/or sorted.

When concluding the section on polypropylene, we made the following findings.

Our first and most important finding is that converters are not chasing dreams. Anyone who uses regranulate knows what the options are. The requests received covered the daily practice.

Most requests were received for PP IM grades. The primary reason for this is the habit of converters, currently only these grades are used and they do not think about anything else. The other is the waste selection. In addition to the currently used methods, only these grades can be produced.

Of the 77 lines of the basic table we created (representing 77 different typical PP grades), only 15 are associated with regranulate requirements or solutions. One of the reasons for this is that due to the thermal shock and the degradation of the polymer chains during recycling, the physical properties of the resulting recycled plastic no longer match those of the starting polymer. A good example is the MFR; during recycling, the MFR will increase, so the plastic finished product originally made of low flow index polymer (later from waste) cannot be made into a similarly low flow index regranulate. Thus, there is no or only limited possibility to use regranulate in the low MFR segments. A good example of

this is the woven textile, which, as a result of its recycling, can be made from the originally split fibre of MFR 3–4.2, mostly with a flow index of MFR 5–6–7–8, mostly injection (IM) grade. In the case of woven textiles, another problem is the presence of different polymers, polyester thread used in sewing, polyethylene lining in the case of big-bags, but it is also important to mention other pollutants, which during processing can significantly change the colour and smell of the regranulate, as well as its mechanical properties.

Another big problem is that MFR ≤ 1 grades typically do not end up in the waste stream, as they are permanently incorporated as pipes or plates. Also, in this segment – typically extrusion applications – strength and, in many cases, pressure resistance are key criteria, so the use of regranulate is not preferred by converters either. As a result, the most valuable waste is plastic products with a very low MFR. However, there is no regular availability of these. Occasional availability cannot be defined as waste stream.

The next level is the waste category between MFR 2.5–4 PPH Raffia and PPH BOPP grades. These could be the basis for PP recycling. Due to its relatively low flow index, almost all regranulate grades can be made from it. The biggest problem with BOPP waste is that BOPP is typically used in the packaging industry, for low-weight unit packaging, such as chips, cigarettes, candies, etc. The method of use also means that the waste is shredded. Therefore, its collection would be an extremely complex task and, despite the great effort, only a very small amount could be expected. The other big problem is that, for example, in the case of Poland, only a quarter of the domestic BOPP production is used domestically, the majority of the produced BOPP is exported. Though many BOPP-wrapped products also enter the country from import sources.

In the case of BOPP, it is a separate problem, how can a regranulate fraction of



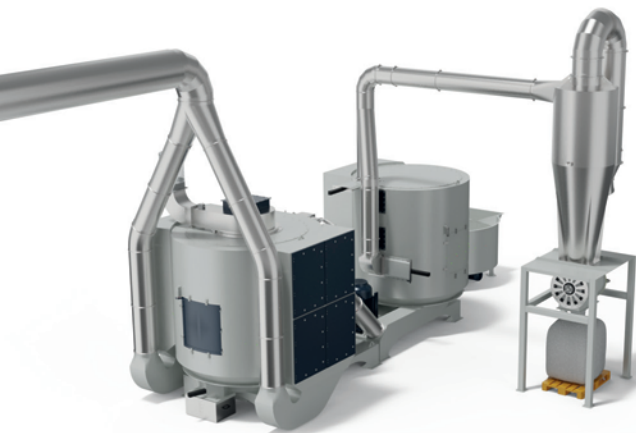
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25–30% be ensured in BOPP production from domestic sources? No way, probably only with the help of waste imports. Furthermore, the contamination of the packaging material is also a problem. Cleaning and sterilising waste contaminated with food is almost impossible. Therefore, we will not have BOPP of the right quality and quantity either in terms of colour, translucency, or organoleptic properties. There is still a lot of competition on the market for high-quality printing or packaging BOPP waste.

In general, it can be said that a significant problem is that only black regranulates can be produced from coloured waste if we do not sort it by color. While converters want the lightest possible colour, possibly transparent regranulate.

The most important polypropylene application in the field of fibre production would be demand for regranulate, but there is practically no supply. The reason for this is that the fibre production technology is the most sensitive to MFR fluctuations, therefore a stable molecular weight distribution and granule homogeneity are important. As mentioned, raffia grades cannot be recycled and reused as raffia, as the molecular chains were stretched in their previous state, so they cannot be stretched again during recycling.

The use of higher MFR applications, primarily in the IM and BM areas, is already common practice, however, for the time being, no regranulate is available in the food or pharmaceutical industries anywhere in Europe, despite the fact that according to the schedule defined by the European Plastics Pact, „food-grade” regranulates must already be available in the PP area in 2024–2025.

Summarising the experience with polypropylene, it can be said that even the maintenance of the current rPP grade selection and quantitative supply is questionable primarily due to the international competition for available high-quality waste.

The investigation related to polyethylenes is still ongoing. We have set up the basic table. Due to the characteristics of polyethylene, the examination aspects of the table were expanded to include density, and the type of catalyst also became an important aspect. Thus, in the study model, the table had 183 lines. In advance, we already see the problems here, which are largely similar to those found in the case of PPs. In the case of low MFR [2] grades, there is no waste available in almost any range. How will we provide regranulate for pipe production, for the production of thin films, and for large blown storage and transport barrels? For now, we are looking for answers. However, it seems that based on the current waste management and sorting methods, only 20–25% of the applications will be solved with the currently used mechanical recycling. Most companies rely on chemical recycling, saying that if oil is put back into circulation, any plastic can be made from it. This could indeed be the solution, but there are two small problems. The first and most important thing is that there is currently no existing industrial solution that would be able to serve the needs that will appear soon. All polymer manufacturers are experimenting with chemical recycling, but their size and capacity fall far short of the demand in the next 5–10 years. Chemical recycling plants with a capacity of hundreds of thousands of tons should be built now to ensure a smooth transition. The other important aspect is that since there is no technology scaled to an industrial level, the carbon footprint of chemical recycling is also unknown.

As mentioned, we did not receive unrealistic demands from plastic converters. But it doesn't just mean that the companies are realistic, but also that the great majority do not count on the mandatory recycling rate as an obligation. Most companies think that there will be no such requirement in their specialized field, as it is physically impossible. Several companies think that they will pay the „punitive tax” and continue their production from

virgin polymer. They are wrong. The decision-makers and legislators are laymen and idealists, they have a hammer, and the plastic industry is just one nail for many. There will certainly be areas of application where there will be an exemption. However, this is expected to be very little and at most has technical reasons, such as gas and water pipes. Anyone who trusts that he will pay the penalty should see that the price for this can be extremely high. A good example is Hungary, where the EPR fee is close to €600 per ton. Extra costs of this magnitude can cause a significant competitive disadvantage.

We are in the last minute, if we do not act now in 2025 or 2030 it will be too late. Therefore, the main task of every plastic converter is to think about how to meet the requirements of the mandatory recycled content. In which area, how much is expected to be required. And share these needs with us so that we can incorporate them into our model.

How will there be a solution, will everyone get enough and suitable quality regranulate? Based on our research, we can say NO in the case of PP. There is neither sufficient quantity nor adequate quality and cleanliness of waste. There are significant tasks in the field of selective waste collection and waste sorting. There is space for improvement. But no advanced waste management system can reverse the degradation of the polymer chains, the rise of the MFR, nor can the problem of the fragmentation of packaging materials be solved.

What can we do? First and foremost, we continue to work on other polymer grades as well. The second most important thing is to unite. We need to establish the central European organisation and association that will represent our interests. We must ensure that legislators do not want to override the laws of physics and chemistry. •

[1] MFR – Melt Mass-Flow Rate (230°C, 2.16 kg)

[2] MFR (190°C/2.16 kg)



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SP Group is part of the ECOSENSE group of businesses committed to using and recycling PET food trays.

Our PET may contain between 70% and 100% recycled material, depending on the required features of the film for packaging one type of product or another.

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PLAST 2023



05.09. – 08.09.2023

Fiera Milano Exhibition Centre, Italy

The exhibition layout of PLAST 2023 comprises 6 halls: Halls 9 and 11 will be occupied by raw material suppliers; 13 and 15 will be dedicated to extrusion; and 22 and 24 will focus on injection moulding, blow moulding and auxiliaries. The 2023 edition will feature the 3 satellite trade fairs dedicated to 3 sub-sectors of excellence: RUBBER; 3D PLAST (focused on additive manufacturing and related technologies); and PLAST-MAT.

INTERPLAS 2023



26.09. – 28.09.2023

The NEC Birmingham, United Kingdom

Interplas is the UK's largest and leading plastics industry event. It is the only one to cover all the manufacturing processes, technologies and services essential to the plastics sector. For over sixty years, Interplas has been the key showcase for more than 400 exhibitors to present solutions, products, machines and ideas to the UK manufacturing industry. Interplas is a forum where innovations in plastics technology are presented.

JOIN THE PLASTICS COMMUNITY

PLASTICS INDUSTRY MEETING 2023



19.09.2023

Hotel Mercure Warsaw Centrum, Poland

The Plastics Industry Meeting is an annual industry conference organised by the Polish Association of Plastics Converters and the Plastics Europe Polska Foundation. With a wide range of representatives from the entire plastics value chain, the most important current industry issues will be addressed.

CENTRAL EUROPEAN PLASTICS MEETING

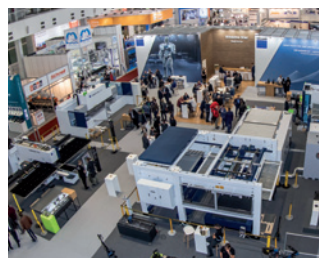


19.09. – 20.09.2023

Eiffel Art Studios, Budapest, Hungary

The CEPM conference has already become a fixture in the calendar of the Central European plastics sector. The CEPM is a place where companies can network quickly and effectively in a friendly yet professional atmosphere. It is an opportunity to find solutions to emerging industry issues.

