

# 挤塑

# EXTRUSION

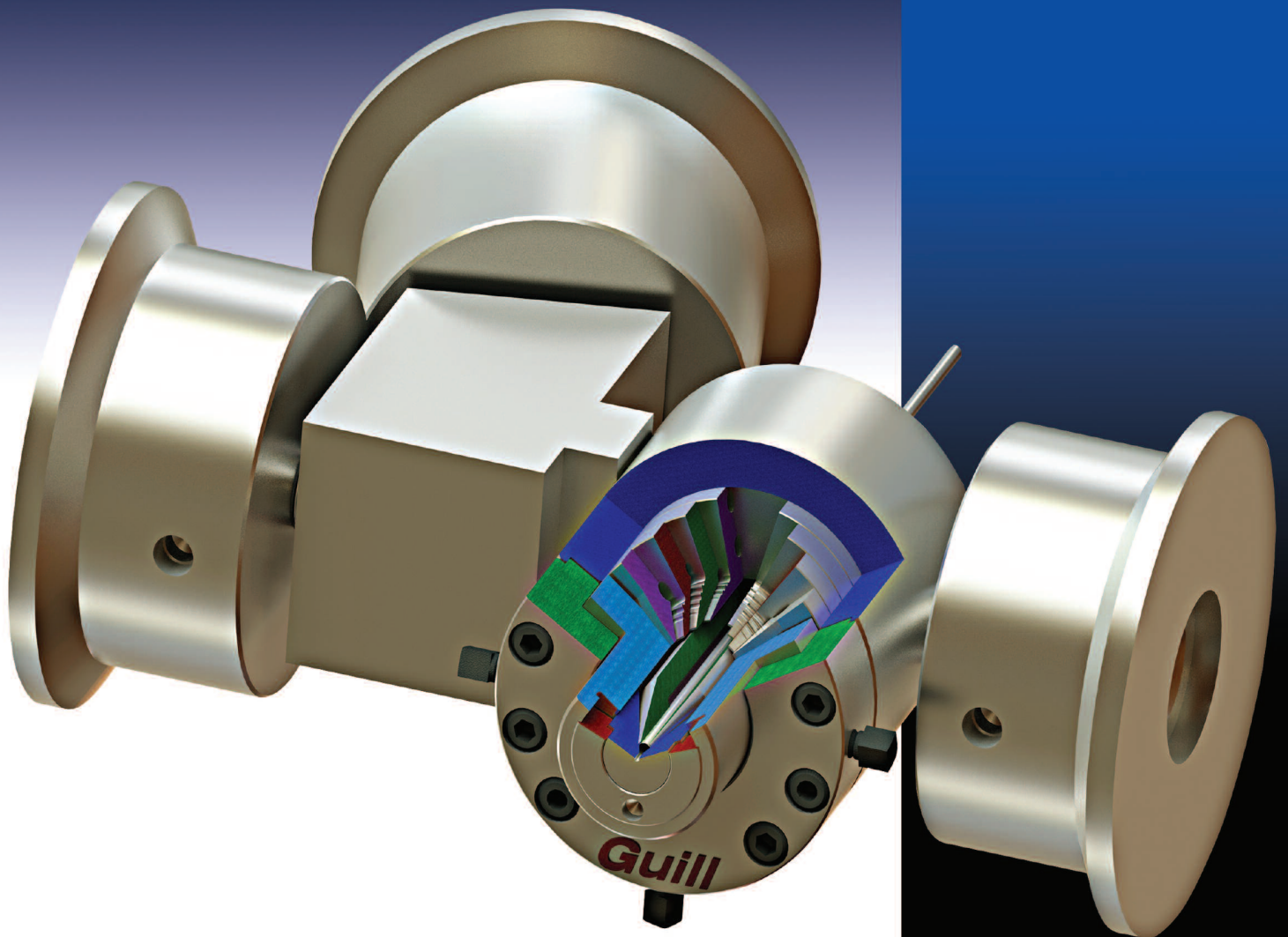
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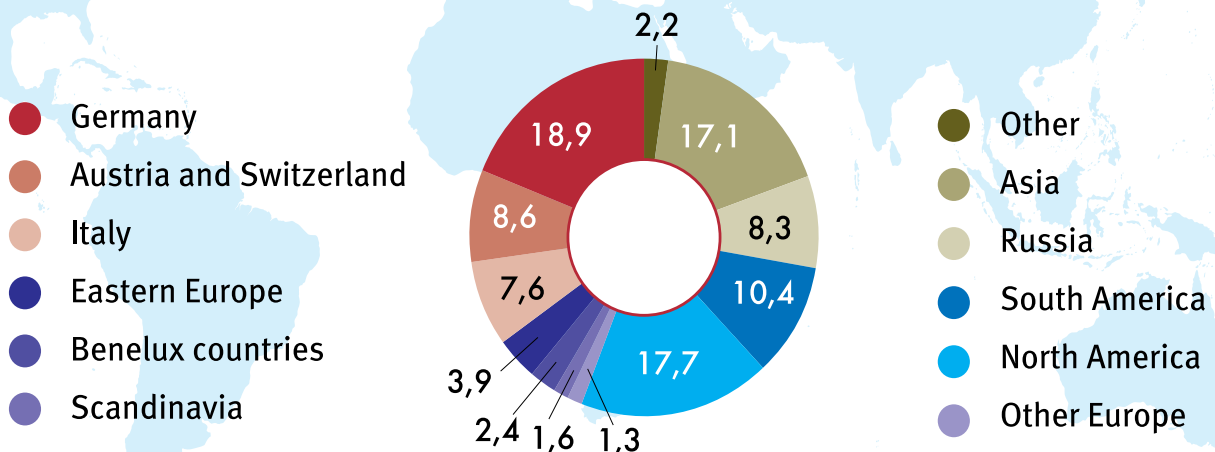
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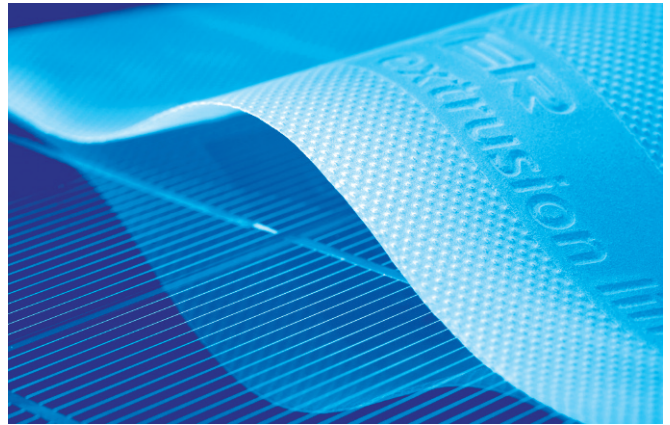
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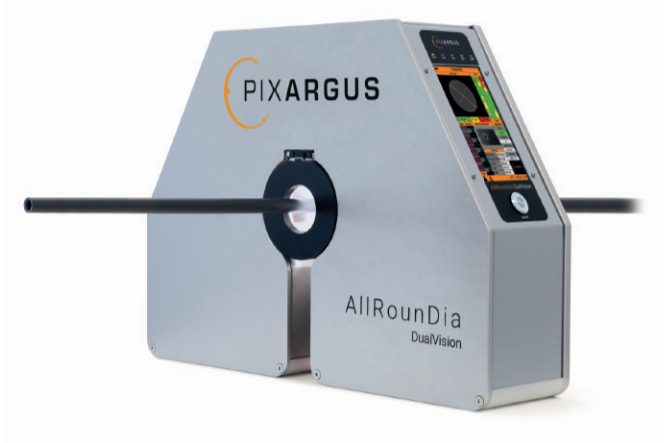
**48** 在K2022展会的展位上，巴顿菲尔-辛辛那提展示了带有重量计量装置的twinEX 93-34平行双螺杆挤出机模型，可加工多达100份的白垩，无需预混。  
*At its booth at K 2022, battenfeld-cincinnati showcased the twinEX 93-34 parallel twin screw extruder model with a gravimetric dosing unit for processing up to 100 parts of chalk without premixing.*



**50** BREYER的挤出系统 "CellProtect" 允许以高速生产低收缩EVA和POE封装膜。  
*BREYER's extrusion system "CellProtect" allows the production of low shrinkage EVA and POE encapsulation film at high production speed.*



**56** 25年来，新一代回收机械公司(NGR)一直是可持续塑料回收机械领域的先驱之一。  
*For 25 years now, Next Generation Recyclingmaschinen (NGR) has been one of the pioneers in the field of sustainable plastics recycling.*



**59** 测量技术专家PIXARGUS对其圆形产品的小预算系统 AllRoundDia DualVision进行了重大升级。  
*Measuring technology specialist PIXARGUS has enhanced its small-budget system for round products – AllRoundDia DualVision – with a major upgrade.*

考特斯机械制造有限公司 (Kautex Maschinenbau) 是吹塑行业可持续创新的全球领先企业，在 Chinaplas 2023 国际橡塑展上将专注于高品质的最终塑料产品。

**36** *Kautex Maschinenbau will focus on final plastic products of highest quality at Chinaplas 2023.*



格诺斯在2023年中国国际橡塑展：格诺斯为您的压力和温度测量提供灵活的传感器解决方案，可根据您的应用进行个性化定制。磨损、腐蚀、温度，格诺斯为每一个挑战提供正确的解决方案。

**32** *Gneuss at Chinaplas 2023: Gneuss provides flexible sensor solutions for pressure and temperature measurements, individually tailored to your application. Abrasion, corrosion, temperature, Gneuss offers the right solution for every challenge.*





### CHINAPLAS 2023

17 - 20 April 2023

Shenzhen / PR China

深圳 / 中國

➡ [www.ChinaplasOnline.com](http://www.ChinaplasOnline.com)

### interpack 2023

04 - 10 May 2023

Düsseldorf / Germany

杜塞尔多夫 / 德国

➡ [www.interpack.de](http://www.interpack.de)

### Highly-functional Material Week

#### OSAKA 2023

17 - 19 May 2023

Osaka / Japan

日本 / 大阪

➡ [www.material-expo.jp](http://www.material-expo.jp)

### Plastics & Rubber Vietnam

25 - 27 July 2023

Hanoi / Vietnam

河内 / 越南

➡ [www.k-globalgate.com/en/Global\\_Portfolio/Plastics\\_Rubber\\_Vietnam/](http://www.k-globalgate.com/en/Global_Portfolio/Plastics_Rubber_Vietnam/)

### PLAST 2023

05 - 08 September 2023

Milan / Italy

米兰 / 意大利

➡ [www.plastonline.org](http://www.plastonline.org)

### Fakuma 2023

17 - 21 October 2023

Friedrichshafen / Germany

弗里德里希斯哈芬 / 德国

➡ [www.fakuma-messe.de](http://www.fakuma-messe.de)

### Plastimagen

7 - 10 November 2023

Mexico City / Mexico

墨西哥城 / 墨西哥

➡ [www.plastimagen.com.mx/en](http://www.plastimagen.com.mx/en)

### Plast Eurasia Istanbul 2023

22 - 25 November 2023

Istanbul / Turkey

伊斯坦布尔 / 土耳其

➡ [plasteurasia.com](http://plasteurasia.com)

## K 2022 展会：成果实现了最高预期



(照片：杜塞尔多夫展览公司, Constanze Tillmann)

(Photos: Messe Düsseldorf, Constanze Tillmann)

■ 三年后，全球范围内的塑料和橡胶行业的从业者终于能够面对面交流思想，这是K 2022 杜塞尔多夫展会的特点，3037家参展商的良好情绪得到了确保。这些公司的报告称，在贸易观众中，有非常好的线索和明显的投资意愿，并提到有希望建立新的客户关系，达成了大量(部分是自发的)商业交易。

杜塞尔多夫展会董事总经理Erhard Wienkamp说道：“杜塞尔多夫的K展再一次满足了最高的期望。它仍然是全球塑料和橡胶行业最国际化、最完整和最具创新性的贸易展览会。”他对良好的结果感到高兴，并补充说：“贸易展览会令人印象深刻地展示了面对面的交流、偶然的相遇以及品牌实物和产品体验的价值。我们非常满意地看到，K 2022成功地发出了作为行业创新驱动力的强烈信号，我们的参展商与大量拥有强大决策权的国际客户开展了业务。”

来自各大洲的17.6万名贸易观众来到杜塞尔多夫参加与他们最密切相关的行业活动。K2022国际来宾的比例超过70%，一直保持在高水平。

K 2022参展商咨询委员会主席乌里奇·莱芬豪舍 (Ulrich Reifenhäuser) 的结论也非常积极：“在过去三年中，几乎没有任何贸易展览会可以在全球范围内或在国家层面上举行。K 2022作为全球第一大塑料和橡胶行业贸易展览会，成功地为我们行业的各个领域提供了新的动力。不言而喻，在贸易博览会上举行

了许多在某种程度上出乎意料的具体合同谈判!”

目前事件的不可预测性和不确定性确实导致了整个行业的紧张局面，但这并没有对参展商的承诺和观众的兴趣造成任何损害，恰恰相反：“特别是在动荡时期，塑料行业正在向循环经济转型，K 2022是共同积极规划未来路线的理想场所。”乌里奇·莱芬豪舍总结道。

原材料生产商、机械制造商和塑料加工商为实现循环经济、节约资源和保护气候而展示的大量新技术进展，尤其令行业参观者兴奋不已。对此，乌里奇·莱芬豪舍评论说：“可以清楚地感觉到，所有公司都已经接受了承担社会责任的必要性，并从工艺链的一开始就以可持续的方式考虑塑料。2022年K展上展示的向循环经济转型的各种解决方案、机械和产品令人难以置信。”

今年K展有157个国家的商务观众来到莱茵河畔。除德国外，来自荷兰、意大利、土耳其、法国、比利时、波兰和西班牙等欧洲国家的来宾人数也较多。有42%的观众来自海外，在国际商务观众中，K展的影响力一如既往地高。来自东亚地区的来宾代表性较差，与三年前的K展相比人数没有那么多，这是由于这些国家目前受限于检疫规定，但2022年K展迎来了来自美国、巴西和印度的大量来宾。

在接受调查的所有参观者中，约有三分之二的人对机械和工厂建设感兴

趣。57%的受访者表示，他们对原材料和辅助材料感兴趣，比2019年K展高出5%，其中可回收材料和生物塑料尤其受欢迎。28%的来宾对塑料和橡胶制成的半成品和技术部件有兴趣，是他们来这里的主要原因(可能有多种反应)。超过70%的访客来自高层和中层管理人员。

K 2022的参观者对展览范围的完整性和展览反映了整个供应链给予了最高分。98%的专业人士表示，他们已经完全实现了与访问相关的目标。

在为期8天的展会期间，很明显地看出，今年的K展选择了循环经济、气候保护和数字化等热门题材，是正确的。在投资意向方面，加工和回收机械设备突出地占43%。展会的重点是发展的可持续性，但也包括循环经济和生产中的能源/资源效率提升。大约40%的决策者表示，他们正在研究碳减排的课题。

同样围绕这三个热门话题的K特别节目也受到了热烈的欢迎。官方特别展览“塑料塑造未来”，围绕K展指导主题，在高水平的讨论和讲座中关注经济、社会和生态方面的挑战以及潜在的解决方

案，整个特别展览的参加人数都很多。在循环经济论坛上，VDMA（德国机械设备制造业联合会）及其13家成员公司令人难忘地展示了技术在塑料行业实施循环经济中的重要性，并通过现场演示和大量有理有据的知识以及关于该主题的信息赢得了国际观众的认可。

下一届杜塞尔多夫K展将于2025年10月8日至15日举行。

### *K 2022 – Trade Fair Results Fulfil Highest Expectations*

■ The joy of the plastics and rubber industry at finally being able to exchange ideas in person on a global level again after three years characterised K 2022 Düsseldorf and ensured an excellent mood among the 3,037 exhibitors. The companies reported extraordinarily good leads and a marked willingness to invest among trade visitors, mentioning promising new customer relations and the con-

clusion of numerous, in part, spontaneous business deals.

“K in Düsseldorf has once again fulfilled highest expectations. It continues to be the most international, complete and innovative trade fair of the global plastics and rubber industry,” says Erhard Wienkamp, Managing Director at Messe Düsseldorf, delighting at the good results and adding: “The trade fair has impressively demonstrated just how valuable face-to-face networking, chance meetings and physical brand and product experiences are. We are very satisfied to see that K 2022 succeeded in sending out strong signals as an innovation driver of the industry and that our exhibitors did business with a high number of international customers with great decision-making powers.”

176,000 trade visitors from all continents travelled to their most relevant sectoral event in Düsseldorf. At over 70% the proportion of international guests at K 2022 remained at a constantly high level.

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The verdict from Ulrich Reifenhäuser, Chairman of the Exhibitor Advisory Board at K 2022, is also very positive: "After hardly any trade fairs could take place worldwide also on a national level over the past three years, K 2022 was all the more eagerly anticipated as the world's No. 1 trade fair of the plastics and rubber industry and succeeded in providing fresh impetus in all sectors of our industry. The many, in part, unexpected concrete contract negotiations held at the trade fair speak for themselves!"

The current unpredictability and uncertainty of events does make for a tight situation in the sector overall, but this did not do any harm to exhibitor commitment and visitor interest, quite on the opposite: "Especially now in turbulent times and where the plastics industry is undergoing transformation towards the circular economy K 2022 was the ideal place to jointly and actively chart the course for the future," sums up Ulrich Reifenhäuser. It was especially the wealth of new technology developments that raw materials producers, machine manufacturers and plastics processors presented for implementing the circular economy, resource conservation and climate protection that thrilled the trade visitors. Commenting on this Ulrich Reifenhäuser says: "It can be clearly felt that all companies have embraced the need to take on social responsibility and think about plastics in a sustainable way from the beginning of the process chain. The variety of solutions, machinery and products for transformation towards a circular economy presented at K 2022 was incredible."

The trade visitors at this year's K travelled from 157 nations to the Rhine. Next to Germany, those European countries strongly represented on the visitors' part included the Netherlands, Italy, Turkey, France, Belgium, Poland and Spain. With 42% of visitors coming from overseas, the reach of K is as high as usual among the international trade audience. While visitors from the East Asian region, in particular, were less well represented than at K three years ago due to the currently more difficult conditions in those countries on account of quarantine regulations, numerous visitors from the USA, Brazil and India were welcomed at K 2022.