MSV 2023

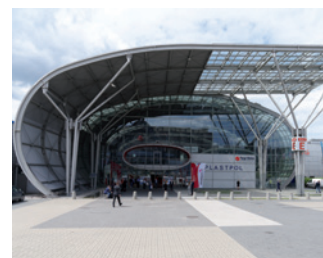


10.10. – 13.10.2023

BVV Trade Fairs Brno, Czech Republic

MSV International Engineering Fair is the most important industrial fair in Central Europe. The majority of visitors are professionals (~80% exert influence on business investment). All key fields of machinery and electrical engineering industry are represented, with focus on machining and forming.

PLASTPOL 2024



21.05. – 24.05.2024

Targi Kielce, Poland

Plastpol is the largest plastics processing fair in Poland and Central Europe. The International Fair of Plastics Processing is a place where representatives of the most important plastics processing companies meet and present their latest achievements in technologies, moulds and tools, plastics, etc.

I FAKUMA 2023



📅 17.10. – 21.10.2023

📍 Messe Friedrichshafen GmbH, Germany

The Fakuma international trade fair ranks second in the overall ranking of international trade fairs for plastics. The Fakuma offers a comprehensive overview of all plastics technologies, whether injection moulding – where the Fakuma occupies a leading international position – extrusion technology or thermoforming. Participants can find out about all the processes, machines and tools that are relevant for working with and processing plastics.

I PLAST EURASIA ISTANBUL 2023



📅 22.11. – 25.11.2023

📍 Tüyap Fair and Convention Center, Istanbul, Turkey

International Istanbul Plastics Industry Fair, the largest plastics industry fair held every year in Europe, is organized by TUYAP in cooperation with PAGEV (Turkish Plastics Industry Foundation) in Tüyap Fair Convention and Congress Center, Istanbul. In 2022, the fair brought together 1.087 companies and company representatives from 41 countries and 64.047 professional visitors from 115 countries.

WHERE AND WHEN?

I JEC WORLD 2024



📅 05.03. – 07.03.2024

📍 Parc des expositions de Paris-Nord, Villepinte, France

JEC World is the global trade show for composite materials and their applications. Held in Paris, the fair is the industry's leading event, hosting all the major players in a spirit of innovation, business, and networking. Featuring ground-breaking solutions, JEC is a networking hub of creativity, vision & action.

I INNOFORM 2024



📅 16.04. – 18.04.2024

📍 Bydgoszcz, Poland

The INNOFORM trade fair is the only one Trade Fair in Poland addressed to the moulding industry, organised in the heart of the Polish Tool Valley – Bydgoszcz, visited annually by the owners, management and technical staff, using technologies of tooling and processing of plastics in plants production.

I CHINAPLAS 2024



📅 23.04. – 26.04.2024

📍 National Exhibition and Convention Center, Shanghai

Chinaplas provides an online and offline sourcing and technology exchange platform, where a well mixture of Chinese and overseas exhibits are displayed under one roof, for international buyers to look for advanced and innovative materials, machines & solutions and new cooperation opportunities.

I NPE 2024



📅 06.05. – 10.05.2024

📍 Orlando, Florida, USA

With more than 55,000 leaders from over 110 countries representing every industry – from automotive to health-care to consumer products to construction and more, NPE is the largest plastics trade show in the Americas and one of the most innovative business events in the world.

POLISH PACKAGING INDUSTRY

The packaging sector is a highly developed area of Polish industry. The packaging industry is characterised by dynamic development, above-average profitability and investment activity. Packaging production in Poland is highly fragmented, but also characterised by a high share of foreign capital in total sales.



**BEATA
PYŚ-SKROŃSKA**

Polish Chamber of
Packaging

Over the past 30 years, the Polish packaging industry has undergone tremendous growth and change. The 1990s were a period of dynamic growth for the market and, as a result, for the packaging industry. This

was possible thanks to the entry of foreign investors into the Polish market, but also thanks to the emergence of smaller, often family-owned companies, some of which have grown to become significant market players during these three decades.

At present, Poland has become the packaging powerhouse of Europe. It is estimated that 20% of all EU packaging companies operate in Poland and 14% of the total EU workforce in the industry is employed in Poland. In terms of production value, the packaging sector can be compared to the furniture or engineering industries.

In 2021, the packaging industry accounted for approximately 4% of the total value of Polish industrial processing. The total value of its production – approximately EUR 12.5 billion – is comparable to such areas of domestic industry as the machinery or furniture industries.

Paper and plastic packaging dominate, accounting for almost 75% of the sector's total output. Glass, metal and wood (including pallets) make up the remainder. In

each of these segments, Poland is among the top five in the EU-27 in terms of production value.

Importantly, the Polish packaging industry stands out against the background of the economy because of its high growth rate, which is evenly distributed across all segments. Even the outbreak of the COVID-19 pandemic did not cause an "earthquake" in the industry, unlike in many other sectors.

CHANGES IN THE PACKAGING MARKET

Over the years, packaging has had to respond to successive changes in lifestyles, household structures, changing consumer preferences and the development and emergence of new products that require packaging. As a result, we have seen a significant role and increasing share of traditional plastic packaging in market structures. What is colloquially known as "plastic" has filled shop shelves.

Per capita consumption of packaging has also increased year on year. Environmental and ecological issues have developed strongly in recent years. The European Union has focused its efforts on the circular economy and the introduction of regulations to reduce the negative impact of waste (including packaging) on the environment.

In 2020, major changes were triggered by a pandemic that temporarily diverted attention from environmental solutions to ensuring maximum consumer safety. The packaging industry coped exceptionally well with this crisis.

The pandemic has also seen a significant acceleration in the growth of the e-commerce

sector and the adaptation of packaging to this form of on-sale, an increase in demand for disposable packaging and for takeaway food and cleaning products. The past year has seen further challenges including inflation, rising energy prices and reduced availability of raw materials (wood, plastics) resulting from the war in Ukraine and the associated sanctions against Russia.

All of these factors have had a significant impact on changes in the structure of the packaging market. We have moved from packaging made from traditional materials, through the very rapid development of plastics, innovations in packaging materials and technologies, the development of active and intelligent packaging, the growth of packaging for e-commerce, the attempts to reduce traditional petroleum-based plastics and the development of bioplastics.

THE STATE OF THE POLISH PACKAGING SECTOR

The Polish packaging sector is currently one of the fastest growing sectors of the economy and Polish production is at the forefront in Europe in virtually all material segments. The packaging market is estimated to be worth around EUR 15 billion. According to analysts working with the Polish Chamber of Packaging, the industry will have grown by 18% by the end of 2022. However, it should be noted that this is largely due to high inflation.

The packaging industry is closely linked to the general state of the economy, as it acts as a service provider for packaged products. We are currently experiencing an economic slowdown that is likely to con-

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28. Fakuma
17-21.10.2023



tinue for at least a few months. According to the analysts' baseline macroeconomic scenario, the economy is expected to pick up in the second half of the year.

For the time being, there is no data to confirm that such a clear recovery has already taken place, retail results are still weak and industrial results are not breaking any records either. On the other hand, general economic indicators are gradually and steadily improving, consumers are feeling better about their financial situation and optimism is slowly growing. Current macroeconomic assumptions suggest that in the third quarter of 2023 we will still see subdued economic activity at a level similar to last year, while the fourth quarter and next year should be marked by a significant upturn.

Poland has a strong position within the EU packaging industry. In terms of production and added value of the packaging sector, Poland ranks 5th in the EU (8% share), being the 3rd largest exporter (10% of the value of EU exports). In 2020, one in five EU packaging producers had their operations in Poland.

Another element that stabilises the packaging situation in the economy is the fact that its main customer (about 65%) is the food industry. Cosmetics, household chemicals and pharmaceuticals, i.e. products that are essential to society, also play

an important role. These are goods that can, of course, be reduced somewhat in a poorer financial situation, but cannot be completely eliminated or postponed.

All these products need packaging. We therefore expect the industry to continue to grow over the next few years, albeit at a slower pace. Much depends on further economic developments in Poland and Europe.

THE FUTURE

For the foreseeable future, the main driver of change is likely to be environmentalism in the broadest sense, both in terms of legislation and public expectations. The European Union has obliged its member states to introduce specific regulations such as Single Use Plastics (SUP) or Extended Producer Responsibility (EPR). After a long time, the law on SUP has finally been approved and will come into force on 24 May this year. 6 June 2023.

The Council of Ministers also approved a draft law on the implementation of the deposit system in Poland, and further work on this document is already underway. Despite the legislative delay, most packaging companies (especially plastic packaging producers) have already started to review their offers in this respect. Interviews with entrepreneurs indicate that one of the reasons for this is the adaptation of packaging to the requirements of the European market, where the Directive has already been implemented (or partially implemented) in many countries.

Legislation aside, the environmental trend among the public is also important. Consumers expect (or rate more highly) products with environmentally friendly packaging and the market is adapting to this by, among other things, reducing the weight of packaging, designing packaging that is easier to recycle, replacing multi-material packaging with mono-material packaging, designing in line with the requirements of the Circular Economy, increasing the recyclate content (to which we will soon be obliged by EU legislation) and looking for alternative solutions.