For around two thirds of all visitors polled machinery and plant construction ranked first in terms of interest. 57% and, hence



5% more than at K 2019, said they were interested in raw and auxiliary materials, with recyclates and bioplastics being particularly popular. For 28% semi-finished products and technical parts made of plastics and rubber were the main reason for coming (multiple responses possible). Over 70% of all visitors come from top and middle management.

Top marks were given by visitors to K 2022 for the completeness of its ranges and its mapping of the entire supply chain. 98% of all professionals stated they had fully achieved the goals associated with their visit.

During the eight trade fair days it became clear that this year's K was right on target with its selection of hot topics, circular economy, climate protection and digitalisation. In terms of investment intentions, machinery and equipment for processing and recycling stood out at 43%. The focus was particularly on sustainability, but also on circular economy and energy/resource efficiency in production. Around 40% of decision-makers said they were looking into the topic of decarbonisation.

The K specials, which also focused on the three hot topics, were also very well received. The official special show, 'Plastics Shape the Future', focused on the economic, social and ecological challenges and potential solutions around the K guiding topics in high-calibre discussions and lectures, and this show was well attended throughout. The Circular Economy Forum, where the VDMA and 13 of

its member companies impressively demonstrated the importance of technology in the implementation of the circular economy in the plastics industry, scored points with the international audience with live demonstrations and a great deal of well-founded knowledge as well as detailed information on the topic.

The next K Düsseldorf will be held from **8 to 15 October 2025**.

➔ [www.k-online.de](http://www.k-online.de)

## NPE2024: 塑料展策划团队

■ 塑料工业协会(Plastics)已将协会活动专家史密斯布林 (Smithbucklin) 以及史密斯布林拥有的公司360 直播媒体加入到策划NPE2024到2027年的塑料展的团队中。

NPE2024 (美国奥兰多塑料工业展览会) 是美洲最大的塑料贸易展, 将汇集整个塑料价值链的公司, 展示最新、最先进的塑料技术和行业创新。史密斯布林将向参展商提供销售和支持服务, 360 直播媒体将为 NPE 和 PLASTICS 团队提供营销和媒体策略。

塑料工业协会首席运营官 Glenn Anderson 表示: "我们希望在奥兰多"



塑料工业展览会领域有最优秀的人才。“我们和很多组织谈过，很明显，史密斯布克林和360直播媒体成功地将协会经验和活动专业知识结合在了一起。”

NPE®是塑料工业协会的旗舰品牌和活动，其历史可以追溯到1946年。

史密斯布克林销售服务高级副总裁 Tom Myers表示：“史密斯布克林非常高兴地欢迎NPE：塑料展成为我们的展品销售客户组合。”360直播媒体总裁杰克·麦克劳德(Jack Macleod)表示：“360直播媒体通过与我们这个领域最雄心勃勃的团队合作而蓬勃发展。我们期待着充分利用我们合并后的销售和营销团队的力量，推动NPE和PLASTICS的业绩。”

2018年，NPE举办了有史以来最大规模的展会，2182家参展公司占据了超过120万平方英尺的净展位面积。时任PLASTICS成员和NPE2018前主席的PLASTICS首席运营官安德森 (Anderson) 总结道：“我最希望看到NPE2024将我们2018年的数据甩到后面，而史密斯布克林和360直播媒体是帮助我们实现这一目标的合适合作伙伴。”

**NPE2024: The Plastics Show – Planning Team**

■ The Plastics Industry Association (PLASTICS) has added association events experts, Smithbucklin, and Smithbucklin-owned company, 360 Live Media, to the team planning NPE2024: The Plastics Show through 2027.



NPE2024, the largest plastics trade show in the Americas, will bring together companies from throughout the plastics value chain, showcasing the newest, state-of-the-art plastics technology and industry innovations. Smithbucklin will provide exhibitor sales and support services and 360 Live Media will deliver marketing and media strategies to the NPE and PLASTICS team.

“We want the best in the business working on NPE,” said Glenn Anderson, COO at PLASTICS. “We talked to a lot of groups, and it was clear that Smithbucklin and 360 Live Media bring the right combination of successful association experience and events expertise to the table.”

NPE® is a flagship brand and event for PLASTICS, with a pedigree stretching back to 1946.

“Smithbucklin is thrilled to welcome NPE: The Plastics Show to our portfolio of exhibit sales clients,” said Tom Myers, Senior Vice President, Sales Services,

Smithbucklin. “360 Live Media thrives on working with the most ambitious teams in our space,” said Jack Macleod, President of 360 Live Media. “We look forward to leveraging the full heft of our combined sales and marketing teams to drive results for NPE and PLASTICS.”

In 2018, NPE staged its largest-ever show with 2,182 exhibiting companies occupying more than 1.2 million net square feet of sold-out exhibit floor space. PLASTICS COO Anderson, a then-PLASTICS member and former Chair of NPE2018, concluded, “I’d like nothing more than to see NPE2024 blow our 2018 numbers out of the water, and Smithbucklin and 360 Live Media are the right partners to help us do it.”

- The Plastics Industry Association (PLASTICS)  
www.plasticsindustry.org
- Smithbucklin  
www.smithbucklin.com
- 360 Live Media  
www.360livemedia.com

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## 全新的品牌形象识别系统

■ 作为公司设计修订的一部分，摩丹 (motan) 进行了全面的品牌重塑。在成立75周年之际，摩丹集团正在给自己一个新的品牌标识。清新透明，该公司在K 2022同样是新设计的展台上展示了新标志、新口号和明确的2个品牌战略。

“对我们的客户和员工来说，重要的是销售。公司结构当然会保留，新的品牌标识不会对公司结构产生任何组织影响，”公司首席营销官卡尔·利瑟兰解释道 摩丹集团。

作为修订后的伞形品牌战略的一部分，公司名称进行了标准化和简化。原则上，本集团旗下所有公司均以“motan”品牌经营。母公司仍然是motan holding gmbh，总部位于康斯坦茨。现在已经建立的清晰结构确保了公司的统一方向和定位，并有助于高度的外部透明度。

因此，“colortronic”今后将不再出现在公司名称中。去年9月，colortronic的最终产品被摩丹品牌同化。在过去15年里进行的这一漫长的一体化进程现在已经结束。在这段时间里，这两家公司在文化和组织上共同成长，形成了一个企业集团。利瑟兰强调，位于弗里德里希斯多夫的销售和服务组织以及技术中心将照常营业。

清晰和简单也适用于未来公司的命名，卡尔·利瑟兰以2021年7月被收购的林堡博尔顿自动化有限公司 ( Bolder automation GmbH ) 为例解释道。公司将更名为“摩丹挤出工程有限公司”，并完全并入摩丹集团。这也涉及到将产品整合到摩丹集团的产品组合中。重要信息：摩丹挤出工程有限公司的办事处仍位于林堡 ( Limburg ) 。

该子公司专门从事塑料工业连续加工过程控制系统的开发和制造，特别是挤出和吹塑。和以前一样，销售将由摩丹销售公司处理。

摩丹还整理了其产品组合。未来的2个品牌战略包括“摩丹”品牌，作为客户特定系统解决方案的优质品牌，以及“swift”品牌，用于快速交付单个产品以及系统业务中的标准解决方案。

双品牌战略的确立伴随着swift产品的重新命名。除此之外，各种上游产品线(计量和混合、干燥、输送以及控制)将保持不变。在应用方面，摩丹继续覆盖塑料制造和加工的注射成型、挤出、吹塑和复合的最重要领域。

无论应用如何，摩丹都非常重视已被证明的摩丹质量以及著名的摩丹文化。后者适用于客户服务和咨询，也适用于内部文化。

摩丹集团全新品牌标识(摩丹集团)

*motan group with new brand identity (motan group)*



### “零损失”-新口号强调可持续发展

长期以来，可持续发展一直被固定在摩丹的企业理念中。除其他事项外，负责任地使用可用资源是产品开发的中心。

但新口号“零损失”用简洁明了的方式表达了更多。除了生态责任，例如通过适当设计的原材料处理系统避免材料或能源损失，“零损失”还包括经济和社会责任的许多其他方面。设备的可用性对高生产效率做出了重大贡献，因此，创新的技术解决方案是除服务外的先决条件。例如，这些包括生产流程链的数字化或智能传感器技术的集成，以避免潜在的损失。在这方面，摩丹正在追求一个可持续的、面向未来的“零损失”公司政策的目标，这反过来又有利于整个公司。

### New Brand Identity

■ As part of the revision of its corporate design, motan has carried out a comprehensive rebranding. For its 75th anniversary, the motan group is giving itself a new brand identity. Fresh and transparent, the company presented itself with a new logo, new slogan and a clear 2-brand strategy on a likewise newly designed exhibition stand at K 2022.

"What is important for our customers as well as the employees is that the sales structure will of course be retained and that the new brand identity will not have any organisational impact on the corporate structure," explains Carl Litherland, CMO of the motan Group.

As part of the revised umbrella brand strategy, among other things the company names were standardised and simplified. In principle, all companies of the group operate under the umbrella brand "motan". The parent company continues to be motan holding gmbh with head-

quarters in Constance. The clear structure that has now been created ensures a uniform orientation and positioning of the companies and contributes to a high degree of external transparency.

Thus, "colortronic" will no longer appear in the company names in future. In September last year, the final colortronic product was assimilated into the motan brand. This long process of integration which has taken place over the last 15 years has now come to an end. Over this time the companies have grown together culturally and organizationally to form a corporate group. Litherland emphasises that the sales and service organisation and tech centre at the Friedrichsdorf location remains open for business as usual. Clarity and simplicity also apply to the naming of future companies, as Litherland explains using the example of Bolder automation GmbH, Limburg, which was acquired in July 2021. The company will be renamed "motan extrusion engineering gmbh" and fully integrated into the motan group. This will also involve the integration of the products into the motan portfolio. Important: The company offices of motan extrusion engineering gmbh remain in Limburg.

The subsidiary specialises in the development and construction of control systems for continuous processes in the plastics industry, especially for extrusion and blow moulding. As before, sales will be handled by the motan sales companies.

motan has also tidied up its product portfolio. The future 2-brand strategy comprises the brands "motan" as a premium brand for customer-specific system solutions and "swift" for quickly deliverable individual products as well as for standard solutions in the systems business.

The establishment of the 2-brand strategy is accompanied by a renaming of the

swift products. Irrespective of this, the various superordinate product lines (dosing and mixing, drying, conveying as well as controls) will remain unchanged. In terms of applications, motan continues to cover the most important areas of plastics manufacturing and processing with injection moulding, extrusion, blow moulding and compounding.

Regardless of the application, motan attaches great importance to the proven motan quality as well as to the well-known motan culture. The latter applies to customer care and consultation as well as to the internal culture.

**"Zero Loss" – new slogan emphasises sustainability**

Sustainability has long been anchored in the motan corporate philosophy. Among other things, the responsible use of available resources is at the centre of product development.

But the new slogan "Zero Loss" expresses much more in a short and concise way. In addition to ecological responsibility, for example by avoiding material or energy losses through appropriately designed raw materials handling systems, "Zero Loss" encompasses numerous other aspects in the sense of economic as well as social re-

sponsibility. Plant availability makes a significant contribution to high productivity, for which, in turn, innovative technical solutions are a prerequisite besides service. These include, for example, the digitalisation of the production process chain or the integration of intelligent sensor technology to avoid potential losses. In this respect, motan is pursuing the goal of a sustainable, future-oriented company policy with "Zero Loss", which in turn benefits the entire company.

➔ **motan Gruppe**  
www.motan-colortronic.com

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min

**2**

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**100**

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## 收购

■ 马格 ( MAAG ) 泵系统公司宣布收购威特泵技术有限公司 ( Witte Pumps & Technology )。威特泵技术有限公司成立于1984年，总部位于德国Tornesch。开发和制造齿轮泵，并为化学、塑料和聚合物加工、食品和饮料以及制药行业提供售后市场零件和服务。威特拥有丰富的经验、专业知识和广泛的先进技术知识，能够为全球第一流的客户提供世界级的定制解决方案。

随着收购威特，MAAG将建立一个新的综合齿轮泵业务部门，该部门将由威特泵技术有限公司的董事总经理和前业主Sven Wieczorek博士领导。创建齿轮泵业务部门将使马格通过利用扩大和整合的足迹，提供增强的产品组合，并为更广泛的客户需求提供完整的解决方案，更有效地为客户服务。马格在瑞士、德国、意大利、美国和中国设有生产基地，并在法国、台湾、马来西亚、印度、泰国和巴西设有服务中心和销售办事处。威特泵技术有限公司在德国生产，并在美国和中国设有销售办事处和服务中心。

### Acquisition

■ MAAG Pump Systems announced that it has acquired Witte Pumps & Technology. Founded in 1984 and based in Tornesch, Germany, Witte Pumps & Technology GmbH develops and manufactures gear pumps and provides after-market parts and services for the chemical, plastic and polymer processing, food and beverage, and pharmaceutical industries. Witte's deep experience, know-how and broad-ranging advanced technical knowledge allow it to deliver world-class customized solutions to its blue-chip customers across the globe.

With the acquisition of Witte, MAAG will establish a new integrated Gear Pumps business unit, which will be led by the Managing Director and former owner of Witte Pumps & Technology GmbH, Dr. Sven Wieczorek. Creating the Gear Pumps business unit will enable MAAG to serve its customers even more effectively by leveraging an expanded and integrated footprint, delivering an enhanced product portfolio and offering complete solutions to a wider range of customer needs. MAAG has production sites in

马格集团总裁Ueli Thuerig说道：“收购威特是MAAG成为客户最关键和最苛刻的齿轮泵需求的首选合作伙伴的重要一步。威特客户齿轮泵的可用性和供应安全性得到提高，马格先进的垂直集成制造能力也得到了提升。将威特和马格的齿轮泵业务合并为一个新的综合业务部门，将扩大我们的技术解决方案和产品对客户的吸引力，我们的全球足迹将使我们能够更好地服务于全球客户群。”

*Ueli Thuerig, President MAAG Group:*

*"The acquisition of Witte represents a major step in making MAAG the go-to partner for our customers' most critical and demanding gear pump needs. MAAG's advanced and vertically integrated manufacturing capabilities will increase the availability and supply security of gear pumps to Witte's customers. Combining Witte and MAAG's gear pump businesses into a new integrated business unit will amplify the attractiveness of our technological solutions and product offerings to our customers, and our worldwide footprint will allow us to better serve our global customer base."*

Switzerland, Germany, Italy, the USA and China, as well as service centers and sales offices in France, Taiwan, Malaysia, India, Thailand and Brazil. Witte Pumps & Technology GmbH manufactures in Germany



and has sales offices and service centers in the USA and China.

► MAAG Group  
www.MAAG.com

## 完成收购

■ 对Herbold Meckesheim工程公司的收购已经正式完成。Herbold Meckesheim将与柯贝隆 ( coperion ) 的回收产品生产整合成为新的回收业务部门，计划为塑料回收加工提供完整的解决方案。

柯贝隆将发挥其作为国际工业和技术领导者的优势，与Herbold Meckesheim(塑料和塑料废弃物回收机械专家)结合起来，构建一个统一的商业模式。Herbold Meckesheim将继续在现有地点运营，并保留其名称。两家公司将结合其在回收领域的的能力，整合构建模块化系统和设备解决方案，利用分布在全球大部分地区的联合销售和服务网络，覆盖循环经济的广阔领域。

回收业务部门计划利用柯贝隆和Herbold Meckesheim的互补技术提供完整的创新解决方案。从机械加工到塑

料的粉碎、洗涤、分离、干燥和造粒，直到散装物料的处理、喂料和挤出，以及混合和造粒，该业务单元涵盖了完整的加工链。

回收业务部门结合了全球服务网络，支持安装和开机，也可提供现场合格和快速的服务。此外，最先进的测试中心可向客户提供产品开发以及试验。在相关方进行重大投资之前，他们可以在测试实验室中对每个流程步骤进行深入测试。

回收事业部计划为PET、聚烯烃、薄膜或硬塑料的回收提供完整的设备和系统。从机械处理到基于溶剂回收和化学回收，再到高度自动化的模块化回收生产线，提供完整的解决方案，提供完整的系统有助于我们为客户提供额外的价值。在设备的整个运行寿命期间，均可以提供工程管理和服务。

**Acquisition Completed**

■ The acquisition of the engineering company Herbold Meckesheim, has formally been completed. Herbold Meckesheim will be integrated with Coperion's recycling product lines into its new Recycling Business Unit that plans to offer complete solutions for plastics recycling processing.

Coperion will combine its strengths as an international industrial and technological leader with Herbold Meckesheim, a specialist in mechanical recycling of plastics and plastic waste, and together they will form a united business approach. Herbold Meckesheim will continue to operate at its existing location and retain its name. Both companies will combine their capabilities in the field of recycling and integrate to build modular systems and plant solutions that cover a broad sector of the circular economy, as well as large sections of the globe with their combined sales and service network.

The Recycling Business Unit plans to offer complete, innovative solutions leveraging both Coperion and Herbold Meckesheim's complementary technologies. From mechanical processing – shredding, washing, separating, drying, and agglomerating of plastics – to bulk material handling, feeding and extrusion, as well as compounding and pelletizing, this Business Unit encompasses the complete process chain.



Herbold Meckesheim GmbH首席执行官Werner Herbold(左)和柯贝隆聚合物部门总裁Markus Parzer (图片来源: 柯贝隆有限公司, 斯图加特)

*Werner Herbold, CEO, Herbold Meckesheim GmbH (left) and Markus Parzer, Polymer Division President, Coperion (Bild: Coperion GmbH, Stuttgart)*

With their combined global service network that supports installations and start-ups, competent and rapid service is also available on site. Additionally, state-of-the-art test centers for product development as well as customer trials are available to customers. Before interested parties make significant investments, they can undertake in-depth testing of every process step in the test labs.

The Recycling Business Unit plans to offer complete plants and systems for recycling PET, polyolefins, film, or rigid plastic. From mechanical processing to solvent-based

and chemical recycling to complete solutions for highly automated to modular recycling lines, offering complete systems helps us deliver additional value to our customers. Engineering and service during the equipment's entire operating life is also available.