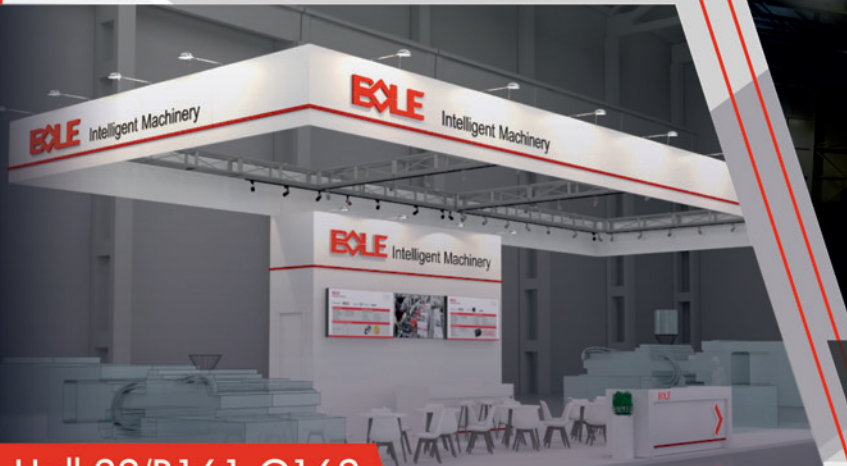
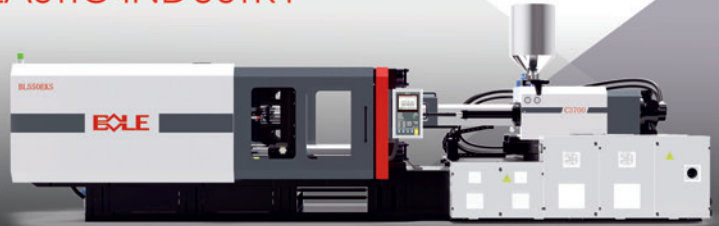
One extremely innovative area is the development of new packaging materials, improving their performance by modifying or applying coatings with specific properties, looking for solutions tailored to new products. Bioplastics will occupy a very important place as an alternative to traditional petroleum-based plastics, with a particular focus on compostable materials.

Packaging must respond to consumer needs and adapt to a changing society, including its expectations, preferences and demands. We anticipate that active and intelligent packaging will continue to evolve and adapt to new methods of selling or personalisation. All materials and technologies used in packaging should be easy and convenient to use, ensure product and consumer safety and provide information about the product and the manufacturer.

The packaging industry faces many legislative, social and environmental challenges in the future. New products and technologies will require new types of packaging, which we will need to secure. It will be up to the manufacturers of new food, pharmaceutical, chemical, household, cosmetic, ecological, etc. products to determine what requirements the packaging must meet in order to properly secure these products and market them, taking into account the many new considerations related to demographics, lifestyles, health, habits, tastes and ecology. •

INJECTION MOLDING MACHINES FOR PLASTIC INDUSTRY

BOLE



Hall 22/B161-C162

Milano Plast
September 5-8, 2023



Hall 4 Stand G70

NEC, BIRMINGHAM, 26-28.09
Interplas 2023

EXPO 2023



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28. Fakuma - Messe Friedrichshafen
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25
YEARS
PASSION FOR
TECHNOLOGY

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Od prawej: Karolina Kocyba, Patrycja Olszak, Katarzyna Gałgus



FOCUS ON ECOLOGY AND DURABILITY

INTERVIEW WITH KAROLINA KOCYBA, OWNER OF KAROLINEX RECYCLING

The Polish plastics processing industry has been developing extremely dynamically in recent years. We are among the European leaders, for example in the packaging sector. On the other hand, thanks to hundreds of Polish recyclers, such as the company you run, we are also experiencing growth in the recycling industry. Please tell us more about Karolinex Recycling.

Karolinex Recycling is a family company that has been active for many years in the field of purchasing secondary raw materials and municipal services such as city cleaning in summer and winter.

We provide a wide range of services in the field of secondary raw materials, waste management and care for the natural environment.

We offer comprehensive cleaning services for facilities and their surroundings. We maintain green areas, pavements and car parks in cities and companies. We work for local authorities, companies and residents.

We treat responsibility as a continuous development process. We are constantly changing and developing procedures. We are aware of working for the common

good. Our tasks are visible to the community, which motivates us to act. Our aim is to build ongoing professional and friendly relationships and customer service is a key element of our organisation.

In addition to waste management and the purchase of recyclable materials, you are also involved in the production of recycled plastic products, as you mentioned.

Karolinex Recycling offers plastic products: film cover hoods and garbage waste bags. Main production is cover hood. Film cover hoods protect the goods against

contamination and dust as well as against changing weather conditions. They are used in production plants of various industries, in construction warehouses, gardening, logistics and distribution centers. Film hoods are very often used in the recycling industry as protection for big bags with regrind and regrulate.

The company ensures the durability of the products. We have a possibility to make hoods with UV protection, as well. Available colours according to the order, the most common colours: transparent and dark transparent, black and resultant.

Taking care of the environment, our company uses recycled materials for production. Regranulate is the main raw material used in the production of film hoods. Thanks to the usage of recycled raw material, we take care of the environment together and actively engage in sustainable development. Our products have good value for money. Dynamic development and integrated management system allow us to fulfill orders quickly and reliably. It helps us to work both in Poland as well as abroad.

As an owner, a woman managing a company operating in accordance with the idea of the closed circuit and environmental protection, I encourage everyone to cooperate with us.

What is your opinion of the state of the Polish recycling industry?

The Polish recycling industry has developed extremely dynamically in recent years. Twenty years ago we were envious of European companies dealing with selective waste collection. Today, I have the impression that we have managed to transfer many Western solutions to our home ground. I am proud that my company is a part of this change.

You mentioned the challenges facing the industry. What do you need for the sector to grow dynamically?



Firstly, as recyclers, we count on sustainable and consistent legislation. Without systemic solutions, we are unable to bear certain risks in the development of our businesses. Legislation that requires entrepreneurs to make financial investments should at the same time provide conditions for further development. Poland still has a lot to do in this field.

“The problem [with plastic waste] is not in the material itself, but in the attitude of society

Please tell us, how do you understand the concept of a circular economy? And is Poland ready for it?

The invention of plastics is one of the greatest achievements of mankind. The multitude of applications, performance properties and ease of processing make

them extremely graceful materials for the production of many functional products. And we are certainly not going to give them up any more.

On the other hand, we have the problem of plastic waste littering the environment. The problem is not in the material itself, but in the attitude of society. At the moment, there is a campaign against plastics that “litter” the planet. This begs the question: is this widely condemned “plastic” reproducing itself and littering the environment? No, it is we who, with our irresponsibility, our lack of restraint and our convenience, are littering the planet.

Therefore, I think that the only solution to this situation is changing our approach to the problem, moving towards a closed-loop economy. And we will not be able to avoid it. Is Poland, as a country, ready for a circular economy? Regardless of the answer, we have no other choice (*laughs*) and we have to introduce it. •

Interviewed by Jacek Leszczyński

BAGSIK: EXPERIENCE AND RELIABILITY IN THE FILTRATION OF PLASTICS



The beginnings of the Bagsik company date back to the early 90s and began with the provision of consulting services in the field of plastics processing. Over the years we decided to use our knowledge more widely and deal with the sale of equipment for machines and its renovation. The main business started and is still to this day the production of screen changers for the filtration of plastics, oil etc., filter screens and the production of sensors for measuring the pressure and temperature of the molten plastic. Installation of these sensors allows an accurate measurement of the parameters of the extrusion process. Due to the data collected this way, it is possible to automate control process, reduce the error threshold and significantly improve the quality of the final product. The use of measuring equipment also directly affects the safety of the machine, prevents overloads or damage to the extruder and parts and peripherals. Along with the increase in trust among the growing number of customers on the Polish and foreign market our experience has increased, which has influenced the development of our machines and equipment.

The principle of operation of the rotary filter is based on a rotating disk, mounted between two filter blocks. On the screen

disk there are special cavities – slots for filtration screens. Due to the eccentric position of the seats in relation to melt flow channel, filtration process can take place on more than one filter screens. With each movement of the screen disc, a new screen is partially inserted into the melt channel, while at the same time the same part of the old contaminated screen is taken out. As a result of such solution, filtration surface area is constant, which ensures that the melt flow pressure is kept constant. This entails invariability of parameters of the molten material, which could lead to a change in its materials behavior. Such solutions prevent pressure peaks, and clean the processed material of any impurities. Cleaned material directly affects the better quality of the final product and the maintenance of production continuity. Rotary screen changers are very widely used not only in recycling processes, but also in the production of pure plastics (PP, PS,

PVC, PET, etc.) and as final product in form of foil, profiles etc.

Rotary screen changers under the Bagsik logo successfully work within many production lines throughout Europe, with a maximum possible capacity of up to 5000 kg/h. We produce automatic filter systems with and without self-cleaning system. The self-cleaning version allows to reduce number of workers and usage of screens. Over the years, self-cleaning system developed and improved in conjunction with dedicated automation, allows to generate cost and material savings.

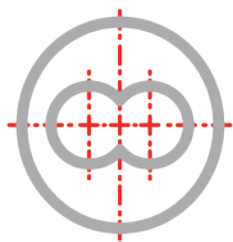
Our offer also includes:

- slide filters
- complete lines for PVC processing
- gear pumps
- filter screens
- pressure sensors. •



Bagsik Sp. z o.o. Sp.k.

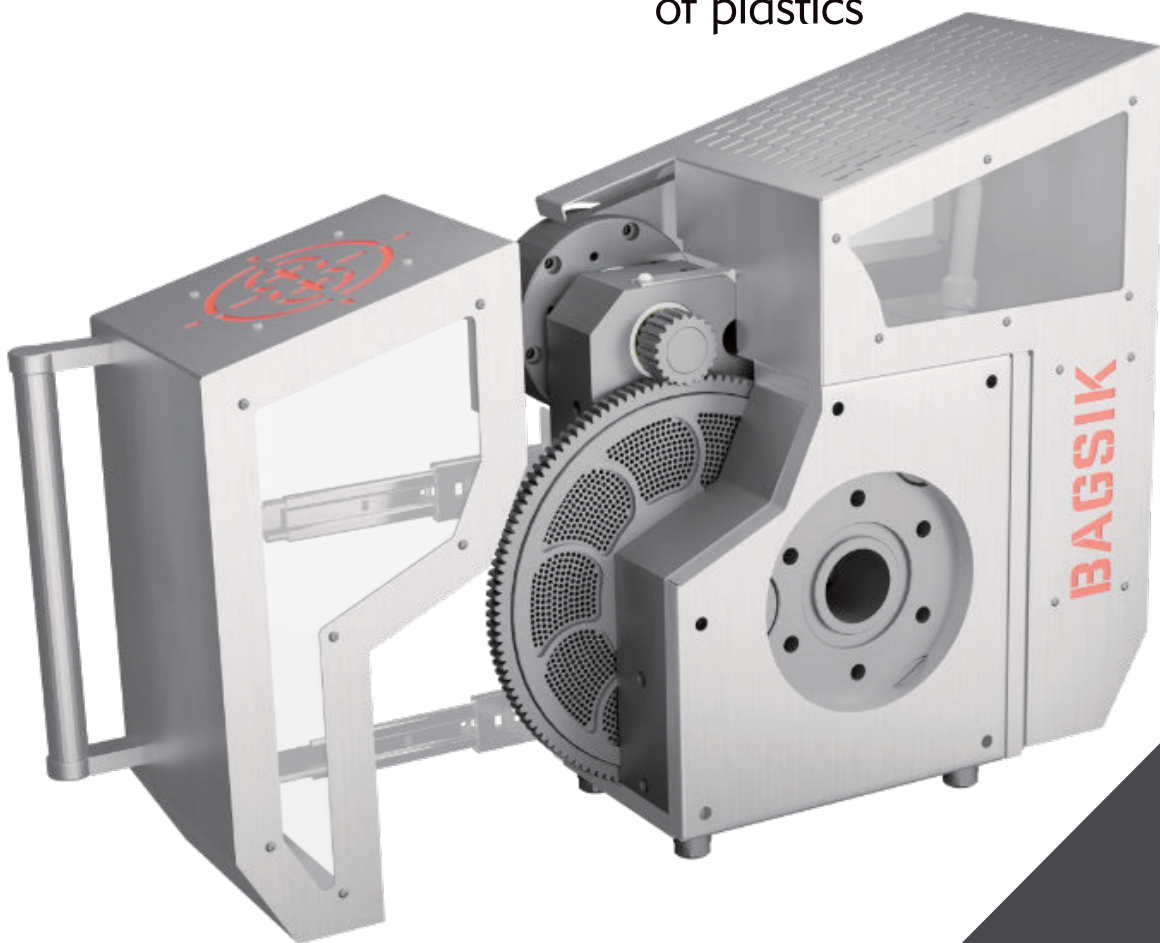
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Bagsik®

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„Reliable solutions for the
production and recycling
of plastics”



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BEDEKO EUROPE – NEWCOMER IN EU MARKET

Bedeko Europe Company is a producer and your partner for masterbatches, additives, fillers, and bio-compounds, offering a comprehensive range of products for polymer converters. We focus on providing the best global supply solutions. We are a leading supplier of recycling processing solutions and converters for PCR materials.



New Plant – Bedeko Production Vietnam

Direct Factory-to-Factory Deliveries: Cost-Effective Collaboration

Bedeko Europe is dedicated to optimizing its operations and passing on the advantages to its customers. Recently, the company has embraced a cost-effective strategy by directly shipping containers from its factories to customers' ports. This decision not only cuts down on transportation expenses but also results in more competitive product prices. Such efficiency enhances cooperation, creating a mutually beneficial situation for its esteemed customers. Goal of Bedeko Europe is to meet customer requirements.

New plant in Vietnam – No. 1 in Fillers

One of the key advantages of Bedeko Europe is its ability to produce customized products according to the specifications and requirements of its customers. The company has a laboratory and production facility in Vietnam. Bedeko Vietnam can develop and manufacture tailor-made solutions for various markets.

Masterbatch stocks > 5K tons in Europe

We measure our success by our ability to fulfill our customers' orders with the highest degree of reliability and efficiency.

Our presence in over 50 countries around the world allows us to gain unique experience and knowledge, thanks to which we help to optimize technologies and reduce costs for our customers.

BLACK MASTERBATCHES

- special blacks for recycling
- all types of carbon and applications

WHITES & COLOURS MASTERBATCHES

- full range of TiO_2
- colours standards & tailored made
- SPD mono concentrates
- effective colours for recycling

RECYCLING ADDITIVES

- humidity absorbers
- melt flow modifier
- compatibilizers
- impact modifiers
- fragrances agents
- odour neutralizers

FILLERS COMPOUNDS

- CaCO_3 compounds
- talc masterbatch
- BaSO_4 compounds: regular & nano
- transparent fillers

REGULAR ADDITIVES

- antiblocks & slips & antyslips
- UV stabilizers & absorbers
- antioxidants & antifogs agents
- processing aids
- flame retardants
- coupling agents

ALL CARRIERS AVAILABLE

Generate additional economy value with Bedeko Europe complex supply chain. •

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**6th International Cooperative
Trade Fair of Tools and
Processing Industry**



16th-18th April 2024, Bydgoszcz, Poland

**Two complementary events in the same time
at the Polish Tools Valley**

A graphic element consisting of a white square frame with a diagonal cutout, revealing a background image of green grass growing in black plastic seedling trays.

**Plastics Recycling
Exhibition**





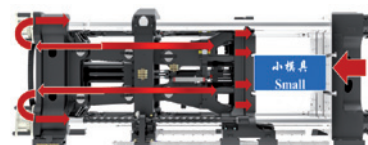
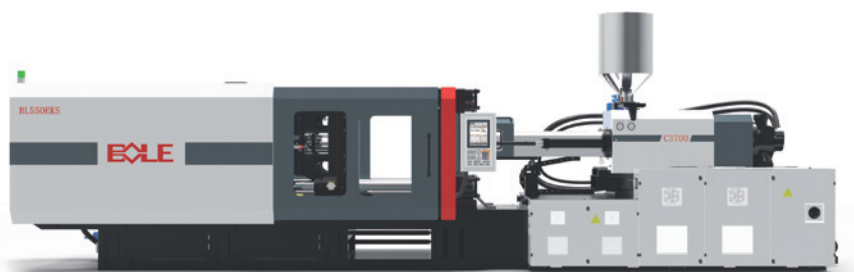
THE BOLE STORY: ALL STARTED WITH A PEN. ROAD TO SUCCESS WITH PASSION FOR TECHNOLOGY

The BOLE Story traces its origins back to a humble pen, marking the beginning of a remarkable journey. Founded by Mr. Kui in the 1990s, BOLE started its venture by producing ballpoint pens with precision mechanisms. However, Mr. Kui was dissatisfied with the quality of the plastic parts used in the pens. Determined to find a solution, he sought to mold the parts in a different direction in the injection mold.

After extensive research, he realized the existing injection molding machine technology in his production plant couldn't achieve the desired results. Undeterred, Mr. Kui decided to create his own injection molding machine, featuring a unique and rigid toggle system that applied clamping force precisely at the center of the machine platen, even under high injection pressures.

The success of the first machine laid the foundation for BOLE's reputation as a reliable manufacturer of injection molding machines. Word spread, and soon, other industries sought BOLE's machines for their plastic parts production needs. This led to the series production of these machines in 2002.

BOLE's machines evolved over the years to accommodate larger clamping forces and shot weights, making them suitable for various applications, from buckets and boxes to high-precision technical parts. The machines' extreme rigidity ensured optimal support for injection molds, resulting in plastic parts with accurate dimensions and weights, reducing material waste significantly.



The extremely rigid clamping unit provides optimum support for the injection molds, preventing mold deflection and the associated increase in the article-specific mold cavity. This leads to the fact that the plastic parts produced on BOLE machines are manufactured in the dimensions and weight specified in the mold.

Comparative tests have shown that the difference in the weight of plastic parts on comparable machines is between +2% and 5%. This means that on an EKS 100 with a shot weight of 100 g in 45 sec in PP over a year you save about 1,000 kg of material and thus about 3.200 EUR.



This basic principle of this new type of clamping unit is still used today in the servo-hydraulic EK and the electric FE series of BOLE Intelligent Machinery.

Precision was a cornerstone of BOLE's designs. The injection unit, with its double injection cylinder system, exhibited quick responses and high repeatability. This, coupled with the reduced friction from linear guides, allowed for precise injection accuracy.



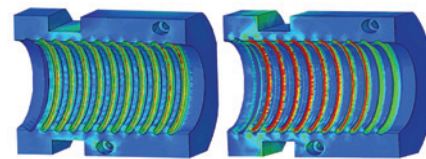
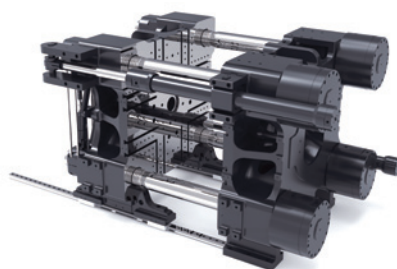
The machines can be operated with lower clamping forces of up to 30%. To take advantage of this, the EKW series from BOLE has been added to the range of machines with larger tie bar and platen spacing.

BOLE embraced energy-efficient technology, adopting servo motor drives in hydraulic machines and gradually transitioning to fully electric machines. With continuous improvements, BOLE aimed to achieve a remarkable availability rate of over 99% for its machines, ensuring high production reliability for customers.

In pursuit of its vision, BOLE extended its product range to cater to evolving market demands. Becoming a leader in injection molding recycling and compounding machines in China, BOLE aimed to offer these technologies globally, empowering customers to reduce component costs and adapt to changing trends in the plastics industry, including the rising demand for biopolymer components.

THE TWO-PLATE MACHINE (DK)

In 2015, the first two-plate machine – according to the well-known BOLE principle, highest quality, stable and reliable – was built.



With this machine, BOLE set new standards in the field of two-platen machines. For the first time, the moving platen was placed on a precision guide, which has a tremendous impact on platen parallelism at high speeds. Furthermore, for the first time, loading of the locking system on the tie bars was scientifically studied and a special locking nut was introduced, which makes it impossible for a tie bar to crack or be damaged over the life of the machine.



BOLE DK Line two platen machine, with electrical Clamping Unit movement and electrical Injection Unit

BOLE also focused on lightweight structural engineering, manufacturing injection molding machines for magnesium in the Thixomolding process. Through rigorous testing and material development, BOLE sought to enhance magnesium properties, such as corrosion resistance, thermal conductivity, and strength.