- ➡ **Coperion GmbH**  
www.coperion.com
- ➡ **Herbold Meckesheim GmbH**  
www.herbold.com



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## 签署PET回收战略伙伴关系协议

■ 英科 (INTCO) 是一家活跃在全球的中国回收公司, 已成为最大的废旧发泡聚苯乙烯(EPS)回收商和最终用户之一。每年, 英科在全球范围内回收大约10万吨EPS废弃物, 并将其加工成新的高质量消费品, 例如相框, 然后在知名家具商店出售。在回收PET垃圾时, 英科医疗科技有限公司和山东英科回收资源有限公司的创始人兼董事长刘方毅也运用了这种循环经济的理念。在这一领域活跃了五年之后, 英科计划在未来几年内对PET回收解决方案的扩展进行重大投资。

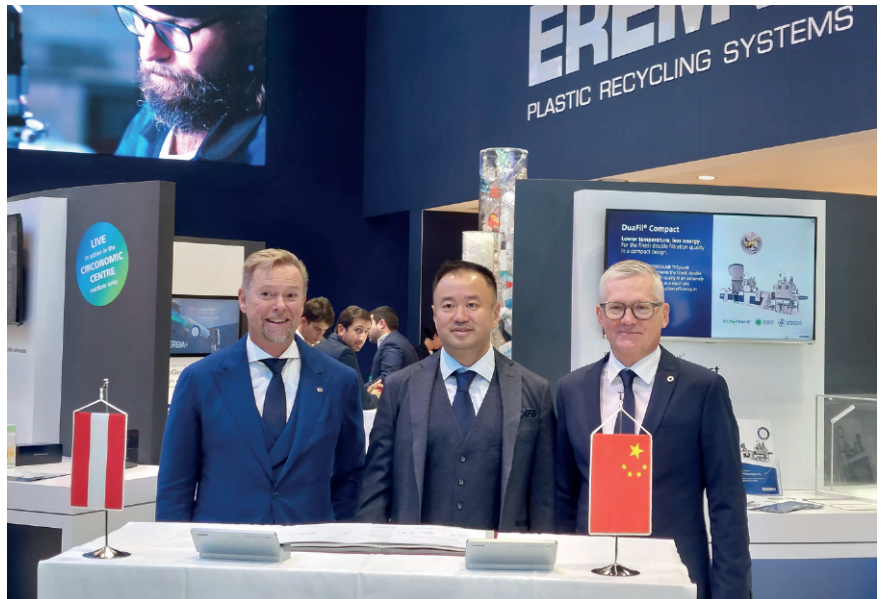
### 回收能力将增加到每年100万吨

刘方毅解释道: “我们也希望成为这一领域的领先供应商, 并在未来几年将我们的PET回收能力从目前的每年约15万吨提高到100万吨, 要做到这一点, 我们需要一个经验丰富、可靠的技术合作伙伴, 埃瑞玛 (EREMA) 就是我们身边的合作伙伴。”

十多年来, 英科一直信赖这家奥地利回收机械制造商提供的技术和服 务。就在几个月前, VACUNITE®瓶对瓶回收系统在马来西亚开始生产。埃瑞玛集团首席执行官Manfred Hackl说: “我们很高兴英科决定进一步加强与我们的合作, 专注于PET回收。”。谈到合作的好处, 他评论说: “英科是一个从一开始就考虑到最终产品的回收解决方案的合作伙伴。促进塑料循环经济是我们的共同目标, 这要求再生颗粒的质量尽可能高。这正是我们团队的优势所在, 我们的专利技术也在发挥作用, 我们正在与客户和合作伙伴一起不断开发这些技术。”

### Strategic Partnership for Recycling PET Signed

■ INTCO is a Chinese recycling company active worldwide that has become one of the largest recyclers and end users of waste expanded polystyrene (EPS). Every year, INTCO recycles around 100,000 tonnes of EPS waste that it acquires around the globe and processes it into new high-quality consumer goods, such as picture frames, that are then sold in well-known furniture stores. Frank Liu, founder and chairman of INTCO Medical Technology Co., Ltd. and Shandong INTCO Recycling Resources Co., Ltd. also applies this cir-



Michael Heitzinger (埃瑞玛有限公司)、Manfred Hackl (埃瑞玛集团) 和刘方毅 (英科) 在 K 2022 签署战略合作伙伴关系协议 (图片来源: EREMA)

*Michael Heitzinger (EREMA GmbH), Manfred Hackl (EREMA Group) and Frank Liu (INTCO) signed the strategic partnership at K 2022 (Photo credit: EREMA)*

cular economy concept when recycling PET waste. Having been active in this segment for five years, INTCO is planning major investment in the expansion of PET recycling solutions over the next few years.

### Recycling capacity is to increase to up to one million tons per year

"We also want to become the leading supplier in this segment and increase our PET recycling capacity from the current level of around 150,000 tonnes a year to one million tonnes in the coming years," explains Frank Liu: "To do this, we need an experienced and reliable technology partner, which we have with EREMA at our side."

INTCO has trusted in the technologies and service provided by the Austrian recycling machine manufacturer for more than ten years. Just a few months ago, a VACUNITE® bottle-to-bottle recycling system started production in Malaysia. "We are pleased that INTCO have decided to further intensify their work together with us, focusing on PET recycling," says Manfred Hackl, CEO EREMA Group GmbH. Regarding the benefits of this partnership, he comments, "INTCO is a partner who also have the end product in mind from the very beginning with their recycling solutions. Promoting a circular economy for plastics is our shared objective,

which requires the highest possible quality of recycled pellets. That's exactly where the strength of our team comes in, as well as our patented technologies, which we are constantly developing together with our customers and partners."

➔ EREMA Engineering Recycling Maschinen und Anlagen GmbH  
www.erima.com

## 推出用于 NDT (无损检测) 的 X 射线操作软件系统

■ 继推出 ECO 产品和一系列新的定制高端解决方案后, VCxray (市场领导者 VisiConsult 的一个品牌) 在斯图加特的 Control 贸易展上推出了名为 x.OS 的 X 射线操作软件系统。

VisiConsult 最开始是基于开发用于工业 X 射线检测的创新软件方案。这一成功推动了机械和自动化领域的强劲增长, 并在解决各种客户需求和行业挑战方面积累了数十年的经验。VisiConsult 的 NDT 部门 "VCxray" 现在展示了一个创新的软件生态系统, 它既全面又可配

置。这种模块化方法可以用作单独的离线应用程序，也可以配置为互连的在线解决方案——以及介于两者之间几乎所有的情形。

系统操作员使用控制软件“VC.control”来运行或进行自动化操作。“VC.acquire”是一款用于 2D X 射线图像或 3D CT 扫描的多功能采集软件，包括许多测量和图像处理功能。办公室的其他同事可以通过“VC.reco”直接评估和解释 CT 扫描的数据，或使用“VC.review”以分析和评估 2D 图像。

所有这些工作内容都可以设置在不同的地方完成，因为所有模块都在本地或通过云相互连接。检测的过程也可以在世界各地的不同系统之间共享。使用“VC.server”，远程评估团队可以访问“VC.storage”中的所有数据。这也是归档数据以进行长期存储的地方。

质量经理或操作员可以使用车间的“VC.dashboard”了解不同检测项目的状态、每个零件的状态和任何其他 KPI。拥有全自动 X 射线检测系统的客户将受益于“VC.planner”模块，主管可以轻松地为他们的系统开发或编辑检测程序和相关技术。他们可以离线执行此任务，然后将新的检测程序发送到“VC.control”模块，而不需要机器停机进行该操作。特别提出的是，这些步骤不需要任何特殊的编程知识。

现在，所有这一切都可以通过 VCxray 的新软件系统实现——一种可以针对任何情况进行配置的模块化方法。对于检测员来说，x.OS 通过所有部件的无缝集成提供最大的舒适度和效率。

**X-ray Operating System for Non-Destructive Testing**

■ After the launch of the ECO line and a new collection of high-end customized solutions, VCxray (a division of the market leader VisiConsult) introduced a comprehensive X-ray Operating System named x.OS during the Control exhibition last year in Stuttgart, Germany.

The origins of VisiConsult were based on the development of innovative software solutions for industrial X-ray inspection. This success led to strong growth in the field of machinery and automation, and has since resulted in decades of experience in solving various customer needs and industry challenges. VisiConsult's NDT division “VCxray” now presents an innovative software ecosystem that is both comprehensive and configurable at the same time. This modular approach can be used as separate offline applica-

tions or can be configured as an inter-connected online solution – and virtually everything in between.

System operators work with the control software “VC.control” to run or automate the X-ray system. “VC.acquire” is a versatile acquisition software for 2D X-ray images or 3D CT projections that includes many measurement and image processing features. Other colleagues in the office can evaluate and interpret the data directly via “VC.reco” for CT scans or “VC.review” for analysing and interpreting 2D images.


All of these tasks can be accomplished without the necessity of being in the same place because all of the modules are connected to each other locally or via the cloud. The inspection process can also be shared between different facilities worldwide. Using the “VC.server”, the remote evaluation team can access all data within the “VC.storage”. This is also the place where data is archived for long-term storage.

Quality Managers or operators can use

the “VC.dashboard” on the shopfloor to get an overview about the status of the different inspection projects, the status of each part and any other KPIs. Customers with a fully automated X-ray inspection system will benefit from the “VC.planner” module where supervisors can easily develop or edit programs and techniques for their systems. They can perform this task offline, and then send the new inspection programs to the “VC.control” module without causing any machine downtime. It is important to note that these steps do not require any special programming knowledge.

All of this is now possible with the new software family from VCxray – a modular approach that can be configured for any situation. For inspectors, the x.OS offers maximum comfort and efficiency through seamless integration of all parts.


➔ VCxray  
**VisiConsult X-ray Systems & Solutions GmbH**  
<https://visiconsult.de>



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## 任命集团管理委员会新成员

■ 在服务于30多年后，迈克尔·海德曼 (Michael Heidemann) 将于2023年6月底离开齐柏林 (Zeppelin) 集团。

弗雷德·科德斯 (Fred Cordes) 将于2023年1月1日起担任齐柏林集团管理委员会成员。自1995年以来，他在齐柏林担任了多个管理职位，并于2017年接任迈克尔·海德曼，担任齐柏林建筑机械有限公司管理委员会主席兼建筑设备中欧战略业务部门主管。在集团管理委员会担任的职务之外，弗雷德·科德斯还将继续兼任这一职务。

齐柏林监事会主席Andreas Brand表示：“我们非常高兴能够聘请弗雷德·科德斯加入集团管理委员会，他是一位经验丰富、能力极强的经理和同事。27年来，他一直是齐柏林公司的重要销售策略师和营销专家。凭借其丰富的行业经验，他能够满足成功实现既定目标的所有要求。”。在科德斯先生的领导下，近年来开创性地创建了销售渠道和数字产品，如建筑设备配置工具和Baggerbörse挖掘机交易所。集团首席执行官彼得·格斯特曼 (Peter Gerstmann) 补充道：“弗雷德·科德斯继续为建筑设备业务开拓新的途径，我们很荣幸他能够成功地在齐柏林集团管理委员会中担任这一重要的关键角色，并进行了合适的内部继任安排。我期待着未来合作的回报。”

### New Member of the Group Management Board Appointed

■ After more than 30 years of service, Michael Heidemann will be leaving the Zeppelin Group at the end of June 2023. Fred Cordes will take over his new position as member of the Zeppelin Group Management Board effective January 1, 2023. He has held various management positions at Zeppelin since 1995 and in 2017, as successor to Michael Heidemann, took over as Chairman of the Management Board of Zeppelin Baumaschinen GmbH and Head of the Construction Equipment Central Europe strategic business unit. In addition to his responsibilities on the Group Management Board, Fred Cordes will also continue to perform these tasks jointly. “We are very pleased that we have been able to recruit Fred Cordes, an extremely experienced and highly competent ma-



Michael Heidemann和Fred Cordes (© Zeppelin GmbH)

Michael Heidemann and Fred Cordes (© Zeppelin GmbH)

nager and colleague, to the Group Management Board. He has been an important sales strategist and marketing specialist at Zeppelin for 27 years. With his in-depth industry experience, he meets all the requirements for successfully implementing the set goals,” stated Andreas Brand, Chairman of the Supervisory Board of Zeppelin GmbH. Ground-breaking sales channels and digital offerings have been created in recent years under the leadership of Mr. Cordes, such as the construction equipment con-

figurator and the Baggerbörse excavator exchange. “Fred Cordes continues to demonstrate new pathways for the construction equipment business and we are proud to be successfully filling this important key role on the Zeppelin Group Management Board with good, internal succession planning. I look forward to rewarding collaboration in the future,” adds Group CEO Peter Gerstmann.

► Zeppelin GmbH  
zeppelin.com

## 合作

■ 美利肯公司 (Milliken & Company) 正在与芬兰软包装巨头普乐集团合作，开发一种更可持续的单一材料层压片材，用于化妆品、牙膏和其他个人防护用途。

这项旨在创造更健康未来的共同努力的成果已在K 2022贸易博览会上展出。美利肯展示了高密度聚乙烯(HDPE)软管，该管采用普乐层压片材制成，并经过美利肯 UltraGuard™ Solutions技术优化。

随着市场对回收和循环利用的强烈

关注，找到能够去除典型金属化(通常是铝)层同时保持必要的屏蔽性能的技术，特别是要满足个人护理品应用所要求的阻隔水蒸气和氧气的传输，比以往任何时候都更加重要，

通过将HDPE薄片材的阻隔性能提高50%，UltraGuard解决方案为可持续发展做出了贡献，实现了站立式柔性袋和软管等流行产品的单一材料结构，并使其最终更具可回收性。这些结构改善了阻隔性能，还允许减小聚乙烯(PE)片材的厚度，从而获得重量更轻的最终产



品，并减少了实现所需结果所用到的树脂原料量。

普乐在这个项目上的工作完全符合其可持续柔性包装的blueloop™计划。普乐 blueloop（蓝色循环）是一个产品组合，旨在通过引入一系列采用聚丙烯（PP）、PE和纸张的单一材料结构的可回收解决方案，使软包装材料成为闭环环境。蓝色循环项目包含可回收和可持续的层压片材解决方案，并有专门的标准，以确保所产生的单一材料HDPE层压片材是完全可回收的，并获得recyclclass的批准。

普乐全球管层片材业务可持续发展和业务发展高级经理Detlev Schulz博士表示：“这项联合开发工作产出的管是不透明的，具有银色光泽，是美容产品应用的理想选择。”“白色也可以，为那些不需要选择闪亮银色的人提供出色的防潮性能和改善氧气渗透。”最可能的最终用途将是40至200毫升的软管。

### Cooperation

■ Milliken & Company is partnering with Finnish flexible packaging giant Huhtamaki Group to develop a more sustainable, mono-material laminate for use in tubes targeting cosmetics, toothpaste and other personal-care applications.

(图片 / Photo ©2022 Milliken & Company)



The results of this joint effort, designed to create a healthier future, have been on display at the K 2022 trade fair. Milliken displayed high-density polyethylene (HDPE) tubes produced using Huhtamaki laminates optimized with Milliken UltraGuard™ Solutions technology. With the market's keen focus on recycling and circularity, it is more vital than ever to find technologies that can eliminate the typical metalized (usually aluminum) layers while maintaining the necessary barrier properties, especially against water

vapor and oxygen transmission needed in personal-care applications.

By improving the barrier properties of HDPE film by up to 50 percent, UltraGuard Solutions contribute to sustainability by enabling more mono-material construction of popular products such as stand-up flexible pouches and tubes and making them ultimately more recyclable. These improved barrier properties also allow for downgauging of the polyethylene (PE) film, resulting in a lighter-weight end product and a reduction in the amount of resin needed to achieve the desired result.

Huhtamaki's work on this project fits in perfectly with its blueloop™ initiative for sustainable, flexible packaging. Huhtamaki blueloop is a product portfolio aiming to make flexible packaging circular by introducing a range of recyclable solutions with mono-material structures using polypropylene (PP), PE and paper. The blueloop program contains recyclable and sustainable laminate solutions, with dedicated criteria, to ensure the resulting mono-HDPE-laminate is fully recyclable and approved by RecyClass.

"The tube resulting from this joint development work is opaque with a silver shine, making it ideal for beauty product

applications," said Dr. Detlev Schulz, Senior Manager – Sustainability and Business Development for Huhtamaki's Global Tube Laminates business. "White would work as well, offering outstanding moisture barrier and improved oxygen transmission for all who don't need a shiny silver option." The most likely end uses will be in 40 to 200 ml tubes.

➔ Milliken & Company  
milliken.com

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## 拥有专利的高压技术获得许可证

■ ECI集团已经与一家机密的中国客户签署了工艺技术和工程设计的许可和工程协议，使用ECI集团专有的合成技术提供两条EVA产品生产线。该技术能够生产40万吨EVA，每条生产线生产20万吨。该工厂将是客户位于中国广西省的综合项目的一部分。ECI集团将为这两条生产线提供技术、设计和培训，以及调试、启动和生产方面的支持。

雷普索尔 (Repsol) 作为ECI集团的合作伙伴，将提供广泛的技术、运营和商业专业知识。雷普索尔在西班牙和葡萄牙的工业园区拥有几家LDPE、EVA和EBA工厂，在高压设施中生产屡获殊荣的聚合物产品有40多年的经验。ECI集团的合成技术产品在行业中是独一无二的，因为它允许以20万吨或更高的产量生产EVA和其它高价值共聚物，这在以前只有管式反应器才能实现。合成技术提供了比管式生产线更高的产量，扩大了高压釜生产线的生产能力。此外，ECI的各种专有设计功能和增强功能有助于提高加工的整体效率，从而提高产量，降低运营成本。

虽然客户以项目机密为由拒绝置评，但他们指出，他们已经审查了一些技术选项，并基于一些重要原因决定选择ECI集团的合成技术，包括无与伦比的产品范围、较低的运营成本、面向未来产品的开发能力而设计以及雷普索尔作为高质量产品长期生产商的声誉。

ECI集团总裁兼首席执行官Joaquin Flores在谈到合同的签署时表示：“这项最新的合同改变了行业的游戏规则。客户现在可以在世界范围内获得种类灵活的高价值产品。我们专有的合成技术为客户提供了最佳的产品组合，具有可靠性的同时具有低运营成本，并提供了优越的产品范围。我们很自豪，该客户在对竞争对手的现有产品进行了详细的技术分析后，选择了ECI的技术，我们期待着在合作伙伴雷普索尔的市场知识和产品专业知识的支持下，成功设计和交付这两条史无前例的生产线。”

### *Licence Secured with Proprietary High-Pressure Technology*

■ ECI Group has signed license and engineering agreements for process technology and engineering design with a confidential Chinese client for two lines of EVA production using ECI Group's proprietary Hybrid Technology offering. This technology is capable of producing



ECI集团已经签署了生产技术和工程设计的许可和工程协议，使用ECI集团专有的合成技术提供两条20万吨EVA生产线

*ECI Group has signed license and engineering agreements for process technology and engineering design or two 200kta EVA lines using ECI Group's proprietary Hybrid Technology offering*

400kta EVA total, each line producing 200kta. The plant will be part of the client's integrated project to be located in Guangxi Province, China. ECI Group will provide the technology, design, and training for the two lines, as well as support through commissioning, start-up, and production.

Repsol, the multi-energy company, as ECI Group's partner, will provide its extensive technical, operational, and commercial expertise. Repsol has several LDPE, EVA, and EBA plants in its industrial complexes in Spain and Portugal and has over 40 years of experience producing award-winning polymer products in its high-pressure facilities.

ECI Group's Hybrid Technology offering is unique in the industry as it allows for production of EVA and other high-value copolymers at capacities of 200 kta and higher, which was previously only possible with tubular reactors. The Hybrid

technology offers the higher capacities of tubular lines with the expanded product capability of autoclave lines. In addition, ECI's various proprietary design features and enhancements contribute to the overall effectiveness of the process and result in higher production with lower operating costs.

While the client declined to provide a comment citing project confidentiality, they noted that they had reviewed a number of technology options and made the decision to select ECI Group's hybrid technology for a number of important reasons including the unmatched product range, lower operating costs, the design built for future product development capabilities and the reputation of Repsol as a long-standing producer of high-quality products.

Commenting on the signing of the contract, Joaquin Flores, President and CEO of ECI Group, said: "This latest award is a

game-changer for the industry. Clients now have access to a flexible slate of high-value products at world scale capacities. Our proprietary Hybrid Technology provides our client with the best combination of production, reliability while lowering operating costs and providing a

superior product range. We are proud that this client chose ECI's technology after carrying out a detailed analysis of the technology against competitors' existing offerings, and we look forward to successfully delivering two lines of this first-of-a-kind design with the support of

our partner Repsol's market knowledge and product expertise."

► ECI Group  
www.ecigrouponline.com

## 将塑料印刷的创新脱墨工艺完全整合到产品系列中

■ KEYCYCLE是埃瑞玛 ( EREMA ) 集团的子公司，与西班牙卡德尔脱墨 ( Cadel Deinking ) 公司密切合作了两年，进一步开发了从塑料表面去除印刷油墨的创新工艺。事实证明取得了成功，因为现在有几条脱墨线在客户的现场运行，在那里通过事实证明了这种工艺在处理内部印刷和后工业薄膜废物方面的效率。在收购卡德尔脱墨品牌后，KEYCYCLE将继续以KEYCYCLE脱墨品牌开发技术并推广脱墨工艺。

KEYCYCLE董事总经理 Michal Prochazka说道：“从2021年1月以来，我们一直独家负责这项专利技术的全球分销，包括与卡德尔在圣维森特德拉拉斯佩格 ( Sant Vicente del Raspeig ) 阿利坎特 ( Alicante)的试点工厂的运营。通过获得商标权，我们现在迈出了将这一工艺技术整合到我们的产品系列中的最后一步”。这项技术是将最初印刷的塑料制成的回收颗粒安全回用到生产过程中的一个里程碑。Prochazka解释说：“该产品不仅提供了顶级的质量，现在也满足了工业标准。”他指的是新的更大的脱墨线，每小时的吞吐量为1200公斤，这是K 2022展会上首次推出的一项创新。有了这种规模的工厂，KEYCYCLE脱墨工艺也为消费后回收环节打开了大门，其中印刷油墨的去除使回收颗粒的质量再次显著提升。

在脱色过程中，油墨从粉碎的薄膜或磨碎原料的表面溶解。只使用水基化学成分，这使得脱墨过程特别环保。然

后将材料送入回收料挤出机。在市场启动以来订购的8套设备中，有5套已经在客户现场投入运行，并取得了令人印象深刻的成果。

卡德尔公司继续作为卡德尔回收实验室运营，致力于提升核心竞争力，开发塑料回收的创新技术实验室以及净化评估的软件技术。

### *Fully Integration of Innovative Deinking Process for Printed Plastics into the Product Portfolio*

■ KEYCYCLE, a subsidiary of the EREMA Group, has worked together intensively for two years with the Spanish company Cadel Deinking to further develop the innovative process of removing printing inks from the surface of plastic. This has proved successful, because there are now several deinking lines in operation at customers' sites, where they are proving their efficiency in processing printed inhouse and post industrial film waste. Having acquired the Cadel Deinking brand, KEYCYCLE will now continue to develop the technology and market the deinking process under the KEYCYCLE Deinking brand.

"We have already been exclusively responsible for the worldwide distribution of this patented technology since January

2021, including the operation of the pilot plant together with Cadel in Sant Vicente del Raspeig (Alicante). By acquiring the trademark rights, we are now taking the final step of integrating this process technology into our product portfolio," says Michal Prochazka, Managing Director of KEYCYCLE. This technology is a milestone in safely feeding back into the production process recycled pellets made from plastics that were originally printed. "The product not only delivers top quality, it now also meets industrial standards," explains Prochazka, referring to the new larger deinking line with a throughput of 1,200 kilograms per hour, an innovation that was presented for the first time at K 2022. With plants on this scale, the KEYCYCLE deinking process also opens the door to the post consumer recycling segment, where the removal of printing inks enables another significant quality upgrade for the recycled pellets. During the decolourisation process, the ink is dissolved from the surface of the shredded film or regrind material. Only water-based chemical components are used, which makes the deinking process particularly environmentally friendly. The material is then fed into the recycling extruder. Of the eight plants ordered since the market launch, five are now in operation at customers' sites, where they are delivering very impressive results.

The Cadel company continues to operate as Cadel Recycling Lab, dedicated to its core competence of developing new innovative technologies for plastics recycling plus laboratory and software techniques for decontamination assessment.

► KEYCYCLE GmbH  
www.ereama.at



大量印刷的薄膜(左)在脱墨过程(右)后是无色的，因此可以在回收挤出机中进行处理，以制成高质量的回收颗粒(下) (图片来源:EREAMA)

*Heavily printed film (left) is colourless following the deinking process (right) and as a result can be processed in the recycling extruder to make high-quality recycled pellets (bottom) (Photo credit: EREMA)*

## 拉伸膜生产线：K 2022上推出拥有专利的全新三转塔收卷机

■ SML在K2022推出了全球首发的专利产品：用于拉伸膜生产线PowerCast XL的三转塔收卷机W4000-4S-3T。这是市场上第一款用于在4.5米宽生产线上制造2英寸拉伸膜手工膜卷的收卷机。SML的新型“一机架三转塔”理念可以显著提高生产速度，特别是在使用较轻的2英寸收卷轴时可实现最高产量。

PowerCast XL与新的转塔式收卷机W4000-4S-3T还没有遇到对手。SML产品经理Thomas Rauscher说：“可以在4.5米宽的设备上生产2英寸的膜卷，大大增加了我们PowerCast拉伸膜生产线的产品多样性和生产效率。”到目前为止，只能在3米宽的生产线上生产2英寸手工膜卷，因此新开发的产品将手工膜卷的产量提高了约50%。与以前一样，采用这个新的解决方案，生产线也可以轻松生产3英寸手工膜卷、机器用膜卷和巨幅膜卷。

Thomas Rauscher解释说：“为我们4.5米宽的PowerCast XL生产线开发新的2英寸手工膜卷绕生产线系统的动力来自于我们的客户。作为我们开发工作的起点，我们采用了经过验证的双转塔收卷机W4000-4S”。新型收卷机W4000-4S-3T的技术基础是获得专利的“一机架三转塔”理念。与其他较宽生产线的收卷机相比，三个1.5米的收卷轴相对较短。这保证了非常稳定的生产工艺，并允许显著提高生产速度，特别是在生产手工膜卷时。

### 耐热C-PETlight促进了循环经济

SML与合作伙伴Sukano AG和Kiefel Packaging B.V.共同研发的结果是C-PET light，产品兼具透明度和可回收性，以及热成型热填充或微波产品的适用性。更多的优点包括热成型周期短和高刚度。因此，新开发的C-PETlight可以成为制造商寻找经济且易于回收的PP和PS替代品的合理选择。



SML的产品经理Max-Phillip Lutz在K 2022展台上

*Max-Phillip Lutz, Product Manager at SML, at the K 2022 exhibition stand*

### 透明度适应了可回收性

SML产品经理Max-Phillip Lutz说：“由于易于回收变得越来越重要，我们在联合研发工作的早期阶段就选择了透明的C-PET light解决方案。”与其他彩色PET或PP和PS产品相比，C-PET light的回收过程要容易得多。C-PET light可与其他后消费或后工业PET材料在现有设施中顺利再加工。

### 可替代PS和PP

一般来说，C-pet的耐温可达220°C。然而，这对于许多应用来说并不是必需的，并限制了热成型时的产量。相比之下，C-pet light可以承受100°C的最高温度。新型C-pet light能够制造高达100°C的热填充透明热成型产品，其产量与传统A-PET工艺相当。特别是与传统的C-PET相比，较短的热成型周期是一种经济上的优势。

### 工艺调整技术

所有三个项目的合作伙伴都分享了各自领域的专业知识和丰富经验，以改进所有工艺过程中的每一个步骤。主要的技术挑战是找到添加剂的最佳用量，在薄膜生产过程中调整配方和工艺技术，并为热成型工艺找到正确的参数。

### Stretch Film Line with a Patented, Brand-new Triple Turret Winder Presented on K 2022

■ SML comes with a world debut in stretch film manufacturing to K2022: A patented triple turret winder for the PowerCast XL stretch film line. The W4000-4S-3T is the first winder in the market for manufacturing 2" stretch film hand rolls on a 4.5 m wide line. SML's new "three-turrets-in-one-frame" concept enables significantly higher production speeds for maximum output quantities – especially at the lighter 2" rolls.

"The PowerCast XL with the new turret winder W4000-4S-3T has yet to meet its match. The possibility to manufacture also 2" rolls on that 4.5 m wide increases the product diversity and productivity of our PowerCast stretch film line significantly," says SML Product Manager Thomas Rauscher. Until now, it was only possible to run 2" hand rolls on lines up to 3 m width, thus the new development boosts the output of hand rolls by about 50%. As before, 3" hand rolls, machine

rolls and jumbo rolls can also be manufactured, with ease, with this new solution. "The trigger to develop a new winding system for 2" hand rolls for our 4.5 m wide PowerCast XL line came right from our customers. As a starting-point for our development works we took the proven double turret winder W4000-4S", Thomas Rauscher explains. The technical basis of the new winder W4000-4S-3T is the patented 'three turrets-in-one-frame concept'. Compared to other winders for wider lines, the three winding shafts with 1.5 m each are relatively short. This guarantees very stable production processes and allows significantly higher production speeds, especially at hand rolls.

**Heat-resistant C-PET Light Cup Promotes Circular Economy**

SML has joined forces with its partners Sukano AG and Kiefel Packaging B.V. The result of their common R&D is a C-PET light cup that combines transparency and recyclability as well as suitability for thermoformed hot-filling or microwavable products. Further advantages include short cycle times during thermoforming and a high stiffness. The newly developed C-PET light can thus be a reasonable option for manufacturers looking for an economic and easy-to-recycle alternative to PP and PS.

**Transparency for recyclability**

"Because easy recyclability is becoming increasingly important, we opted for a transparent C-PET solution at an early stage of our joint research and development work" says Max-Phillip Lutz, Product Manager at SML. Compared with other coloured PET or PP and PS products, the recycling process of C-PET light is considerably easier. C-PET light film can be smoothly reprocessed in existing facilities together with other post-consumer or post-industrial PET materials.

**Alternative to PS and PP**

In general, C-PET is temperature resistant up to 220°C. However, this is not necessary for many applications and limits the output in thermoforming. In contrast, C-PET light was developed to withstand a maximum temperature of 100°C. The new C-PET light enables the manufacturing of transparent thermoforming products for hot-fill applications up to 100°C at output volumes comparable to those of conventional A-PET processes. Especially

the shorter cycle times during thermoforming are an economic advantage compared with conventional C-PET.

**Adjusting process technology**

All three project partners shared their specific expertise and their profound experience in their respective areas in order to improve every single step in all processes. The main technical challenges were to

find the optimum dosage for the additives, to adjust the formulations and the process technology during film production, and to find the right parameters for the thermoforming process.

➔ SML  
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## 未来的水泥袋

■ 塑料织物箱式阀口袋不仅适用于干燥散货的防破损和防潮包装，而且正成为此领域更加长久的包装替代品。

“我们希望通过我们的包装技术进一步推动工业领域对可持续发展的日益关注，并为包装制造商提供创新和实用的解决方案”Starlinger 销售经理 Hermann Adrigan 解释道。“今年，在Starlinger的展台上，我们使用了新的制袋机ad\*starKON Sxneo来生产AD\*STAR®品牌的箱式阀袋，其中回收材料的比例为22%。我们想借此表明即使经过繁琐生产工艺的塑料带状织物也可使用回收材料，而质量丝毫不会降低。Starlinger 客户甚至用回收聚丙烯在我们的设备上生产高性能包装，如集装袋。”

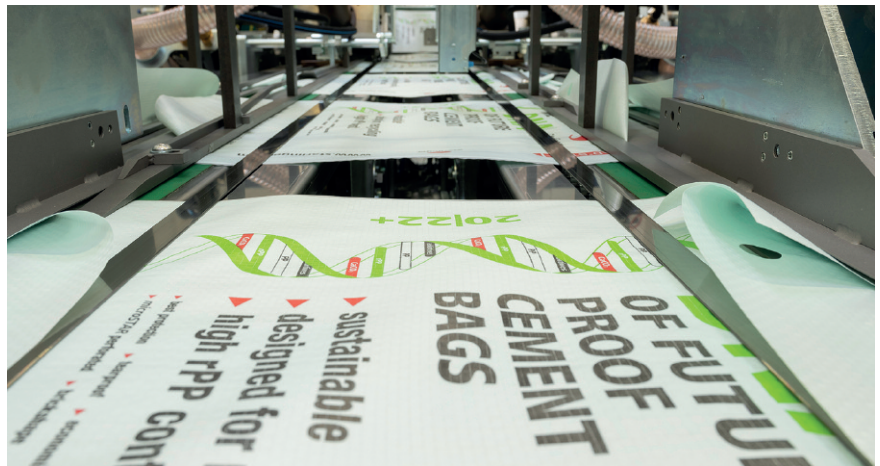
此外，Starlinger新的专利gripTEC技术可以增加袋子表面的摩擦系数，以显著减少堆积的袋子的滑动。以此方式降低滑落袋子造成人员伤亡的危险，并节省数吨散货以及包装材料。另外，还消除了后期生产中产生的 CO<sub>2</sub>，这是对可持续发展的又一贡献。

在 Starlinger 设备上，不仅可用回收聚丙烯 (rPP) 而且还可回收 PET 生产和进一步加工带状织物。“作为奥地利‘Verpackung mit Zukunft’ (面向未来的包装) 平台的一员，构建封闭式塑料包装循环对我们来说尤为重要”，Adrigan 说道。“凭借我们的循环包装理念，我们可提供工业领域的封闭式包装循环。如聚丙烯织物制成的集装袋等工业包装拥有材料通行证，由此可追溯从生产、使用到回收和循环再利用的生命周期。这样，可用旧集装袋再次生产新集装袋，质量不变，而且封闭包装循环。”

由 PET 制成的单一材料包装可完全回收再利用：在回收再利用过程中，可对此材料进行再生处理，使其具备新材料属性，包括食品适用性，并可重复回收再利用。凭借生产 PET 和 rPET 带状织物的技术，Starlinger 已将这一巨大优势用于编织包装，并且是此方法的唯一供应商。PET 带状织物高强度、食品级且具有出色的蠕变强度，可由 100% 回收材料制成。与“瓶对瓶回收”一样，可实现“袋对袋回收”，并封闭包装循环。这样不仅减少原材料消耗，而且还降低 CO<sub>2</sub> 排放和能耗。PET 和 rPET 带状织物已成功用于集装袋的生产。

### Cement Bag of the Future

■ Block bottom valve bags made of woven plastic are not only a tear and



斯达林格在K展台上展示了用22%的回收材料生产的AD\*STAR®箱式阀口袋 (©Starlinger)

*Starlinger demonstrated the production of AD\*STAR® block bottom valve bags with 22 % recycled content on the new ad\*starKON SXneo bag conversion line at its K 2022 trade fair stand (©Starlinger)*

moisture-resistant packaging for dry bulk goods – they are also becoming an increasingly sustainable packaging alternative in this sector.

“With our packaging technology, we want to promote the growing focus on sustainability in the industrial sector and offer packaging manufacturers innovative and viable solutions,” explains Hermann Adrigan, Sales Manager at Starlinger. “This year, we produced our AD\*STAR® block bottom valve sacks with 22 % recycled content on our new sack conversion line ad\*starKON SXneo at the Starlinger stand. In this way, we want to show that it is possible to use recycled material in woven plastic packaging, which is manufactured in a complex process, without having to accept a loss of quality. Starlinger customers are even producing high-performance packaging such as big bags with recycled polypropylene on our lines.”

In addition, Starlinger’s new, patented gripTEC technology can increase the coefficient of friction on the bag surface to significantly reduce slipping of stacked bags. This lowers the risk of personal injury from bags slipping down, and saves tonnes of bulk material and packaging. What’s more, the CO<sub>2</sub> generated during replacement production is eliminated – another contribution to sustainability. Starlinger lines can produce and process woven fabric not only with recycled polypropylene (rPP), but also with recycled PET. “As a member of the Austrian platform “Verpackung mit Zukunft” (Packag-

ing with a Future), creating closed cycles for plastic packaging is of particular importance to us,” says Adrigan. “Our circular packaging concept paves the way for a closed packaging cycle in the industrial sector. Industrial packaging such as big bags made of woven polypropylene are equipped with a material passport that allows to trace their life cycle from production and use to return and recycling. This means that new big bags can be made from used big bags without quality loss, and the packaging cycle can be closed.”