To support its growing endeavors and to continue its current path in the production of customized machines, which range from 50 ton to 6,800 ton clamping force and future up to 12,000 tons and with up

to 7 injection units currently available, BOLE built a new factory in China province: Changsha, dedicated to high-end standard injection molding machines, while its main plant in China, Ningbo focused on customer-specific machines and innovations.

With a strong commitment to quality, innovation, and customer satisfaction, BOLE Intelligent Machinery continued to shape the future of injection molding technology, aiming to provide cutting-edge solutions to the global plastics industry. •



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BETTER FACTORY WINNERS OF THE II OPEN CALL

Planet-friendly straws, eco wine production, smart envelopes, knitted shoes... Meet the 9 teams selected for Better Factory, an EUa-funded project, disrupting factory innovation.



- Better Factory aims to help manufacturing SMEs to become more competitive globally, by using art and technology expertise to create new and personalised products
- The 16-month programme boosts each team (consisting of a manufacturing SME, an artist, and a technology provider) with up to EUR 200,000 in funding and technical support
- The first round of 8 teams have already successfully innovated process like centuries-old Parma ham production, zero waste metal production, and a new circular material for young tree growth
- The second round of teams will be working on numerous innovations, from a smart digitised envelope to eco-friendly diving fins, to sustainable durable drinking straws

WHAT IS THE BETTER FACTORY PROJECT?

Bydgoszcz Industrial Cluster Tool Valley is a partner of the Better Factory project, funded under the European Commission



H2020 programme, that brings together key actors in the European technology, art, and innovation landscape. It aims to help European manufacturers become more competitive in the global market by providing up to EUR 200,000 equity-free funding to develop and deploy collaborative intra-factory experiments.

The goal of the experiments is to lead a diversification of the Manufacturing SMEs & Mid-caps product portfolio. Manufacturing Companies will discover new business models and digitise their factories to match the production of new or personalised products, thanks to the collaboration with Artists and Technology Suppliers during the lifetime of the Better Factory project and beyond.

Collaborations between Manufacturing Companies, Artists, and Tech Suppliers can take on many forms and deliver a wide variety of outcomes. At a technical level, the

focus will be to minimise the impact on production costs, and to create more value by reducing waste, energy, and other production resources; optimising intra-factory logistics; using robots to support workers; production pre-planning and simulation.

Prioritised sectors are plastic and rubber, furniture and wood, food and agriculture, construction, metal and machinery, and textile and leather.

WINNERS OF THE BETTER FACTORY PROJECT!

Through these 16-month experiments, conventional factories will be transformed into lean-agile production facilities, capable of manufacturing new and personalised products along with existing ones.

The first round of 8 teams came from 12 European countries, and have successfully innovated processes like centuries-



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant 951813.

old Parma ham production, tested human-robot coworking to create zero waste metal production, and pushed the boundaries of a new circular material Stone Paper for young tree protection.

The Second Open Call for applicants saw 56 applications from teams of one manufacturing SME, one artist, and one technology provider. After an initial sifting process, 19 of these teams were invited to pitch during a Jury Day with independent expert judges, and finally, 9 top teams were selected to go through to participate in the project.

During the second open call, Poland was the leading country. Among the applicants were five companies from Poland – members of Bydgoszcz Industrial Cluster Tool Valley. But only one of them won the com-

petition – Plast Farb company as part of the “SMART ENVELOPE – digital and eco-friendly envelopes”! This project will develop a new line of eco-friendly postal products with digital features, enhancing customer experience and reducing environmental impact, optimising production efficiency, and monitoring energy consumption and production waste.

The 9 teams chosen to take part in the second round of Better Factory will explore new markets using digital tools, test and develop new lean-agile production technologies, make deals through the Robotics and Automation MarketPlace (RAMP), access training to re-skill staff, receive business support and mentoring, and get up to 200,000 EUR of equity-free funding. So who are the teams in question, and what manufacturing challenges are they innovating and solving?

1. **OCCE – The 100% Recyclable Office Chair**

Reimagining the traditional office chair with a focus on 100% recyclability, reduced emissions, and minimised production costs.

2. **Internet of Art and Wine – Sustainable Wine Production with AR and Robotics**

Optimising Wine Production with Smart Corks, Eco-Packaging, Biomaterials, E-Labeling, and Augmented Reality.

3. **STARIOT – Sustainable straws, greener future**

Revolutionising the straw market with durable, resistant and socially responsible products.

4. **SHOES IN CIRCLE – Your footprint, reduced**

Sustainable knitted shoes, combined with IoT and robotics to reduce waste.

5. **MICOCRAFT – Bio-Inspired Glue for Sustainably Manufactured Products**

A biobased material, using a natural glue, replaces synthetic materials, for a sustainable manufacturing process for the construction industry.

6. **SMARTVIEW – Factory floor collaboration at your fingertips**

Enhancing cross-factory collaboration and communication for improved productivity, sustainability, and worker well-being.

7. **SMART ENVELOPE – Digitalised and eco-friendly envelopes**

A new line of sustainable and digital postal products, designed to enhance customer experience and environmental responsibility

8. **3 DART DESIGN – Transforming metal waste into opportunity**

Identifying new applications and markets for products made from over-used powder from medical implants.

9. **ReFINE – Dive deeper with less impact**

The future of sustainable F1 scuba diving fins, with an optimised design and restored manufacturing processes.

Interested in the innovations these teams are working on? Follow their progress over the next few months by following Better Factory on Twitter and LinkedIn, signing up for the newsletter, and also meeting the team at numerous European events announced on our blog. •



**Bydgoszcz Industrial Cluster
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MAJUMI CHEMICALS: PROVIDING THE BEST SOLUTIONS FOR PLASTICS AND RUBBER INDUSTRY

MAJUMI CHEMICALS is a family business founded in 2004. Since then the company has developed very dynamically. The company currently employs 24 people. Due to our passion for what we do and our ambition to provide the best quality raw materials to our customers, the company has succeeded in cooperating with the biggest and best raw material producers in the world. In this case the company guarantees high quality of the offered products.

The highest quality of products, individual approach to each customer, professional technical and customer service, flexibility and quick decision-making make MAJUMI CHEMICALS one of the key players on the plastics and rubber market in Poland and Central Europe, as well as on the Portuguese, Spanish, Italian and German markets.

Global producers of window profiles, cables, technical profiles, pipes, hoses and foils for both domestic and foreign markets have trusted us, thus beginning a successful cooperation that has lasted for many years with some of our customers.

Majumi Chemicals supplies technical support and product solutions to clients all around the world, that is for the United States, the European Union, Brasil, South Korea, Israel, Turkey, India and for the south-east countries of Asia as well as for other regions.

All of the products meet the standards of REACH and FDA.

Majumi Chemicals has a logistic base in Radom with logistic capacity of two thousand tonnes of products, which guarantees regular deliveries and adequate protection of stocks for all customers.

Continuous development of the company and knowledge of the global raw materials market allow us to continuously expand our offer.

Our objective is a service through supplying products meeting the requirements of clients as well as achieving and maintaining high level of service through applying practice and professional competences.

Our utmost aim is to consistently raise the standard together with the trust and satisfaction of our clients by creating the best quality products and ensuring the development of the company together with the rise of the satisfaction of its workers.

You are more than welcome to cooperate with the Majumi Chemicals team! •

In the offer of our company the customer can find the following products:

PVC resins (K-58, K-67, K-70)

Impact modifiers

Chlorinated polyethylene

Processing aids

Ca-Zn stabilisers

Tin stabilisers

Internal and external waxes

Foaming agents

Rubber grade of chlorinated polyethylene

CR rubber

EPDM

Silicones

Chloroparaffin

TPU

Stearates

Stearic acid

ESBO

Plasticizers

Compounds

External and internal foil

Copper tapes for cable and wire industry

PE, PP compounds

White masterbatch compounds

TPE compounds

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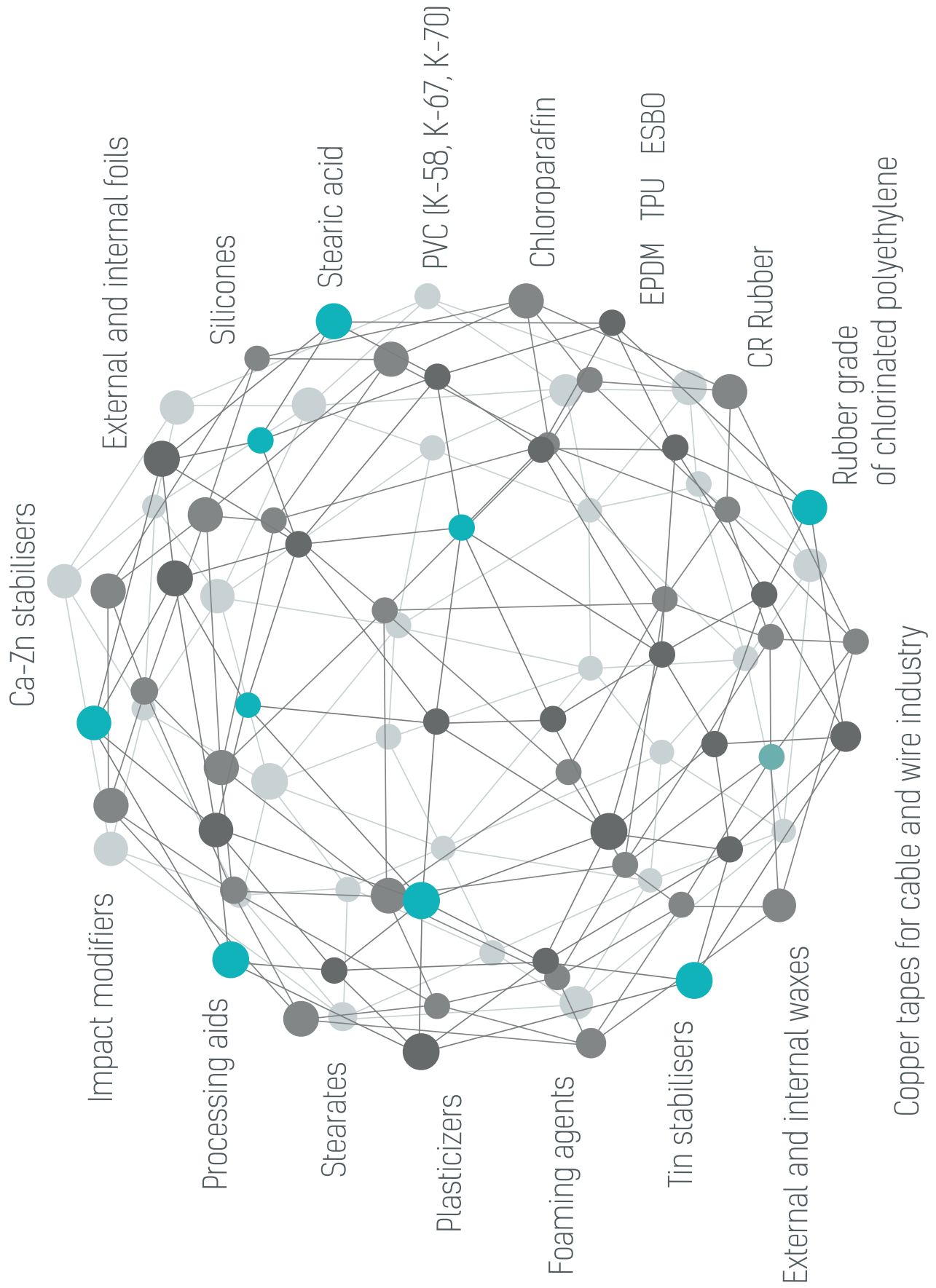
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Visit us at Hall 11, Stand B156