Mono-material packaging made of PET is virtually made for recycling: In the recycling process, this material can be processed in such a way that it has the properties of virgin material – including food grade quality – and can be recycled repeatedly. With the technology for producing tape fabric from PET and rPET, Starlinger has harnessed this major benefit for woven packaging and is the only supplier to offer this process. PET tape fabric is high-strength, food grade, has excellent creep resistance and can be made from 100% recycled material. As with bottle-to-bottle recycling, this enables “bag-to-bag” recycling and closes the packaging cycle. This not only lowers raw material requirements, but also CO<sub>2</sub> emissions and energy consumption. Both PET and rPET tape fabrics have already been used successfully in the production of big bags.

► Starlinger & Co. Ges.m.b.H.  
www.starlinger.com

## 挤出工具

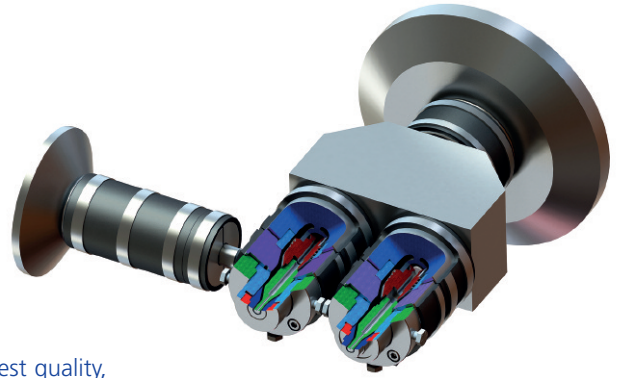
■ Guill推出最新一代800系列产品，这是一种2至6层挤压模具，旨在为汽车、医疗、家电和工业应用生产高品质、高材料效率的1/8至6英寸外径管材。经过重新设计的800系列可针对任何多层、多腔医用管路以及燃料管路结构、多层PEX管道和滴灌应用等生产完美平滑挤压及具有层定义的氟聚合物和其他材料。Guill设计进一步允许薄层（0.02毫米以下）组合聚合物和粘合剂。

Guill提供各种十字头和内联管路模具，具有固定或可调节中心，适用于单挤压或共挤压应用。该工具可用于加工任何化合物，并具有公司的专利精密Feather Touch同心度调节系统（即Seal Right系统），该系统与Feather Touch系统相结合，可消除聚合物泄漏。Guill还提供独特的螺旋流量分配系统。

所有Guill工具都是通过使用计算流体动力学（CFD）程序对流动通道进行严格的计算机模拟生成的，从而优化均匀流动，而且没有焊接线。

### Extrusion Tooling

■ Guill introduces the latest generation of its Series 800, the 2-to-6 layer extrusion tooling designed to produce the highest quality, highest material-efficient 1/8" to 6" OD tubing for automotive, medical, appliance and industrial applications. The redesigned Series 800 produces flawlessly smooth extrusion and layer definition of Fluoropolymer and other materials for all multi-layer, multi-lumen medical tubing, as well as fuel line constructions, multi-layer PEX pipe and drip irrigation applications, among others. The Guill design further allows thin layer combinations of polymers and adhesives to .02mm or less. Guill offers its extensive line of crossheads and inline tubing dies in fixed and adjustable center, for single or co-extrusion applications. The tooling is designed to



process all compounds and features the company's patented, precision Feather Touch Concentricity adjustment, the Seal Right System, which combines with the Feather Touch system to eliminate polymer leaking. Guill also offers its unique spiral flow distribution system. All Guill tooling is produced with rigorous computer simulation of the flow channels using Computational Fluid Dynamics (CFD) programs, resulting in optimum uniform flow with no weld lines.

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## 中国的新生产厂

■ Sami Busch 和 Kaya Busch 一同参观了 Busch 普旭即将兴建的全世界第八家制造工厂所在地块，骤然绽放的烟花也是 Busch 普旭迈向成功的重要标志。目前，项目投资协议已经正式签订。

Busch 普旭在中国已有 40 多年的发展历史。1981 年，在中国改革开放后，Busch 普旭成为第一批在中国开展经营活动的德国企业之一。2001，Busch 普旭在上海成立了全资子公司。如今，它已成为 Busch 普旭最大、最成功的销售和服务公司之一。

“蔡甸区区位优势明显，配套设施完善，专业人才众多。相信此次在蔡甸区的投资，将是我们集团发展历史上一个具有里程碑意义的举动，我们迫切期待着蔡甸新工厂的建成投用。”Busch 普旭集团所有人及联合首席执行官 Sami Busch。

武汉位于中国腹地中心，长江、汉水在此交汇。这座城市是中国中部的工业中心，拥有众多制造业产业链，包括钢铁生产和汽车制造等。武汉还拥有中国最大的内河港口、该地区最大的机场、全国最负盛名的大学之一，并且位于连通上海和香港、世界上最快的铁路之一上，交通非常便捷。

Busch 普旭与武汉也有着深厚的缘分。在 2020 年初新冠肺炎疫情爆发后，Busch 普旭立即交付了十二台急需的 MINK 干式爪式真空泵，以支援武汉火神山医院的建设。因此，Sami Busch 和 Kaya Busch 在访问武汉的时候也参观了这家医院，并在那里见到了支援的 MINK 真空泵。

Busch 普旭新工厂计划将于 2025 年开始投入生产。目前，该公司也已经在蔡甸区一个临时的厂房内进行生产，并已聘用了 15 名员工。Busch 普旭的目标是持续培养人才，因为公司重视长期的雇佣关系，中国的这座新工厂预计将在未来雇用约 400 名员工。此次投资协议的签订也被中国的多家媒体争相报道，包括电视台在内的 14 家中国媒体的代表出席了签约活动，并对 Sami Busch 和 Kaya Busch 进行了采访和报道。

### New Production Plant in China

■ Fireworks, as a sign of good success, greeted Sami and Kaya Busch as they toured the site where Busch Vacuum Solutions' eighth production facility worldwide will be built. Now the investment contract has been signed.



Busch 普旭集团所有人及联合首席执行官 Kaya Busch、蔡甸区区长余从斌和 Busch 普旭集团所有人及联合首席执行官 Sami Busch；后排从左数起第二位：德国海外商会联盟（AHK）大中华区副总裁 Jonathan Schoo）（来源：Busch 普旭中国）

*After the signing (front from left to right): Kaya Busch, Co-Owner and Co-CEO of Busch Vacuum Solutions, Yu Congbin, Mayor of Caidian District, Sami Busch, Co-Owner, and Co-CEO of Busch Vacuum Solutions. (Back row between Kaya Busch and Yu Congbin): Jonathan Schoo, Vice President - AHK Greater China (Chamber of Commerce Abroad, Representation of German Business in China) (Source: Busch China)*

“We have a close relationship with China. This investment in Caidian District is another fruitful outcome of our cooperation with China,” said Kaya Busch, Co-Owner, and Co-CEO of Busch Vacuum Solutions, in his speech before the signing ceremony.

Busch has over 40 years of history with China. In 1981, Busch was the first German industrial company to sign a cooperation agreement to manufacture in China after the reopening of the country. In 2001, an independent subsidiary was established in Shanghai. Today it is one of the largest and most successful Busch sales and service companies worldwide.

In his speech, Sami Busch, Co-Owner, and Co-CEO of Busch Vacuum Solutions, stated: “Caidian District has a clear location, excellent facilities, and many professionals. We believe this investment in Caidian District will be a milestone in our Group's history, and we look forward to the opening of our new plant.”

Wuhan is centrally located in China at the confluence of the Yangtze River and the Han River. The city is the industrial hub of central China and has manufacturing operations in many industries, including iron production and automotive. Wuhan also has China's largest inland water port, the region's largest airport, one of the country's most prestigious universities,

and is conveniently located on one of the world's fastest rail links connecting Shanghai to Hong Kong.

The Busch family also has a deep connection to Wuhan. Directly after the outbreak of the Corona Pandemic in early 2020, Busch delivered twelve urgently needed MINK claw vacuum pumps to support the construction of the hastily built Huoshenshan Emergency Hospital. Therefore, Kaya and Sami Busch visited the hospital and could see the MINK vacuum pumps in location.

Busch is expected to start production in the new plant in 2025. However, the company is already producing at a rented site in Caidian. So far, 15 employees have been hired. Busch's goal is to build talent successively because the company attaches importance to long-term employment relationships. The Chinese production facility is expected to employ 400 people in the future.

The signing of the investment agreement received a great deal of media coverage in China. Representatives from a total of 14 Chinese media, including TV stations, were present at the event to report and conduct interviews with Sami and Kaya Busch.

➔ Busch Dienste GmbH,  
Busch Vacuum Solutions  
www.buschvacuum.com



## 2023阿拉伯国际塑料橡胶工业展览会ArabPlast

■ 阿拉伯塑料展将于2023年12月13日至15日在迪拜世界贸易中心举行，是中东和北非地区塑料、橡胶、石化产品和包装行业的最重要的贸易展览会。

自2004年以来，Al Fajer信息与服务公司（Messe Düsseldorf）一直保持着合作关系，并于2023年2月27日在杜塞尔多夫签署了合同。杜塞尔多夫展览中心董事总经理Erhard Wienkamp说道：“阿拉伯国际塑料橡胶工业展览会是阿拉伯世界塑料和橡胶行业最重要的交流和商业平台，”他补充说：“我期待着继续与Al Fajer信息与服务公司成功合作。”

海湾国家不仅是最大的石化产品生产国和出口国，也是一流塑料制品的供应国。该地区强劲的经济状况确保了良好的投资环境，这也导致了塑料的需求增加。

最近一期阿拉伯塑料展于2021年11月举行，虽然受到新冠大流行的影响，仍取得了巨大成功，有来自129个国家的217家参展商和超过11200名观众参加了展会。

阿拉伯塑料展为该地区的专家和决策者提供了与来自世界各地的原材料和技术供应商会面的绝佳机会。来自德国、丹麦、瑞士、埃及、奥地利、意大利和土耳其的2023阿拉伯塑料展官方国家展馆已经筹备就绪。

阿拉伯塑料展的成功是基于杜塞尔多夫展览中心与全球塑料和橡胶行业公司建立的良好关系。杜塞尔多夫展览中心将其专业知识归功于其在杜塞尔多夫作为K展组织者的角色。就在最近的2022年10月，在每三年举办一次的K展成立70周年之际，来自59个国家的3020家参展商成功聚集在一起，来自世界各地的观众超过17.7万人。

Al Fajer信息与服务公司理Nadhal Mohamed说：“我们国际合作伙伴杜塞尔多夫展览中心是界头号塑料和橡胶贸易博览会K展的组织者，在他们的支持下，阿拉伯国际塑料橡胶工业展览会已成为中东地区的最重要的橡塑展会。”

阿拉伯国际塑料橡胶工业展览会是国际平台“Global Gate”服务品牌的一部分，该品牌包含了杜塞尔多夫展览中心在全球范围内为塑料和橡胶行业提供的国际平台。通过自己的活动以及与领先的塑料和橡胶行业区域贸易展览会（如阿拉伯塑料展）的战略联盟，杜塞尔多夫展览中心为相关增长市场提供了为行业量身定制的业务平台。



从左至右：Al Fajer信息与服务公司总经理Nadhal Mohamed；杜塞尔多夫展览中心董事总经理埃哈德·维恩坎普(Erhard Wienkamp)，（图片来源：杜塞尔多夫展览中心）

*From left to right: Nadhal Mohamed, General Manager, Al Fajer Information & Services; and Erhard Wienkamp, Managing Director of Messe Düsseldorf (Photo: Messe Düsseldorf)*

### ArabPlast 2023

■ ArabPlast, which will be held at the **Dubai World Trade Centre from 13 to 15 December 2023**, is the leading trade fair for plastics, rubber, petrochemicals and packaging in the MENA region.

Since 2004 Al Fajer Information & Services and Messe Düsseldorf have maintained a partnership, whose continuation was secured by the signing of a contract in Düsseldorf on 27 February 2023. "ArabPlast is the leading communication and business platform for the plastics and rubber industry in the Arab world," says Erhard Wienkamp, Managing Director of Messe Düsseldorf, and he adds: "I look forward to continuing our successful cooperation with Al Fajer Information & Services."

The Gulf States are not only top producers and exporters of petrochemical products but also suppliers of first-class plastics products. The robust economic conditions in the region ensure an excellent investment climate, which also results in increased demand for plastics.

The latest edition of ArabPlast, held in November 2021 and still impaired by the pandemic, was a resounding success, counting 217 exhibitors and more than 11,200 visitors from 129 countries.

ArabPlast provides experts and decision-makers from the region with an excellent opportunity to meet with raw material and technology vendors from around the

world. For ArabPlast 2023 official national pavilions from Germany, Denmark, Switzerland, Egypt, Austria, Italy and Turkey are already planned.

ArabPlast's success is based on Messe Düsseldorf's good relations established with the companies of the global plastics and rubber industry. Messe Düsseldorf owes its expertise especially to its role as organiser of K in Düsseldorf. Just recently in October 2022 at its 70th anniversary, K, which is held every three years, succeeded in bringing together 3,020 exhibitors from 59 nations with more than 177,000 visitors from all over the world. "With the support of our international partner, Messe Düsseldorf, the organiser of the world's No. 1 trade fair for plastics and rubber, K, ArabPlast developed into the leading event in the Middle East," says Nadhal Mohamed, General Manager, Al Fajer Information & Services.

ArabPlast is part of the Global Gate service brand, which bundles Messe Düsseldorf's worldwide range of international platforms for the plastics and rubber industry. With its own events and strategic alliances with leading regional trade fairs for the plastics and rubber industry – such as ArabPlast – Messe Düsseldorf offers the industry tailor-made business platforms in relevant growth markets.

► **Messe Düsseldorf GmbH**  
www.arabplast.info

# 绿色、智能、先进 CHINAPLAS 2023 一展尽览三大热点技术 Green, Smart, Advance – 3 Hot Technologies in 1 Show at CHINAPLAS 2023

绿色、智能、先进是当今工业的三大关键词，橡塑业当然也包括在内。“绿色”是对循环经济和可持续发展的承诺。“智能”可以激发创新并增强用户体验。“先进”是提高生产力和品质的强大工具。“CHINAPLAS 2023 国际橡塑展”将于2023年4月17 - 20日在深圳国际会展中心举行，观众在同一展会便可尽览这三大热点技术，有助于激发新灵感和探索新商机。

## 加强创新实现循环经济

不可否认，塑料消耗（尤其是即弃塑料）给环境带来了巨大挑战，当前行业正不遗余力地加强创新，以实现循环经济，达成可持续性发展。

塑料行业一直以来采用线性模式，即「取-用-弃」的方式。循环经济的目的在于减少塑料废弃物，方法是采用「闭环」系统，以持续循环的流程，对塑料进行生产、使用和再利用，避免塑料泄漏到环境中。

循环经济的主要目标在于提高回收率。生产后废料和消费后废料应通过回收流程来重新利用。回收技术在速度、效率和节约成本方面正与时并进。

在“启新程·塑未来·创新共赢”的主题下，观众来到“CHINAPLAS 2023 国际橡塑展”可在3个主题专区，包括再生塑料专区、生物塑料专区和回收再生科技专区，找到全方位的可持续解决方案。3个主题专区的面积超过14,000平方米，埃瑞玛、史太林格、埃维恩、陶朗、坚锋、国龙、NatureWorks、百奥诺、睿安科技等200多家机械制造商和材料供应商，将展示最新的环保塑料材料和加工技术。

## 橡塑业日趋智能化

“工业4.0”改变了许多产品的制造过程。拥有160年历史的塑料行业也在工业4.0的趋势下，采用尖端技术提高效率、降低成本，逐步走向智能化。

数字化促使塑料行业的制造系统愈趋智能化。在各个生产环节 - 从产品设计、实际生产流程，以至供应链、分销到交付，数字化智能制造系统都有助于企业应对当前和未来的挑战。

数字化在塑料加工过程中的角色越



莅临“CHINAPLAS 2023 国际橡塑展”，观众在同一展会便可尽览绿色、智能、先进三大热点技术

*At CHINAPLAS 2023, visitors will for sure immerse in green, smart, and advance technologies in the same occasion under one roof*

发重要。随着塑料加工设施逐步转型为数字化的智能工厂，制造业对先进机械和辅助设备、传感器、生产管理系统和其他产品的需求亦与日俱增。

配合橡塑行业走向数字化的发展趋势，“CHINAPLAS 2023 国际橡塑展”将设立注塑成型及智能制造专区，展示面积超过60,000平方米，汇聚全球近330家解决方案提供商。除了西门子、科控、贝加莱、倍福、包米勒、史陶比尔、摩丹、恩格尔、德马格、发那科、威猛巴顿菲尔等国际知名品牌外，还有海天、震雄、力劲、博创、伊之密、大同、汇川等众多中国领先供应商，将在主题专区全方位展示各种智能制造解决方案和机器，促进智能解决方案和技术的应用，实现数字化制造转型的目标。

## 先进：自动化 + 3D打印

自动化和3D打印是促进技术进步的两大关键动力。尽管人们认为其工作会被机器人所取代，但塑料行业的自动化并不是一场在全劳动力或全自动化之间作出选择的零和游戏。许多塑料工艺都可以自动化。投资自动化有助塑料制造商的现有设备发挥更大效用。以医疗

器械行业为例，制造商可使用自动化流程将塑料部件插入医疗部件，并测量型腔压力以确保部件正确插入。

3D打印，又称增材制造，自上世纪80年代初首次发明以来，市场经历了巨大的增长和创新。随着一项关键专利于2009年到期，许多科技公司相继提供低成本的消费级3D打印机，让3D打印不再是小众技术。2021年，全球3D打印塑料市场达到7.869亿美元，预计2022年至2030年的复合年增长率将达23.9%。个人化产品开发和政府激励措施，加上汽车、医疗和航空航天等应用行业不断增长的需求，将推动市场在未来数年进一步扩展。

先进的自动化和机器人技术不在话下，“CHINAPLAS 2023 国际橡塑展”还将设置3D技术专区，观众可接触到来自伊之密、铂力特、中望、汉邦、德科等解决方案供应商的3D打印新材料、技术和硬件。

## 2023年1月8日中国全面放开入境

中国内地实施入境限制接近3年，已于2023年1月8日放宽入境限制。来华人员只需入境时出示48小时内核酸检

测阴性结果，不再需要申请健康码和集中隔离，可放行进入社会面。中国将完善海外旅客的签证安排及逐步恢复国际航班。将于4月份在深圳举办的“CHINAPLAS 2023 国际橡塑展”蓄势待发，做好了准备迎接阔别3年的海外观众，火力全开推出具创新性的橡塑解决方案及行业信息。

**G**reen, Smart, Advance are the 3 keywords for most of the industries nowadays, including but not limited to plastics and rubber industries. Green is the commitment for circular economy and sustainability. Smart can inspire innovations and enhance user experience. Advance is the powerful tool for improving productivity and quality. At CHINAPLAS 2023, to take place from **April 17-20, 2023** in **Shenzhen** World Exhibition and Convention Center (SWECC) visitors will immerse in these 3 hot technologies under one roof, helping inspire new ideas and explore new opportunities.