MAS AUSTRIA: SUSTAINABILITY & INNOVATION IN RECYCLING



THE CONICAL RECYCLING MARVEL – THE MAS TWIN-SCREW EXTRUDER EXPERT

At MAS Austria, we take great pride in being at the forefront of **sustainability and innovation in the recycling industry**. Our **twin-screw extruders** have proven to be a game-changer, explicitly designed for recycling applications and excelling in the upcycling sector. Focusing on flexibility and resource efficiency, our twin-screw extruders enable environmentally friendly processing of recyclable plastic fractions, resulting in the highest quality granulate.

Unparalleled Advantages of MAS Twin-Screw Extruders:

- Over 200 Global Deployments: Our certified innovation has been successfully deployed in more than 200 locations worldwide, contributing

significantly more material to the recycling cycle than conventional screw extruders.

- Targeted Energy Input: With a reduced and precise energy input, MAS extruders minimize unnecessary cooling and offer superior energy efficiency, measured in kWh/kg.
- User-Friendly Touch Control Panel: Logical and intuitive design ensures easy handling and operation through our touch control panel.

A Conical Marvel: Revolutionizing the Recycling World

Unlike conventional twin-screw extruders often adapted for recycling, MAS extruders are purpose-built for this crucial application. Our innovative and patented technology seamlessly combines the exceptional homogenization and degassing performance of co-rotating twin-screw ex-

truders with robust mechanical engineering, offering a wide range of applications for diverse recycling fractions.

The heart of our process lies in the **patented conical co-rotating design of the extruder unit, featuring a large feed opening**. This unique design allows for the smooth and efficient processing of large volumes of materials initially, followed by a shorter distance to travel and lower circumferential velocity, resulting in reduced shear and environmentally friendly processing.

The perfect balance achieved by MAS extruders ensures faster processing, shorter retention time, reduced energy consumption, and the prevention of harmful melting of plastic fractions. Undesirable by-products, gases, and odors are minimized, resulting in a significantly higher yield of usable, high-quality granulate for the recycling and upcycling cycle.

DRD – DRY CLEANING MACHINE: WASHING WITHOUT WATER

Our commitment to sustainable solutions extends to our DRD (Dry Cleaning) technology. The DRD machine facilitates **simultaneous cleaning and drying of pre-shredded plastic recycling fractions, all without water.**

The DRD system operates by rotating the plastic within a cylindrical chamber while circulating hot air around it, effectively drying the material. Concurrently, impurities such as sand, dust, and moisture are separated by a screen, and heavier particles are discharged via a heavy particle separator. An optional second cleaning step removes any remaining fine dust particles, perfectly synchronized with the drying process.

MAS DRD systems are fully automated and controlled through a user-friendly PLC, allowing for precise adjustments based on the plastic's moisture content and level of contamination. This innovation significantly reduces operating costs compared to traditional wet washing methods while extending the lifespan of filtration screens and enhancing the extrusion process's stability.

Join the Recycling Gamechanger Revolution:

MAS Austria invites you **to be part of the recycling revolution** as we drive upcycling to the next level. Meet our dedicated Sales Managers at upcoming trade shows like Plast Milan and Fakuma, where you can explore our proven technologies and innovations in machinery and plant construction. Alternatively, contact us anytime to schedule a meeting at your convenience.

Contact us at sales@mas-austria.at, and let's work together to build a sustainable and greener future for our planet.

Be a part of the revolution, and together, let's take upcycling to the next level. •



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ATUS & MEYER TOGETHER FOR PCR IN HDPE PACKAGING

Packaging made from PCR nowadays needs to meet a growing number of criteria. To satisfy market expectations, primarily in the area of shredded plastic sorting by colour, ATUS entered into a partnership with MEYER. What has resulted from such synergistic collaboration between these innovation leaders?

ATUS AND MEYER – SYNONYMS OF QUALITY AND CUTTING-EDGE APPROACH

They say that 'opposites attract'. This is especially true considering two companies with a vision that are boldly setting trends in their sectors and leveraging state-of-the-art developments.

ATUS is the nation's foremost recycler of HDPE packaging, having been in business for more than 20 years. The company creates turnkey solutions for the construction industry, as well as makes in-house HDPE regranulates for their customers operating in blow moulding, injection moulding and extrusion applications. Their mission is to be a quality leader in specialty recycled products (**PCR**) for the packaging and industrial sectors. The brand is committed

to technological growth, eco-friendliness and advanced machinery.

And the latter has expanded over the past six months with another high-end piece of equipment – this time from MEYER, a manufacturer of the highest technology optical sorters and X-Ray inspection equipment. ATUS specialists saw particular potential in the optical sorter, i.e. CG.P Sorter, made by MEYER.

"Following a number of technological tests in our Test Centre, it became clear that the full RGB vision systems, broadband LED lighting and the patented Maglev 3.0® and Target Positioning 3.0® defect rejection systems used in our equipment enabled ATUS to achieve the most satisfactory colour separation of HDPE PCR flakes among the solutions available on the Polish and

European markets", comments Piotr Okoń, Sales & Business Development Manager at MEYER Europe.

ATUS was keen to achieve precise colour detection and sorting of HDPE flakes, and thus to complete its range of **PCR regranulates for blow molding, in white and natural variants**. The machine meets these objectives to an overriding degree, both in terms of sorting quality and the yield of the final material fractions, as well as the sheer efficiency of the process. "We are satisfied with the performance of the MEYER CG optical colour sorter. This machine has met our expectations in terms of the colour separation process of PCR regrind, giving us the ability to recycle more HDPE waste, with less product loss, while maintaining stable, top-quality production. We are now able to supply top-grade PCR re-



GRANULATES



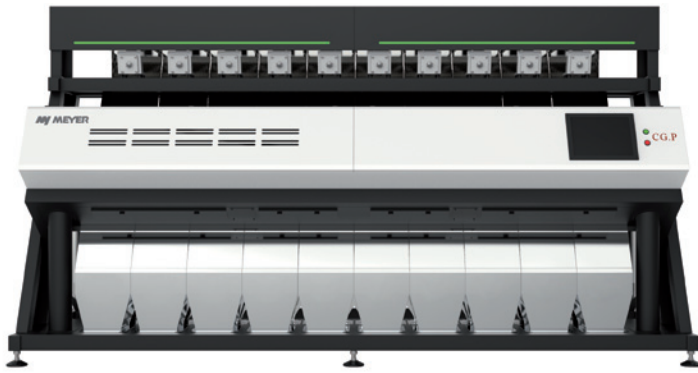
HDPE/PP



PET



PVC



Meyer CG.P Optical Sorter, Effective & High-Performance Color Sorter

granulates, the grade of which meets the requirements of many of our customers", says Jakub Barnaś, owner and plant manager of ATUS Group.

THE ROLE OF THE OPTICAL SORTER IN RAW MATERIAL PROCESSING

In the modern market, it is the technology used to process the raw material that is of particular relevance. However, it is **colour separation** that is very often used in the **recycling of plastics**. The business customer will expect not only coloured raw material, but also white or transparent flakes. And today, regranulates in different colours can be created without the use of dyes.

The question is: how can the most efficient sorting be carried out? The answer to this question is MEYER CG.P optical sorter, which allows plastic material to be segregated and divided into different colours to produce a final product with the desired colour. Plus, it has a sorting capacity of up to 10 tonnes of input material per hour. Yet, the machine's capabilities also extend beyond this. In fact, the sorter provides the option of adjusting the intensity of the LED light source, which facilitates easy identification of even subtle colour differences.

PARTNERSHIP THAT HAS YIELDED TANGIBLE RESULTS

The collaboration between the ATUS and MEYER brands, which started six months ago, included conceptual, implementation, assembly, programming and training work

for the integration of the new sorter into existing processes.

As a result, MEYER has implemented another innovative project and ATUS has improved the production quality of post-consumer HDPE waste regrinds by extending its scope to include **natural** regranulate and **white** regranulate (apart from a mix of other colours, of course). That is what customers expect today.

ABOUT COMPANIES

MEYER Europe represents one of the world's leading manufacturers of optical sorters. MEYER's portfolio includes optical (colour and polymer) separation equipment for various plastics (including PET, HDPE, PP, PVC, etc.), ferrous and non-

ferrous metals and many other, even the most unusual materials that require specialised improvement of the final product quality. At the beginning of 2023, MEYER launched the 3rd generation of cameras for polymer sorting of plastics (PET, PE/PP and others). With the new developments, the reduction of previously difficult-to-detect contaminants such as PC, PET-G, PVC, TRITAN, ABS, PS, PA and many others is greatly facilitated. Customers looking to expand their business have the option of carrying out tests on their own material at the MEYER Europe Test Centre in Michalowiec near Warsaw, Poland.