### *Intensifies Innovations Towards a Circular Economy*

There is no denying that plastics consumption – especially for single-use plastics – has created a huge challenge to our environment. Plastics industry now spares no effort to intensify innovations towards a circular economy for sustainability development.

The plastics industry has long been applying the linear model, or “take-make-dispose” approach. Circular economy concept aims to reduce the amount of plastic waste generated by applying a “closed loop” system, redesigning how plastic products are taken, made, used and reused to alleviate the plastic waste problem.

One of the main thrusts of circular economy is the increased rate of recycling. Post-industrial waste and post-consumer waste need to undergo recycling in order



for them to be re-used. Recycling technologies have seen tremendous improvements in terms of speed, efficiency and cost-saving advantages.

Under the theme "A Brighter and Shared Future, Powered by Innovation", CHINAPLAS will provide visitors with a whole spectrum of sustainable solutions in 3 theme zones, including Recycled Plastics Zone, Bioplastics Zone, and Recycling Technology Zone. With over 14,000 sqm, 200+ machine makers and materials providers are to showcase latest environmentally-friendly plastic materials and processing technologies.

### *Plastics and Rubber Industries Go Smart*

Industry 4.0, has created a remarkable impact on the production of a huge range of products. Plastics industry, yet having a history of 160 years, also goes smart with cutting-edge technologies for greater efficiency and cost reduction in the era of Industry 4.0.

Through digitalization, manufacturing systems for plastics industry have become much more intelligent. The adoption of smart manufacturing process in all aspects of production – from product design, actual production, supply chain, distribution and sales, and delivery – has made it possible for companies to withstand current and future challenges.

Digitalization has been increasingly applied particularly in plastics production processes. There is growing need for advanced machinery and auxiliary equipment, sensors, process control software and other products to transform a plastics production facility into a smart manufacturing plant.

In the rising trend of digitalization among plastics and rubber industries, CHINAPLAS will bring together almost 330 solution providers around the world in Injection Molding and Smart Manufacturing Solutions Zone with over 60,000 sqm.

Plenty of leading suppliers are about to showcase full array of

塑料行业正不遗余力地加强创新，以实现循环经济，达致可持续性发展

*Plastics industry now spares no effort to intensify innovations towards a circular economy for sustainability development*

smart manufacturing solutions and machines at the theme zone, to facilitate the adoption of smart solutions and technologies and achieve the targets of digital manufacturing transformation.

**Automation and 3D Printing** are the two key enablers for technology advancement. Despite the perception that robots will take the jobs of humans, automation in the plastics industry is not a zero-sum game to decide between an all-human workforce or an all-automated one. A number of plastics processes can apply automation. Investing in automation would be a means to do more with the equipment plastics manufacturers currently have. In the medical devices industry, for example, manufacturer may use automated process to insert plastic parts into a medical component, and measure the cavity pressure to ensure the parts are properly insert.

3D printing, or additive manufacturing, market has seen a tremendous growth and innovation since it is first invented in the early 1980s. After the expiration of a key patent in 2009, allowing many technology companies to offer low-cost consumer-level 3D printers, 3D printing is no longer a niche technology. The global 3D printing plastics market reached USD 786.9 million in 2021 and is expected to grow at a CAGR of 23.9% from 2022 to 2030. Personalization products development and government incentives, coupled with the rising demand from the end-user industries such as automotive, medical, and aerospace, shall boost the market to expand further over the coming years.

### *China Relaxes Travel Restriction from 8 Jan 2023*

Three years after the border control, China relaxed travel restriction. Overseas travelers will only have to show a negative nucleic acid test result obtained within 48 hours and will no longer need to apply health code and quarantine upon arrival, and can enter society directly. China will improve visa arrangements for foreigners and resume the international flights gradually. CHINAPLAS 2023 welcomes the relaxation of border controls and is ready to receive international visitors in Shenzhen.

► **Adsale Exhibition Services Ltd.**  
www.ChinaplasOnline.com

# 满足中国回收市场的需求： 塑料回收解决方案

## *Plastics Recycling Solutions to Meet the Needs of the Chinese Recycling Market*

亚洲最大的塑料贸易展览会“Chinaplas 2023”今年将再次向国际商务观众敞开大门。从4月17日至20日，第35届橡塑展会在深圳举行，奥地利回收机械制造商埃瑞玛 ( EREMA ) 也将展示其多种多样的塑料回收机械技术。

埃瑞玛董事总经理Michael Heitzinger ( 迈克尔·海茨辛格 ) 说道：“来自奥地利的代表团今年终于能够再次参加展会，与我们的客户和对我们的技术感兴趣的每个人见面。在冠状病毒引起的中断之后，我们非常期待这一展会。”

埃瑞玛将展示其完整的产品组合和服务，重点是瓶到瓶和消费后物料的回收领域。凭借 VACUREMA® 和 VACUNITE® 瓶到瓶系统，公司近年来在中国市场站稳了脚跟，现已定位为技术和市场的领导者。埃瑞玛中国销售经理 Kurt Pichlmann 表示：“对于每个出口的国家而言，在瓶子生产过程中采用回收再生的高质量rPET粒子将成为一个快速增长的领域，因此引起了很大的兴趣。”最近几个月，中国客户的代表已经能够在K展上了解到整合在埃瑞玛大型PET回收系统中的创新，以及在其它客户已经投入使用这些设备的工厂现场看到这些创新。”

### 瓶子和瓶盖的回收方案

埃瑞玛还注意到，中国对其消费后的塑料垃圾回收解决方案越来越感兴趣。回收机械结合 inarema® TVEplus® Re grindPro® 与 ReFresher - 下游消除气味技术-采用埃瑞玛的工艺，使其生产的PCR-HDPE能够直接与食品接触，并以高达100%的比例反馈到包装生产中。这种回收工艺的适用性已得到美国食品和药物管理局(FDA)的确认，适用于由HDPE饮料瓶和HDPE、PP和PET饮料瓶瓶盖组成的物料来源。

### 在生产、研究和开发方面的投资

尽管受到新冠肺炎疫情的限制，但过去三年是埃瑞玛在中国市场销售最成功的三年。在此期间，成立于20年前的上海分公司设立了一个备件仓库，并扩大了在客户场所安装调试物料回收机器的技术人员团队。

在该公司位于奥地利的总部，一个新的研发中心目前正在顺利展开。这里将汇集跨部门和跨公司的测试机器和实验室进行研究和开发。为了在研究和开发工作中进行试运行，中心将在几周内提供全套机器，用这些机器可以试验整个回收过程，包括挤出的上游和下游过程。生产区域的扩展已经完成，生产能力增加了约60%。

*Asia's largest plastics trade fair, Chinaplas 2023, will open its doors again this year to international trade visitors. From April 17 to 20, the venue for the 35th edition of the trade fair is Shenzhen, where Austrian recycling machine manufacturer EREMA will also be presenting its wide range of technologies for mechanical plastics recycling.*

"A delegation from Austria will finally be able to travel to the trade fair again this year and meet in-person with our customers and everyone interested in our technologies. We are very much looking forward to this after the Corona-related break," says Michael Heitzinger, Managing Director of EREMA.

EREMA will be presenting its complete portfolio of products and services with a focus on the bottle-to-bottle and post-consumer recycling segments. With the VACUREMA® and VACUNITE® bottle-to-bottle systems, the company has gained a foothold in the Chinese market in recent years, and is now positioned as a technology and market leader. "The production of high-quality rPET pellets that can be reused in bottle production processes in each of the export countries is a fast-growing segment and is therefore attracting a lot of interest," says Kurt Pichlmann, sales manager in China for EREMA. "In recent months, representatives of Chinese customers have been able to find out about the innovations integrated into EREMA's large-scale PET recycling systems at the K trade fair, as well as see them in action on-site at other customers' plants who have already put these machines into operation.

### Recycling solution for bottle and closure

EREMA is also noticing growing interest in China for its solutions for recycling post-consumer plastic waste. The recycling machine combination INTAREMA® TVEplus® Re grindPro® with ReFresher – a downstream anti-odour technology – features EREMA's processes that enable the PCR-HDPE produced with it to be fed back into the production of packaging with direct food contact - and in proportions of up to 100 percent. The suitability of this recycling process has been confirmed by the U.S. Food and Drug Administration (FDA) and applies to the input streams consisting of HDPE beverage containers and closures of HDPE, PP and PET beverage bottles.

**Investments in production, research and development**

Despite restrictions due to the COVID-19 pandemic, the past three years have been EREMA's most successful years on the Chinese market in terms of sales. During this time, a spare parts warehouse was set up at the Shanghai branch, which was founded 20 years ago, and the team of technicians who commission recycling machines at customers' premises has been expanded.

At the company's headquarters in Austria, the completion of a new R&D centre is currently well under way. This will bring together cross-departmental and cross-company test machinery and a laboratory for research and development. For carrying out trial runs in the course of research and development work, a full range of machines will be available at the centre in a few weeks, with which the entire recycling process, including the

processes upstream and downstream of extrusion, can be tried out. The expansion of the production areas has already been completed, increasing production capacity by around 60 per cent.

**EREMA在2023年中国国际橡塑展 :**  
10展馆H41展位

**EREMA at Chinaplas 2023: Stand 10H41**

► **EREMA Group**  
Unterfeldstr. 3, 4052 Ansfelden, Austria  
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# 生态环境友好和可持续性双拉薄膜生产的解决方案

## *Solutions for an Eco-friendly and Sustainable BO Film Production*



布吕克纳电池隔膜薄膜生产线

*Brückner Battery Separator Film Production Line*

布鲁克纳的展会亮点为未来的工艺流程和产品应用铺路。

*Brückner's show highlights pave the way for future processes and applications.*

除了为快速发展的循环经济所作的研发之外，布鲁克纳机械公司还坚持进一步提高薄膜生产效率这一雄心勃勃的目标。这意味着减少原材料的使用，不断降低生产能耗，并在薄膜生产中实现“零浪费”。在深圳举行的2023年中国国际橡塑展上，未来薄膜拉伸技术的最新解决方案将在10号展馆，10Q21号展位上进行展示。

膜生产相对应的新生产线概念：

- 最受欢迎的BOPP包装薄膜的生产线概念将超过目前基准能力60,000 ~ 70,000吨年产量。这也意味着按每1公斤薄膜计算，能耗降幅为两位数。
- BOPA双拉薄膜：新的生产线类型，产量提高可达80%—基于生产线速度从220米/分钟提高到350米/分钟，生产线宽度从6.6米加宽到7.4米。

### 更高的效率 – 更低的能耗

薄膜双拉生产线的效率更高，产量越高，生产单位能耗就越低。这些参数主要受生产线速度和生产线宽度的影响。在中国国际橡塑展期间，布鲁克纳机械公司将展示为包装薄

### 薄膜生产中更多的可持续性

- 一种新型的直接回收，可节省能源，节约原材料，并且非常接近于生产中的“零浪费”目标。

- 智能化的拉伸烘箱管理，确保每年节约能源大约160万 kWh。
- 符合空气流体力学的区域分隔设计增加了收卷机上A级薄膜的比例，减少了生产废料，并降低了单位能耗。

#### 单一材料的薄膜 – 循环经济的解决方案：

单一材料解决方案，是新应用的理想选择，因为它们保证了在废塑料分离中良好的分类能力，并保证了较高的回收材料质量。布鲁克纳机械公司已经开发了单一材料的包装解决方案，完成了闭环式的塑料包装生命周期。除了最先进的材料BOPP和BOPET之外，新的机会正在向BOPE敞开。

- 最近成功的推出了几项PP单一材料包装产品的开发：比如，软包装袋，以前复杂的复合材料现在被基于BOPP和CPP的全聚丙烯产品所取代，甚至可适用于耐蒸煮的应用。
- 从布鲁克纳试验生产线的测试生产清晰的证明，消费后废弃的回收PET材料，可按50%以上的比例添加到新的纯净原材料中，而不会有任何质量上的损失。
- 生产BOPE薄膜的生产线概念，也可以具有生产BOPP薄膜的灵活性。薄膜生产商可以选择工作宽度6.6米，产量3吨/小时，或选择工作宽度8.7米，产量5吨/小时的生产线。

#### 特种薄膜生产线：进一步的新发展

布鲁克纳的特种膜生产线，在全球都有很大需求，特别是对于快速增长的电动车和新能源行业。专利的LISIM线性电机同步拉伸工艺非常适用于高效生产各种具备最佳性能的特种薄膜：

- 电池隔膜和电容器薄膜：在这些领域中，以前的生产线宽度将分阶段从5.5米进一步增加到6米以上，产量将相应的增加20%以上。
- 布鲁克纳特殊的BOPET厚膜生产线为绿色能源解决方案提供了支持，生产用于光伏板的高性能太阳能背板。
- 工业薄膜可用于各种广泛应用：绝缘薄膜，复合薄膜，电缆电线的电气外壳，电机和变压器的薄膜开关，窗膜，离型保护膜，电机绝缘薄膜。
- 柔性印刷电路和电子产品：用于RFID天线的基材，有机显示器，有机光伏，医疗传感器，印刷电池的基材。



布吕克纳薄膜拉伸生产线

*Brückner film stretching line*

In addition to the developments for the rapidly developing circular economy, Brückner Maschinenbau is also sticking to its ambitious goals for further increasing efficiency in film production. This means decreasing use of raw materials, ever lower energy consumption and "zero waste" in film production. At Chinaplas 2023 in Shenzhen, latest solutions for the film stretching of the future will be presented in *Hall 10, Booth 10Q21*.

#### Higher efficiency – lower energy consumption

The more efficient and higher output a film stretching line is, the lower the specific energy consumption. These parameters can mainly be influenced by the line speed and the line width. At Chinaplas Brückner Maschinenbau will present corresponding new line concepts for packaging film production:

- Production of the most popular packaging film BOPP with a line concept with an annual output above the current benchmark of 60,000 to 70,000 tons per year. This also means a two-digit lower energy consumption, based on 1 kg of film.
- BO films made of polyamide (BOPA): New line types with up to 80% more output – based on an increase in production speed from 220m/min to 350m/min and line widening from 6.6m to 7.4m.

#### More sustainability in film production

- A new type of direct recycling saves energy, conserves raw material and comes very close to the goal of "zero waste" in production
- Intelligent stretching oven management ensures an energy saving of around 1.6 million kWh per year
- Aerodynamic zone separation increases the proportion of A-grade film on the winder, reduces production waste and lowers specific energy consumption

#### Mono-material films – solutions for a Circular Economy:

Mono-material solutions are ideal for the use in new applications since they guarantee good sortability in waste separation and high-grade recycling material quality. Brückner Maschinenbau has developed mono-material packaging solutions to close the life cycle of plastic packaging. Besides the state-of-the-art materials BOPP and BOPET, a new opportunity is opening up with BOPE.

- Several developments for PP mono-material packaging have been successfully launched recently: E.g. flexible pouches, where complex laminates are now substituted by all-polypropylene versions based on BOPP and CPP or even retortable applications
- Trials on the Brückner laboratory line clearly showed that post-consumer waste recycle PET can be added to the virgin material in a proportion of above 50% without any losses in quality
- Line concepts for the production of BOPE

films, also having the flexibility to produce BOPP films. Film producers can choose lines between a working width of 6.6 m and an output of 3 t/h, or a working width of 8.7 m and an output of 5 t/h

#### *Specialty film lines: Further developments*

Special film lines from Brückner are in great demand worldwide, especially for the rapidly growing e-mobility and new energy sector. The patented simultaneous LISIM stretching process is ideally suited for the very efficient production of a wide variety of specialty films with the best properties:

- Battery separator films and capacitor films: In these segments, a further increase in the previous line width from 5.5m to over 6m and the associated increase in output of over 20% will take place in stages.
- Green energy solutions are supported by Brückner's special BOPET thick film lines, producing high performance solar backsheet used for photovoltaic panels
- Industrial films for a wide variety of applications: Insulating film, composite films, electrical enclosures for cables and wires, membrane switches in motors and transformers, window film, protection and release film, motor insulation film
- Flexible and printed circuits and electronics: Substrates for RFID antennas, organic displays, organic photovoltaic, medical sensors, printed batteries



布吕克纳薄膜拉伸生产线

*Brückner film stretching line*

布吕克纳机械制造公司在2023年中国国际橡塑展上亮相：10展馆Q21展位

Brückner Maschinenbau at Chinaplas 2023: Stand 10Q21

► **Brückner Maschinenbau GmbH & Co. KG**  
Königsberger Str. 5-7, 83313 Siegsdorf, Germany  
[www.brueckner.com](http://www.brueckner.com)

## 创新的脱气和去污技术，适用于要求苛刻的回收应用

## *Innovative Degassing and Decontamination Technologies for Demanding Recycling Applications*

格诺斯推出新系列的OMNI回收生产线。

*Gneuss presents new series of OMNI Recycling Machines.*

图1：格诺斯OMNImax回收生产线，带MRSjump挤出系统，旋转过滤系统和3C旋转喂料机



Picture 1: Gneuss OMNImax Recycling Machine with MRSjump Extrusion System, Rotary Filtration System and 3C Rotary Feeder



## 格诺斯技术

### 新型OMNI回收机，用于PET，PS和聚烯烃消费后回收的闭环回收

格诺斯的MRS挤出技术已被证明是聚酯、聚苯乙烯、聚丙烯或聚乙烯等受污染材料再加工的替代方案。结合高效的格诺斯旋转过滤系统和优化的真空技术，可以设计出为特定材料量身定制的可定制回收线。来自FDA的几份无异议信(LNO)、EFSA合规性和拉丁美洲的当地批准证实了该技术的净化效率。

### OMNI回收机用于消费后纤维或热成型回收

格诺斯将通过新的OMNI回收生产线展示其最新的机械创新，以满足当今和未来的回收需求。

OMNImax回收生产线处理各种聚合物以及各种形式和形状的工业和消费后废物。它包括一台3C旋转喂料机、一台MRSjump挤出机、一个全自动熔体过滤系统RSFgenius和一个在线粘度计VIS。

### 3C 旋转喂料机

新开发的3C旋转式喂料机无需任何外部加工步骤即可使用低堆积密度材料。传送带将切碎的回收材料送入料斗，在那里，带有刀具的快速旋转圆盘切割、压实和预处理材料。刀具将能量添加到材料中，并在材料自动送入MRSjump挤出机之前开始加热和脱气过程。

### MRSjump反应器

MRS挤出机基于传统的单螺杆技术，但配备了用于脱挥的多螺杆部分。它可以对PET进行非常高效和温和的去污，同时满足直接食品接触标准的要求。MRS挤出机允许使用简单而坚固的真空系统将R-PET直接加工成高质量的最终产品，如包装片材、捆扎带或长丝，而无需预干燥。这是通过其独特的专利多旋加工段实现的。多旋加工段是一个包含多个卫星单螺杆的机筒，由齿圈和小齿轮传动装置驱动。

卫星螺杆的旋转方向与主螺杆相反。这不成比例地增加了聚合物熔体的表面交换。一个用于排气通风的大开口，暴露卫星螺杆的整个长度完全在真空下。这为聚合物熔体提供了极好且不受限制的通道，聚合物熔体的表面通过多螺杆部分中卫星螺杆的作用以极高的速率不断更新。可用于脱挥的表面积和表面积交换率远远大于其他挤出系统。由于聚合物熔体上的热应力和机械应力最小化，在MRS挤出机上加工的PET具有出色的光学和机械性能。

新的MRSjump具有更长的多旋转部分的修改版本，可确保更长的材料停留时间和真空下的更多表面积交换。更长的多旋转部分，加上在1 mbar下运行的强大真空系统，可用于提高R-PET的粘度，并在输入材料发生变化的情况下将其保持在稳定的水平。因此，不需要任何液相(LSP)或固态聚

合(SSP)。随着挤出过程中特性粘度的稳定和/或增加，MRSjump特别适用于回收，例如PET薄膜废料或纤维回收 - 由于低特性粘度或可变输入粘度，以前无法通过单个挤出步骤直接回收的应用。结合格诺斯的旋转过滤技术，可以保证高熔体纯度。可以通过在线粘度计VIS提供质量保证，用于测量熔体在线粘度。

由于对PET瓶片的需求超过供应，加工商正在寻找替代原料(例如，满足回收成分的要求)，MRSjump为PET热成型、薄膜或纤维回收提供了出色的解决方案，而新开发的MRS切割压机可以使用低堆积密度材料。

### OMNIboost回收生产线，包括反应器JUMP

带有反应器JUMP的OMNIboost回收生产线将PET废物(无论是工业还是消费后的形式)直接加工成高质量的产品。集成的JUMP可将PET熔体的IV值提升至0.95 dl/g。

在JUMP中，聚合物通过几个缓慢转动的元件，形成聚合物膜，其表面不断更新。反应器容器保持在真空下，通过真空可靠地去除挥发性物质。通过调节反应器中的停留时间、真空度、液位和搅拌装置的旋转速度，可以改变缩聚反应以实现所需的产品性能。JUMP是一种坚固可靠的液态缩聚系统(LSP)，是传统固态系统(SSP)的紧凑、快速和高效的替代方案。它能够将聚合物直接重新引入生产过程，而无需重新熔化PET。

## 格诺斯过滤技术

### 压力恒定和过程恒定旋转过滤系统的定制改造

连续旋转过滤系统的特点是筛网以环形形式分布的独特过滤盘。可以在熔体通道中不工作的过滤盘部分更换筛网，同时生产过程继续运行，没有任何中断或干扰。

格诺斯的顶级型号RSFgenius与集成的反冲洗系统一起运行，为非常苛刻的应用和最高的质量要求提供自清洁。筛网可以自动重复使用多达400次，过滤细度可低于10微米/1200目。

将全自动RSFgenius改装到现有的挤出生产线上，无论是在造粒、片材、纤维还是管道生产应用中，都允许使用更受污染(通常更便宜)的材料和/或使用更精细的筛网。每次改造都是量身定制的，通常不需要移动任何现有设备。

## 格诺斯测量技术

### 挤出测量技术 - 灵活、快速、安全、数字化

格诺斯为您的压力和温度测量提供灵活的传感器解决方案，可根据您的应用进行个性化定制。磨损、腐蚀、温度，格诺斯为每一个挑战提供正确的解决方案。

格诺斯交付速度快。无论是标准传感器还是特定应用的定制解决方案。灵活的制造结构允许最短的交货时间。

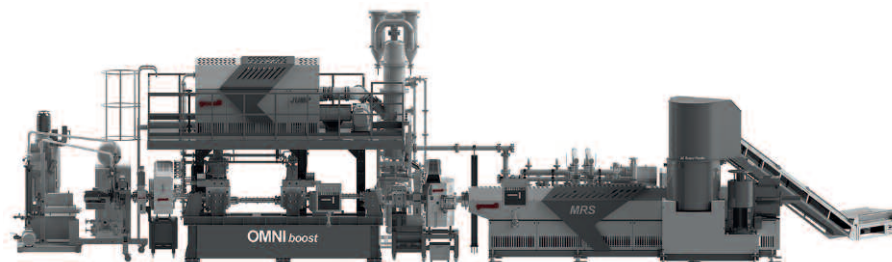


图2：OMNIboost回收生产线，带JUMP反应器，MRS挤出系统，旋转过滤系统和3C旋转喂料机

Picture 2: OMNIboost Recycling Machine with JUMP polyreactor, MRS Extrusion System, Rotary Filtration Systems and 3C Rotary Feeder



图3：专利旋转过滤系统RSFgenius

Picture 3: Patented Rotary Filtration System RSFgenius

格诺斯创造安全。除了符合标准的压力监测外，格诺斯还为测量设备提供必要的质量保证。

格诺斯是数字化的。最新一代的格诺斯传感器和压力监测器完全以数字方式进行通信。用于数字仪表监控的集成RFID芯片适用于所有传感器型号。

### Extrusion Technology

#### *New OMNI Recycling Machines for closed loop recycling of PET, PS and polyolefin post-consumer reclaim*

Gneuss' MRS Extrusion Technology has proven itself as an alternative for the reprocessing of contaminated materials like polyester, polystyrene, polypropylene or polyethylenes. In combination with the highly efficient Gneuss Rotary Filtration Systems and optimized vacuum technology, customizable recycling lines tailor-made for a specific material can be engineered. Several Letters of Non Objection (LNOs) from the FDA, EFSA conformity and local approvals in Latin America confirm the decontamination efficiency of the technology.

#### *OMNI Recycling Machine for post-consumer fiber or thermoform reclaim*

Gneuss will show its latest machinery innovations for today's and tomorrow's recycling needs with the new OMNI Recycling Machines.

The OMNImax Recycling Machine processes industrial and post-consumer waste from all kinds of polymers and in all forms and shapes. It includes a 3C Rotary Feeder, an MRSjump extruder, a fully automatic melt filtration system RSFgenius and an online viscometer VIS.

#### *3C Rotary Feeder*

The newly developed 3C Rotary Feeder makes it possible to use low bulk density materials without any external processing steps. A conveyor belt feeds shredded reclaim material into the hopper, where a fast-rotating disc with knives cuts, compacts and pre-conditions the material. The knives add energy into the material and start the heating and degassing process before the material is automatically fed into the MRSjump extruder.

#### *MRSjump*

The MRS extruder is based on conventional single screw technology but is equipped with a multiple screw section for devolatilization. It enables very efficient and gentle decontamination of PET, whilst achieving the requirements for direct food contact standards. The MRS extruder permits the processing of R-PET directly into high quality end products such as packaging sheet, strapping tape or filaments without pre-drying by using a simple and rugged vacuum system. This is achieved by means of its unique and patented processing section. The Multi Rotation Section is a drum containing multiple satellite single screws, driven by a ring gear and pinion transmission.

The satellite screws rotate in the opposite direction to the main screw. This disproportionately increases the surface exchange of the polymer melt. A large opening for venting, exposing the full length of the satellite screws, is completely under vacuum. This provides excellent and unrestricted access to the polymer melt, the surface of which is constantly replaced at an extremely high rate by the action of the satellite screws in the multiple screw section. The surface area – and the surface area exchange rate – available for devolatilization are far greater than in other extrusion systems. As the thermal and mechanical stress on the polymer melt is minimized, PET processed on the MRS extruder has excellent optical and mechanical properties. The new MRSjump has a longer, modified version of the Multi Rotation Section, which ensures both a longer residence time of the material and more surface area exchange under vacuum. The longer Multi Rotation Section, coupled with a powerful vacuum system operating at 1 mbar, can be used to boost the viscosity of R-PET and to hold it at a stable level in spite of variations in the input material. Therefore, there is no need for any liquid phase (LSP) or solid state polymerization (SSP). With the stabilization and/or increase of the intrinsic viscosity in the extrusion process, the MRSjump is especially well suited to recycling e.g. PET film waste or fiber reclaim – applications for which direct recycling with one single extrusion step was previously impossible due to low intrinsic viscosity or variable input viscosities. In combination with Gneuss' Rotary Filtration Technology, a high melt purity is guaranteed. Quality assurance can be provided with an online viscometer VIS for measuring melt viscosity.

As demand for PET bottle flakes outpaces supply and processors are looking for alternative feedstock (e.g. to fulfill recycled content mandates) the MRSjump offers an excellent solution for PET thermoform, film or fiber recycling, while the newly developed MRS cutter compactor makes it possible to use low bulk density materials.

图4：  
带数字仪表监控的格诺斯传感器

Picture 4:  
Gneuss sensors with digital  
gauge monitoring



### OMNIboost Recycling Machine including polyreactor JUMP

The OMNIboost Recycling Machine with an polyreactor JUMP processes PET waste, whether form from industry or postconsumer, directly into high-quality products. The integrated JUMP can lift the IV value of a PET melt up to 0.95 dl/g.

In the JUMP the polymer passes over several slow turning elements which create a polymer film, the surface of which is constantly renewed. The reactor vessel is kept under vacuum, through which volatile substances are reliably removed. By regulating the residence time in the reactor, the vacuum, the fill level and the speed of rotation of the agitating devices, the polycondensation reaction can be altered to achieve the required product properties. The JUMP is a robust and reliable liquid state polycondensation system (LSP) and a compact, quick and efficient alternative to conventional solid state systems (SSP). It enables direct reintroduction of the polymer into the production process without the need to remelt the PET.

### Filtration Technology

#### Tailor-made retrofits of pressure- and process-constant Rotary Filtration Systems

The continuous Rotary Filtration Systems are characterized by a filter disk on which the screen cavities are located in a ring pattern. Screens can be changed on the part of the filter disk that is not active in the melt channel, while the production process continues to run without any interruptions or disturbances.

Gneuss' top model, the RSFgenius, operates with an integrated back-flushing system offering self-cleaning for very demanding applications and highest quality requirements. Screens can be automatically re-used up to 400 times and filtration finenesses below 10 microns/1200 mesh are available.

Retrofitting a fully-automatic RSFgenius to an existing extrusion line, whether in a pelletizing, sheet, fiber or pipe application, permits the use of more contaminated (and often cheaper)

material and/or the use of finer screens. Every retrofit is tailor-made and usually without the need to move any existing equipment.

### Measurement Technology

#### Measuring Technology for Extrusion – Flexible, Fast, Safe, Digital

Gneuss provides flexible sensor solutions for pressure and temperature measurements, individually tailored to your application. Abrasion, corrosion, temperature, Gneuss offers the right solution for every challenge.

Gneuss delivers fast. Whether standard sensor or application-specific customized solution. The flexible manufacturing structure allows shortest delivery times.

Gneuss creates safety. In addition to standard-compliant pressure monitoring, Gneuss offers the necessary quality assurance of the measuring equipment.

Gneuss is digital. The latest generation of Gneuss sensors and pressure monitors communicates completely digitally. Integrated RFID chips for digital gauge monitoring are available for all sensor models.

格诺斯在2023年中国国际橡塑展：  
10展馆H31展位

Gneuss at Chinaplas 2023: Stand 10H31

► Gneuss Kunststofftechnik GmbH  
Moenichhusen 42, 32549 Bad Oeynhausen, Germany  
www.gneuss.com

## 专注于高品质的吹塑塑料产品

# Focus on Blow Molded Final Plastic Products of Highest Quality

考特斯机械制造有限公司 (Kautex Maschinenbau) 是吹塑行业可持续创新的全球领先企业，在 Chinaplas 2023 国际橡塑展上将专注于高品质的最终塑料产品。在“体验前所未有的改变 (Experience the Difference)”的主题下，观众将在2C31展位了解到考特斯作为客户的优选商业顾问，如何帮助客户生产出高品质的最终塑料产品。此外，所有生产解决方案均可通过创新虚拟现实和增强现实技术在展台上体验。考特斯还将展示可持续发展的愿景和使命以及具体项目。



水壶 / Watering can

*Kautex Maschinenbau, one of the world's leading pioneers of sustainable innovations in the blow molding industry, will focus on final plastic products of highest quality at Chinaplas 2023. Under the motto "Experience the Difference", visitors to booth 2C31 will learn how Kautex, as Preferred Business Advisor, enables*

*customers to produce final plastic products of the highest quality. In addition, all production solutions can be experienced at the booth via innovative virtual reality and augmented reality technology. Furthermore, Kautex will present its sustainability vision and mission as well as specific projects.*

Chinaplas 2023 国际橡塑展将于4月17日在深圳国际会展中心 (宝安新馆) 开幕，考特斯将在2C31展位向观众传达“最终塑料产品”业务理念。“对我们来说，客户拥有高品质的塑料产品才是重点，而非生产机器。”考特斯亚洲首席执行官 Geoffrey Chan 说道，“我们知道这次参展我们的展示与大家设想中的机器制造商不一样。但我们确信：我们必须先探讨客户的产品，然后才能探讨生产解决方案。只有了解客户的真正需求和产品，我们才能持续、长期满足他们。此外，我们秉承公司愿景、理念和使命行动，以高品质的最终客户产品为核心，引领变革并创造增值。”

### 创新与可持续发展 —— 虚拟技术展示生产解决方案

“体验前所未有的改变”的宣传口号也进一步体现在生产解决方案的展示方式上：来宾可通过创新的虚拟现实与增强现实技术在展位体验丰富多样的生产解决方案。考特斯亚洲首席销售官 Dimitri Zhang 表示，无论客户关注的是瓶子、油

罐、大桶、IBC 吨桶、复合材料容器还是皮划艇的制造，考特斯将通过创新的方式为每一位客户精准地展示他所感兴趣的生产解决方案。因此，我们并没有仅仅展示一台实际的机器，更是适合客户的机器。

### 可持续发展的愿景和使命

观众还可在展位了解到考特斯的可持续发展愿景和使命。在可持续发展愿景中，考特斯机械制造有限公司的目标是为客户提供最好的支持，使客户的产品质量更佳更具可持续性。这项使命聚焦于积极推动循环经济的建立，始终坚持企业使命，即创造领先的变革和高附加值。展位上的项目介绍将展示考特斯如何将可持续发展愿景和使命付诸实践。

其中R-Cycle 是考特斯积极参与建立循环经济的示范项目。借助数字产品护照，回收相关信息已在塑料产品生产期间记录下来并存储在 R-Cycle 数据库中。在回收过程中，可以读取这些资料，以实现充分的二次利用。另一个是与 Bras-

kem 合作的项目，利用消费后回收材料（PCR），通过吹塑工艺在考特斯技术中心成功加工成单层吹塑成型的儿童喷壶。



The booth is a clear visual statement of the "Final Plastic Product" philosophy of Kautex. "For us, the plastic product of highest quality of our customers is in the foreground, not the producing machine," explains Geoffrey Chan, CEO, Kautex Asia. "We are aware that we are taking a different approach here as expected of a machine manufacturer. But we are convinced: First, we must talk about our customers' product in order to then talk about the production solution. Only by understanding our customers' real needs and product, we can satisfy them sustainably and in the long term. Furthermore, we act in accordance with our corporate vision, philosophy and mission. With the final customer product of highest quality at the center, we create leading change and added value."

#### **Innovative and sustainable – virtual presentation of production solutions**

The motto "Experience the Difference" further refers to the way Kautex presents its production solutions: At the booth, visitors can experience 19 different production solutions – via innovative virtual reality and augmented reality technology. "Regardless of whether a customer is interested in producing bottles, jerry cans, IBCs, liners or even kayaks, says Dimitri Zhang, CSO, Kautex China. "We can show each customer exactly the production solution that is interesting to them in an innovative way. So, we don't just show a physical machine, we show the right machine for the customer."

#### **Sustainability vision and mission presented**

Furthermore, visitors can learn at the Kautex booth about the company's sustainability vision and mission. In its sustainability vision, Kautex Maschinenbau sets itself the goal of providing its customers with the best possible support in making their products better and more sustainable. The mission is focused on actively driving the establishment of the circular economy, always in line with the corporate mission, which states creating

leading change and added value. Specific projects at the booth show how Kautex is putting its sustainability vision and mission into practice.

R-Cycle is an exemplary project in which Kautex is actively involved in establishing the circular economy. With the help of a digital product passport, recycling-relevant information is already recorded during the production of a plastic product and stored in the R-Cycle database. During recycling, this data can in turn be read out for optimal reuse. The pilot projects that Kautex has undertaken as part of the R-Cycle initiative can be seen at the booth.

Another project – in cooperation with Braskem – successfully demonstrates that upcycling of post-consumer waste (PCR) with appropriate measures leads to ever better results. The compounds used were successfully processed at the Kautex Technical Center into monolayer blow molded products. Braskem's material was used to make a children's watering can, which will be given out as a giveaway at the booth.