ATUS Group is a Polish enterprise operating in numerous foreign markets, being the leading recycler of HDPE packaging in Poland. They process about 25,000 tonnes of plastic per year. At the same time, the company is ranked among the top three producers of dimpled membranes in Europe. One of the main hallmarks of ATUS is the comprehensive operation of processes at each step: from the collection of HDPE raw material, through selection, processing, storage, to packaging and shipping. The company prides itself on the advanced machinery fleet and R&D department, prioritising innovative solutions for the construction industry and aiming for responsible, sustainable manufacturing. •

MEYER
Sorting creates values

ATUS

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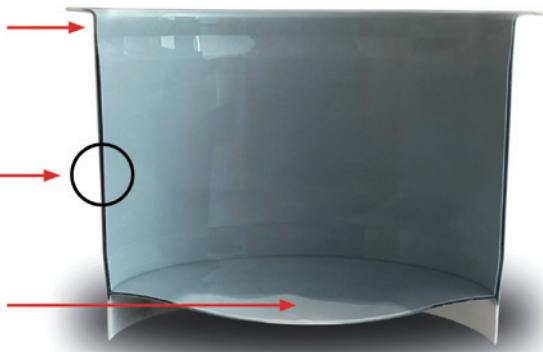
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MOLD-MASTERS SUSTAINABLE CO-INJECTION PCR CAPABILITIES HAVE BEEN EXPANDED TO INCLUDE SMALL TO MEDIUM CONTAINERS AND PRODUCTS

Excellent process control. Complete fill. Up to 50% PCR core.



Ability to have gate area clear of PCR to maintain structural strength.



Mold-Masters is dedicated to offering solutions that support our customers sustainability efforts. Mold-Masters has demonstrated how its equipment can be used by molders to inject up to 50% of total part weight with Post-Consumer Recycled (PCR) material as a means to minimize cost per part (save on virgin material and concentrates) and help our customers meet their sustainability targets. Now, the technology has advanced to include compatibility with smaller containers and products with weights as low as 5 g. Previously co-injection PCR was only compatible with larger packaging up to 950 g such as 5 gal (20 l) pails.

When it comes to PCR and sustainable applications, Mold-Masters has proven capabilities. Utilizing our industry-leading co-injection multi-layer technology, we have the ability to combine 2 separate resins into a single 3-layer melt flow. This enables our customers to inject high PCR content as the core layer up to 50% of total part weight.

What sets Mold-Masters co-injection apart is our leading-edge control, which allows us to precisely control distribution and thickness of the core layer. This is what gives us the ability to inject up to

50% PCR core and enables our customers to maximize sustainability targets and implementation ROI on their application.

This sustainable processing solution has the potential to generate significant savings for the molder (based on current prices) by reducing the use of virgin material. These significant savings and favorable ROI mean that sustainability initiatives can also make good financial sense.

Our precise uniform leading-edge control allows Mold-Masters to achieve more consistent and fuller core fill. Mold-Masters patented "fold-over" capabilities is a technical advantage that enables us to achieve the highest core percentage and allows us to ensure uniform distribution and complete coverage of PCR resins which prevents contact of PCR with product.

Another significant difference is that we give molders the flexibility to position the core where they want it. For example, on packaging applications customers may prefer to keep any PCR core away from the injection point to avoid molded in stresses which can cause brittleness and result in drop test failures.

One of the major advantages of Mold-Masters Co-injection technology is that there is typically no penalty to cycle time or part quality, and in many cases, molders can reuse their existing tooling (minor modification may be required). A variety of resin materials can be combined although those with similar melt temperatures are ideal for compatibility. Many applications are those that utilize the same material (ex: 50% virgin HDPE, 50% PCR HDPE). However, our thermally isolated manifolds make it possible to combine two thermally different resins.

Mold-Masters makes implementing this into your application simple and economical with our Co-injection CONNECT package. This package includes an E-Multi auxiliary injection unit which allows our customer to convert any injection molding machine to co-injection. The package also includes the co-injection hot half, process control, engineering, and start-up support. If you're interested in adopting sustainable processing solutions, feel free to reach out to us at europe@moldmasters.com to discuss your application today. •



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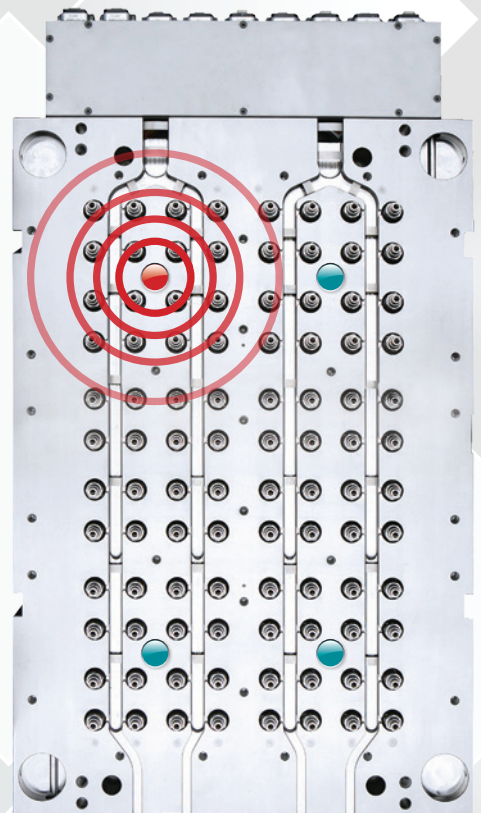


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ERP SYSTEM CRUCIAL FOR PRODUCTION

Production optimisation and process improvement have become extremely trendy buzzwords in recent times. This indicates both an increased awareness and willingness to undergo digital transformation, as well as an attempt to meet global challenges, which affect almost every company. What role does the right ERP system play in this situation? A crucial one.

WHAT IS AN ERP SYSTEM?

ERP stands for Enterprise Resource Planning and refers to the most effective management of a company's assets. An ERP system, on the other hand, is an IT program designed to support such planning, with the aim of helping to manage and optimise a company's key decision-making and business processes.

ERP IN PRODUCTION

Although ERP systems are available in many industries and sectors, they play a significant role in manufacturing companies. Consisting of a variety of available functional modules and add-ons, they allow comprehensive data collection, tracking and analysis, leading to increased competitiveness and optimisation of the company's operations on many levels. With the right ERP system tailored to the characteristics of a manufacturing company, all stages and processes – such as purchasing, production, sales, warehousing, accounting or human resources management – can be meticulously monitored, administered and

improved. As a result, this has a huge impact on the quality of operations, growth and increased profits.

OPTIMISATION

Many processes in today's manufacturing companies are becoming so complex that managing them is equally difficult and complicated. Companies can quickly lose control of spare capacity, the optimal use of certain machines or the availability of materials, resulting in significant losses in productivity and profitability.

Individual resources and capacities within companies may be in short supply or particularly important and therefore need to be optimally loaded and exploited – as far as possible, they should be used continuously to generate the greatest possible efficiency and meet the quality and deadline requirements of customers. These key resources, also known as bottleneck resources, determine how long orders are backlogged in production, what lead times are and how the working capital load develops. If these resources are planned and

used incorrectly, it leads to a chain reaction, the effects of which are felt both internally and by end customers. As waiting and downtime increases, production and lead times also increase, disrupting delivery times.

The planning of companies' resources (including capital, personnel, materials, information, tools and machinery) must therefore ensure a continuity in which as many processes as possible can exploit the resources in question and thus run smoothly. Focusing on optimisation will then lead to increased data quality, better information flow and an appropriate response to customer requirements. Ultimately, this will increase the efficiency and effectiveness of the company's processes, making it more competitive and profitable. Appropriate optimisation will also avoid bottlenecks and overloads, making a real difference to employee satisfaction, creating a proper and prosperous production enterprise.

GLOBAL CHALLENGES

The reality around us, rapidly changing energy prices and availability of materials pose a huge challenge to any manufacturing company. This also leads to loss of certainty and an important question – what does the future hold?

However, this is just one of the many question marks emerging in manufacturing companies today. Despite market differences and issues specific to individual types of production or countries, there are global challenges and concomitant uncertainties that concern many manufacturers:



We are not sure which products actually generate a profit. In the face of many variables and spikes in energy and component prices, to maximise profits and prioritise accordingly, the pre- and post-calculation functions will be helpful in order to comparisons and optimise production for profitability.

We do not know how much material should be in stock. Inefficient management of material management that is not used can be very costly. Functions that calculate volume values and ABC-classification allow us to maintain an optimum stock level that is as low as possible, but also safe.

We do not know whether we can afford to cover all costs. Proper cash flow reports, taking into account both invoices sent and received as well as orders and historical data lead to accurate and comprehensive forecasts that provide peace of mind for planning.

We do not know how much profit we will make on our products when energy prices rise. Simulations and worst-case scenario calculations allow us to calculate production costs and generate profit margin reports with many variables.

These are just a few of the important issues that can be tackled with an ERP system. In order to overcome the recession and increase profitability, competitiveness and market share, the focus should not, as it may seem, be solely on savings and financial cuts. The solution may lie in being open to digital transformation and

choosing the right ERP system to optimise operations and processes.

Manufacturing companies have never had to adapt to new market conditions and customer requirements as dynamically as they do today. The use of functional business software in the form of an ERP system seems to be a key issue – especially for small and medium-sized enterprises – which has so far mostly relied on outdated, non-integrated solutions. The implementation of an ERP system dedicated to manufacturing may represent a watershed moment for many companies. •



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Monitor ERP



PLASMAQ RECYCLING SOLUTIONS: POWER OF EXPERIENCE, POWER OF PATENT

Recycling is a sub-pillar of the circular economy, the introduction of which is a priority task in European and global economic policy. This is a consequence of ongoing climate change, the drastic reduction of non-renewable resources, and the ever-increasing amount of waste, which should become valuable new raw materials instead of going to landfills.

Recycling is not a simple matter. Recyclers face many challenges. First, “mental”, because of some simplifications, perhaps lobbies, plastics themselves are falsely understood as a source of environmental pollution. While environmental pollution is the result of bad human behavior and mismanagement of plastic. Secondly, locally there are legislative barriers, or rather slowness in the introduction of relevant directives that would facilitate the implementation of a circular economy. Another issue is financial factors, the rising operating and energy costs. Another obstacle is the temporary and local difficulty of sourcing waste for recycling. Recyclers are forced to look for new sources of feedstocks, such as post-consumer and agricultural plastics, often highly contaminated, which can weaken the final recycling product.

That's why it's critical to find an experienced partner that will give recyclers reliable tools to work with, such as machines that are proven, long-lasting, low-maintenance and energy-efficient.

Such a partner is the Portuguese family-owned company, Plasmaq. They produce a wide range of equipment and integrated solutions customized to the client's needs. They develop recycling lines tailored for the needs of recyclers, integrating the phases of separation, washing, crushing, drying and transport of recovered plastics. Plasmaq lines are outstanding for reliable equipment design, flexible tailoring of so-



lutions to meet exact needs, simplicity and low energy and water consumption.

The above is the result of hard work, many years of experience, testing and analysis of designers, mechanics, engineers and loyal Plasmaq's customers. That is why Plasmaq keeps its intellectual property protected with patents. The purpose of patents is to protect one's own money and one's own business. Plasmaq believes that the patent is also a way to protect customers. On one hand, patent is meant to obliterate the competition and discourage potential counterfeiters. In this way, the patent reduces the risk that clients will be cheated by promises to be delivered a device “based on” or “similar” to Plasmaq's. Cases are known where a customer tempted by promises to buy a cheaper version of a particular equipment loses money and time.

On the other hand, patents confirm that Plasmaq is expert and innovator in the recycling machines manufacturing. Intel-

lectual Property is a critical and very substantial portion of Plasmaq's assets. Such machines as Plasmaq's flagship product, PLASCOMPACT screw press, for example, is a result of years of rethinking, analysis and complex algorithms laid out by designers who devote years to the issue at hand. Of course, there will always be attempts to copy and there will always be people who will not want to understand that it is not possible to make a perfect copy, and certainly not at a cheaper cost.

However, in the case of advanced machines, what makes the difference is not to be found in any drawing, not even inside the machine. The effectiveness and quality of PLASCOMPACT result from the fact that its constructors, from the very beginning, created a machine specifically for dewatering flexible plastics, and then for years, they laboriously introduced further modifications, improvements and refinements, seemingly insignificant. This cannot be copied. •



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CERTIFIED CIRCULAR POLYMERS MADE OF PROCESSED OIL FROM PLASTIC WASTE

Aramco, TotalEnergies, and SABIC have for the first time in the Middle East and North Africa successfully converted oil derived from plastic waste into ISCC+ certified circular polymers. The plastic pyrolysis oil, also called plastic waste derived oil (PDO), was processed at the SATORP refinery jointly owned by Aramco and TotalEnergies, in Jubail, Saudi Arabia. It was

then used as a feedstock by Petrokemya, a SABIC affiliate, to produce certified circular polymers.

The project aims to pave the way for the creation of a domestic value chain for the advanced recycling of plastics to circular polymers in the Kingdom of Saudi Arabia. The process allows the use of non-sorted

plastics, which can be difficult to recycle mechanically, and consequently contributes to solving the challenge of end-of-life plastics.

A first milestone for the project was obtaining ISCC+ certification to assure transparency and traceability of the recycled origin of feedstock and products. Three

industrial plants were involved in the process: SATORP refinery, Aramco's Ju'aymah NGL Fractionation Plant and Petrokemya. All successfully obtained the ISCC+ certification, enabling the production of circular materials.

Mohammed Y. Al Qahtani, Aramco's President of Downstream, said: "This achievement illustrates the importance of the petrochemical sector in creating more sustainable products and solutions. Our aim is to create circular solutions for plastic waste, while also making progress on our ambition to achieve net-zero Scope 1 and Scope 2 greenhouse gas emissions across our wholly-owned operated assets by 2050. By leveraging spare capacity of existing infrastructure, we aim to produce circular products that could be scaled up at low cost. Aramco is considering multiple ways of tapping into new technologies and leveraging existing assets to support the deployment of circular, more sustainable and lower-carbon products."

Bernard Pinatel, President, Refining & Chemicals, TotalEnergies, said: "This advanced plastic recycling initiative reflects TotalEnergies' ambition to concretely contribute to addressing the challenge of end-of-life of plastics. Several other circular economy projects are being studied, leveraging the partners' technical expertise and experience to further contribute to plastics recycling. It is a major pathway towards TotalEnergies' target to produce 30% of circular polymers by 2030, and its strategy to build a multi-energy company with the ambition to get to net zero by 2050 together with society."

Sami Al-Osaimi, SABIC EVP Petrochemicals (A), said: "SABIC is a national champion in chemicals that supports Saudi Vision 2030, ensuring sustainable future growth by focusing on environment, energy and climate. This project is aligned with SABIC's commitment to avoid landfill and incineration through its innovation competencies and advanced technology. This project shows collaboration across



the petrochemical value chain to overcome upstream and downstream challenges in circular plastics. To this end, SABIC recently announced its target of one million metric tons of Trucircle solutions by 2030, which intends to help provide our customers with more sustainable solutions."

SABIC, and TotalEnergies are founding members of the non-profit organization Alliance to End Plastic Waste (AEPW), which aims to bring collective knowledge, resources and experience to address current waste management challenges. •

Photos: SABIC



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Koltex PRS is a European manufacturer of plastics recycling machinery and equipment. We provide turnkey solutions for recycling companies. We produce complete plastic recycling systems for the crushing, sorting, washing, transport and pelletizing waste



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The Lindner family business has been offering innovative, tried-and-tested shredding and recycling solutions for decades. Its subsidiary Lindner Washtech is a world-leading manufacturer of industrial plastic washing and sorting systems for film, rigid plastics and PET



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Polish LDPE recycler and manufacturer that offers LDPE regranalates and wide range of plastic bags, films made of recycled materials. The company is also purchasing LDPE waste for recycling purposes

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The past few months have not been kind to optimism in the plastics industry. This is hardly surprising, as low polymer prices, production stoppages and pessimistic forecasts for the second half of the year can cause headaches. The economic situation in Germany and China is certainly having a major impact. However, there are markets that, despite temporary problems caused by the current economic situation and the influence of the larger economies, have been growing rapidly for several decades. One country that deserves special attention is Poland.

In the last international issue of "Plast Echo" I pointed out that in the period since 1989 the Polish economy has been the second fastest growing in the world, after China. I also wrote that Poland and the countries of the CEE region could represent the security and stability of Western European industry, given the chimeric nature of the Chinese market, which is *de facto* not a free market, due to the influence of the Communist Party there.

I still hold this view. Poland is an important partner for many EU countries. It is the country that has received the most reshoring investments in the post-covid period, and it is considered the best place in Europe for this process. Its proximity, large population and workforce, educated

society, high technological culture and cultural proximity make it extremely easy to do business in Poland today.

In the following two years, GDP is expected to grow between 2.2% and 3.4%. It is worth noting that despite starting from a very low base in 1989, when Poland was the poorest country in the Eastern bloc, it now ranks 22nd in the world in terms of nominal GDP (IMF data for 2022), and the Polish government is talking more and more boldly about joining the G20. Another measure of the success of the Polish economy, and an important proxy for investment attractiveness, are export figures, which reached a record €343.8 billion in 2022. This ranks Poland 22nd in the world and 20th in services.

The war in Ukraine, with which Poland shares a border, is undoubtedly having a major impact on the current economic situation. However, Poland's membership of the European Union and, above all, NATO, has insulated it somewhat from its neighbour's problems.

At the same time, the Polish government is using the time afforded by Russia's involvement in the aggression against Ukraine to strengthen national security and rapidly modernise an army. This is partly thanks to plans to spend up to 4% of GDP on armaments, which will also be reflected in the development of investment and production in this sector. Decisive action has also made the Polish economy independent of Russian blackmail, such as energy resources.

The Baltic Pipe pipeline, which gives access to Norwegian gas reserves, the Swinoujscie gas port (access to raw materials from the US, among others) and Saudi Aramco's investment in a refinery in Gdansk, with access to an oil port, make the Polish market independent of Moscow's whims, which is still a problem for some Western European countries.

It is also worth mentioning the development of logistics infrastructure, which is a significant advantage for Poland among the countries of the region. The port of Gdansk handled 68.2 million tonnes of cargo in 2022, and as much as 41.2 million tonnes in the first half of 2023. The investment in the Vistula Spit diversion, allowing direct access to the Baltic Sea from the seaport of Elbląg, is being completed. The planned container terminal in Świnoujście, in turn, will provide direct access to Central and Eastern European markets, bypassing the port of Hamburg. At the same time, the road infrastructure is developing rapidly, with 4,000 km of motorways added in the last 20 years. Their length is now almost 5,000 km.

Poland remains a growth leader and an alternative to distant Asian markets as a place to develop business. Plastics companies have also contributed to its success, as Western investors have been relocating production here for three decades, taking advantage of the opportunities and potential of the largest country in the CEE region. It is worth taking a closer look at a place that continues to grow at an incredible rate. •



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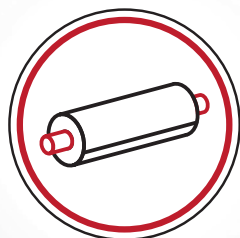
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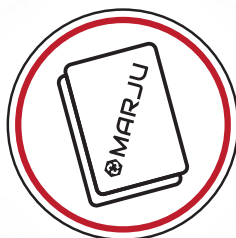
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