**考特斯机械制造公司在2023年中国国际橡塑展上。2C31展位**

**Kautex Maschinenbau at Chinaplas 2023: Booth 2C31**

► **Kautex Maschinenbau**  
Kautexstr. 54, 53229 Bonn, Germany  
[www.kautex-group.com](http://www.kautex-group.com)



# CHINAPLAS拥有泵和过滤系统、造粒和粉碎系统、回收系统和数字解决方案

## With Pump & Filtration Systems, Pelletizing & Pulverizing Systems, Recycling Systems and Digital Solutions at CHINAPLAS

作为世界上增长强劲的市场之一，中国正在制造越来越多的塑料新产品。MAAG集团考虑到这一点，将在2023年4月17日至20日的中国深圳国际橡塑展，德国馆10号馆F11号展位展出产品。我们的现场专家将很高兴向您介绍我们的聚合物行业产品组合：

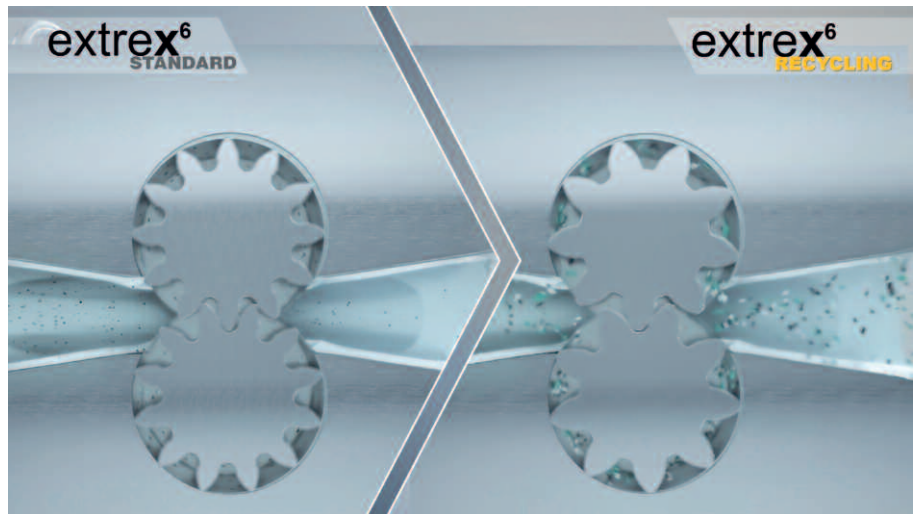
*More and more new developments in plastics are being made in China, one of the strongest growth markets in the world.*

*MAAG Group takes this into account and will be present at Chinaplas in Shenzhen, China, from*

*April 17-20, 2023 in the German Pavilion in hall 10, booth No. F11. The MAAG experts on site will be happy to inform the visitors about their product portfolio for the polymer industry:*

⇒ **MAAG 集团 extrex® GA** 齿轮泵专为常规的热塑性挤出应用而设计，由于采用了先进的齿轮和轴承技术，因此整体效率高，磨损小。在高压差和简单紧凑的设计情况下，它们也可以采用低脉动泵动作。在中国安装了超过15,000台MAAG齿轮泵。新开发的extrex®循环泵确保了循环过程中的可靠挤出。Extrex®具有优化的几何结构，在许多情况下，无需上游保护过滤器，节省空间并减少加热和驱动功率所需的能量。与所有MAAG泵一样，extrex®旨在满足日常操作的高要求。

⇒ **MAAG ETTLINGER ERF 350** 是一种用于过滤严重污染的聚合物原料的高性能熔体过滤器。过滤器采用旋转穿孔滚筒自清洁，熔体通过滚筒从外到内连续流动。刮板清除表面滞留的污染物，并将其输送至排放系统。这使得过滤器能够自动使用，并且在长时间内不容易出现中断，而无需更换滤网。优点：可靠的熔体过滤、超低的熔体损失以及熔体的良好混合和均匀化。



extrex6标准泵和extrex6循环泵的比较：MAAG的熔体泵经过专门升级，用于处理循环市场上较高污染水平和较大颗粒的工艺

*Comparison of extrex6 standard pump and extrex6 recycling pump: MAAG's melt pump has been specially upgraded for processes dealing with higher contamination levels and larger particles on the recycling market*

⇒ **BAOLI-3**型切料机配备德国制造的核心部件，设计用于硬质和软质切料机材料。值得注意的亮点是其紧凑的设计，具有高度调节、左侧/右侧控制功能，提供了操作灵活性，并减少了操作期间的噪音产生。同时，它为清洁提供了方便，便于维护、更换材料和更换颜色。BAOLI-3造球机基于MAAG 60多年的经验和在中国近1,000台BAOLI造粒机的安装基础，开发出一种新的增强型造粒机，该造粒机具有高可靠性、改良的操作性和优化的成本/效益比。

⇒ **ZHULI®造粒系统** 是一种灵活、成本效益高的水下造粒系统，设计用于标准产品，如填充聚烯烃、聚酯和热塑性弹性体。ZHULI®造粒系统的切割工具提供高质量的球形颗粒，适合进一步加工，生产率可高达1,200 kg/h。此款造粒系统占地面积小，操作简单。

- The **MAAG Group extrex® gear pumps GA** are designed for common thermoplastic extrusion applications and offer a high overall efficiency and hence minimum abrasion due to leading gear and bearing technology. They convince with low pulsation pump action also in cases of high differential pressure and a simple and compact design. With over 15'000 MAAG gear pumps installed in China, you know that you have competence on your side.

The newly developed extrex® recycling pump ensures reliable extrusion in the recycling process. The extrex® features an optimized geometry that, in many cases, eliminates the need for an upstream protective filter, saving space and reducing the energy required for heating and drive power. Like all MAAG pumps, extrex® is designed to meet the high demands of everyday operation.

- **MAAG ETTLINGER ERF 350** is a high-performance melt filter for the filtration of heavily contaminated polymer feedstock. The filter is self-cleaning with a rotating, perforated drum, through which there is a continuous flow of melt from the outside to the inside. A scraper removes the contaminants that are held back on the surface and feeds them to the discharge system. This enables the filter to be used fully automatically and without any disruptions over long periods without having to replace the screen. The advantages: Reliable melt filtration, ultra-low melt losses and good mixing and homogenizing of the melts.

- The **BAOLI-3 strand pelletizer** is outfitted with German-made core components and has been designed for use with both hard and soft pelletizing materials. The most noteworthy highlights are its compact design that features height-adjust-

ERF, 高性能熔体过滤器, 从循环熔体流中去除杂质和污染物

*ERF, high-performance melt filters remove impurities and contaminants from the recycling melt stream*



BAOLI-3—高可靠性铸坯造粒机有无数参考文献

*BAOLI®-3 – Highly reliable strand pelletizer with countless references*

ment, left-side/right-side control capabilities that provide greater operational flexibility, and reduced noise generation during operation. At the same time it offers easy access for cleaning making it easy for maintenance, material changes, and color changes. The BAOI-3 pelletizer is based on MAAG's more than six decades of experience and an installed base of nearly 1'000 BAOI pelletizers in China to develop a new and enhanced version which provides high reliability, improved handling, and an optimized cost/benefit ratio.

- The **ZHULI® system** is a highly flexible, cost-efficient underwater pelletizing system designed for use with standard products, such as filled Polyolefins, Polyesters and Thermoplastic Elastomers. ZHULI®'s cutting tools deliver spherical pellets of the highest quality that are ideally suited for further processing, with throughput rates of up to 1,200 kg/h. The pelletizing system has a small footprint and is simple to operate.

**MAAG集团在2023年中国国际橡塑展上：**  
德国馆，10号厅，F11展位

**MAAG Group at Chinaplas 2023:**  
German Pavillon, hall 10, booth F11

► **Maag Pump Systems AG**  
Aspstrasse 12, 8154 Oberglatt, Switzerland  
[www.maag.com](http://www.maag.com)

# 塑料的配混和回收以及生物塑料加工的前沿技术

## *Pioneering Technologies for the Compounding and Recycling of Plastics and for the Production of Bioplastics*

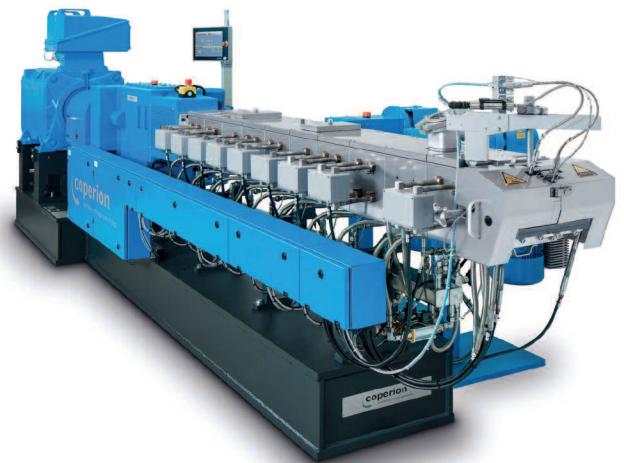
在今年的中国国际橡塑展上，来自德国斯图加特的应用技术提供商科倍隆 (Coperion) 有限公司将展示自己在塑料加工应用领域广泛的前瞻性。凭借深厚的现有基础，科倍隆被认为是塑料回收和生物塑料加工方面的专家。科倍隆将在其展台上展示其在塑料回收方面的专业知识，以及PET回收的模拟完整系统。在这套设备上，我们可以看到来自科倍隆的众多关键部件。最近科倍隆收购了合作伙伴Herbold Meckesheim，与该伙伴合作，科倍隆现在能够提供完整的塑料回收系统。

*At this year's Chinaplas Coperion GmbH will be presenting itself as a technology provider for a wide range of forward-looking applications in the processing of plastics. With an extensive installed base, Coperion is considered an expert in the recycling of plastics as well as in the production of bioplastics. Coperion will bring its expertise in plastics recycling to life at its booth with a virtual complete system for recycling PET. This plant allows a look inside numerous key components from Coperion and recently acquired partner Herbold Meckesheim, with whom Coperion now offers complete systems for plastics recycling.*

此外，科倍隆还将在2023中国国际橡塑展上展示其在传统配混系统方面的专业知识。科倍隆将展示一台ZSK 58 Mc<sup>18</sup>双螺杆挤出机，配有科倍隆 K-Tron K-ML-SFS-KT20双螺杆喂料机，以及STS 25 Mc<sup>11</sup>实验室挤出机，配有Colormax Systems的C/S-LW-NT28双螺杆喂料机。此外，还将展出科倍隆 K-Tron快换喂料机 T35-QC，用于配料补充的2415真空接收器，以及所有科倍隆技术和设备的综合服务。

### 增强的塑料配混，回收和加工生物塑料

在今年的中国国际橡塑展上，科倍隆将展示其ZSK和STS双螺杆挤出机的多功能和高效加工应用，以及其在塑料回收和生物塑料加工等开创性应用方面的工程专业知识。本次展出的ZSK 58 Mc<sup>18</sup>双螺杆挤出机，特性扭矩为18 Nm/cm<sup>3</sup>，产品质量一流，保持了高产量的特性。它已经在中国南京的科倍隆制造基地进行了本地组装。凭借在中国的组装，科倍隆能够对客户的需求做出尽可能快的响应。客户受



将在2023年国际橡塑展上展出的ZSK 58 Mc<sup>18</sup>等科倍隆挤出机，是目前塑料行业面临的挑战的理想解决方案，例如回收塑料或生产生物塑料(图片来源:德国斯图加特的科倍隆)

*Coperion extruders such as the ZSK 58 Mc<sup>18</sup>, which will be on display at Chinaplas 2023, are ideal solutions for the current challenges facing the plastics industry – such as recycling plastics or producing bioplastics (Image: Coperion, Stuttgart, Germany)*

益于本地化的附加价值，节省了运输费用和税收，以及有着更快的交货时间。甚至售后服务也根据当地的零件和需求进行定制。ZSK ZSK 58 Mc<sup>18</sup>挤出机将配备Coperion K-Tron K-ML-SFS-KT20双螺杆失重式喂料机。除了复合和回收，科倍隆挤出机还适用于生物塑料的加工。由于所使用的基础聚合物的多样性和配方的多样性，该工艺对挤出系统提出了很高的要求。科倍隆已经实现了许多种生物塑料生产系统，因此在设计所需的工艺流程方面拥有全面的工程知识，以实现生物塑料最终产品所需的机械性能。

科倍隆将在本次中国国际橡塑展上展示的STS 25 Mc<sup>11</sup>实验室挤出机，螺杆直径为25毫米，设计简单，操作方便，易于清洗。采用与整个STS Mc<sup>11</sup>挤出机系列相同的螺杆，直径比D<sub>0</sub>/D<sub>1</sub>为1.55，相同的最大特性扭矩Md/a<sup>3</sup>为11.3 Nm/cm<sup>3</sup>，生产参数能够可靠地放大到更大的STS型号。为了延长加工窗口，科倍隆将STS 25 Mc<sup>11</sup>的螺杆转速提高到了1200转/分钟。



这样，实验室挤出机非常适合配方开发和基础科学研究，小批量2公斤，实现产量高达110公斤/小时。科倍隆将在展出的STS 25 Mc<sup>11</sup>将与Colormax Systems C/S-LW-NT28双螺杆失重式喂料机一起展出。

### 来自同一家供货商的完整塑料回收工厂

科倍隆和Herbold Meckesheim共同完成了塑料回收的整套设备。从机械加工、塑料的粉碎、洗涤、分离、干燥和凝聚到散装物料的输送以及喂料和挤出，一直到配混和造粒，所提供的系统覆盖了塑料回收的整个工艺链。

科倍隆和Herbold Meckesheim为工业后和消费后废物的机械回收、化学回收、溶剂型回收和除臭提供解决方案，根据回收的塑料类型量身定制。他们将一起在中国国际橡塑展期间展示PET回收的模拟工厂，展示他们在众多塑料回收过程中的专业知识。展台观众可以直接看到工艺流程，并查看关键技术的结构和功能。

### 科倍隆 K-Tron喂料机实现了最大的灵活性

此外，还将展出高精度的科倍隆 K-Tron K2-ML-D5-T35/S60快速更换喂料机，具有ActiFlow™智能散装固体活化器和电子压力补偿(EPC)，以及用于补充的2400系列真空接收器。展出的T35/S60快速更换喂料机(QC)专为需要快速更换物料和方便快速清洗的应用而设计。QC喂料机允许快速拆卸整个供料模块与更换第二个螺杆单元。可提供双螺杆和单螺杆喂料模块。

ActiFlow™智能散装固体活化器提供了一种创新的方法，可以可靠地防止不锈钢料斗中粘性散装物料的架桥和斜孔，而不会引起料斗内部的搅拌。智能助流器对料斗壁施加温和和振动，从而以最佳振幅和频率精细活化所含物料。它是专门设计用于与科倍隆 K-Tron的称重式失重喂料机生产线一起工作。

2400系列真空接收器提供大容量排序系统，主要用于需要更大的输送速率或长距离，在一个或多个目的地的输送应用中。它们是根据高质量标准设计的，适用于大多数行业的粉末，颗粒和颗粒状物料气动输送。输送速率范围为327至6,804千克/小时(720至15,000磅/小时)。2415颗粒接收器也将在2023中国国际橡塑展期间展出。

### 服务

科倍隆为新工厂和现有系统的升级改造开展了密集的研发工作。为此，科倍隆为其所有技术提供全面的维护和现代化升级包，从而将工厂的生产力、灵活性和可靠性提高到一个全新的水平。这种服务使设备运营商能够在最短的时间内充分发挥设备的性能潜力。

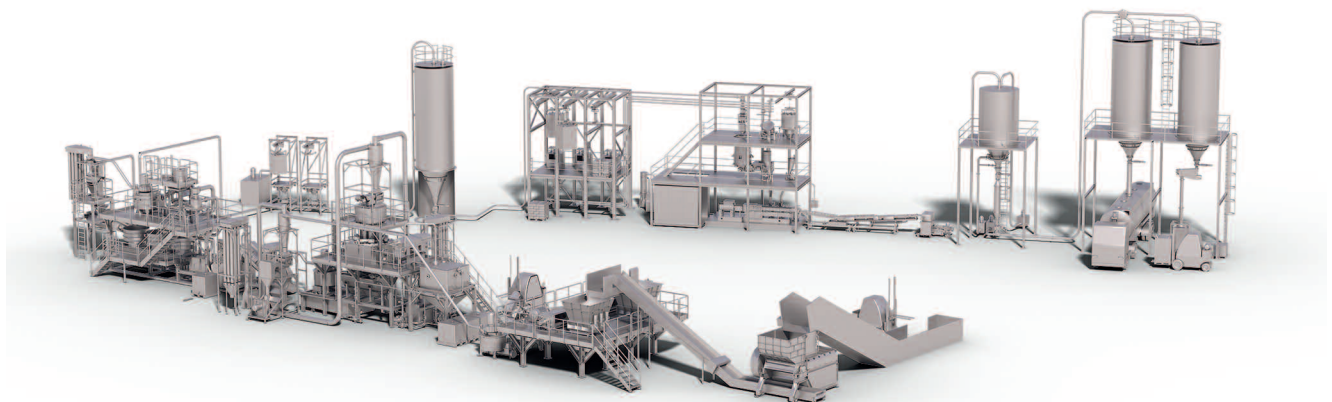
In addition, Coperion will be demonstrating its expertise in conventional compounding systems at Chinaplas 2023. Coperion will show a ZSK 58 Mc<sup>18</sup> twin screw extruder with a Coperion K-Tron K-ML-SFS-KT20 twin screw feeder, as well as the STS 25 Mc<sup>11</sup> laboratory extruder with a C/S-LW-NT28 twin screw feeder from Colormax Systems. In addition, the Coperion K-Tron quick-change feeder T35-QC will be on display together with a 2415 vacuum receiver for ingredient refill, as well as the comprehensive service offering on all Coperion technologies and equipment.

### Enhanced plastics compounding, recycling and processing of bioplastics

At this year's Chinaplas, Coperion will be presenting the versatile and efficient processing applications of its ZSK and STS twin screw extruders as well as its engineering expertise in groundbreaking applications such as the recycling of plastics and the production of bioplastics. A ZSK 58 Mc<sup>18</sup> twin screw extruder with a specific torque of 18 Nm/cm<sup>3</sup> will be on display, characterized by its consistently high throughput capacity with first-class product quality. It has been locally assembled at Coperion's manufacturing site in Nanjing, China. With the assembly in China, Coperion is able to react as fast as possible to customer demand. Customers benefit from local added value, transport and tax savings as well as from shorter delivery times. Even after-sales services are customized to local parts and needs. The

凭借单一来源的完整系统，科倍隆和Herbold Meckesheim正在制定塑料回收的新标准(图片来源:科倍隆，德国斯图加特)

*With complete systems from a single source, Coperion and Herbold Meckesheim are setting new standards for plastics recycling (Photo: Coperion, Stuttgart Germany)*



ZSK 58 Mc<sup>18</sup> extruder will be outfitted with a Coperion K-Tron K-ML-SFS-KT20 twin screw loss-in-weight feeder.

In addition to compounding and recycling, Coperion extruders are suitable for the production of bioplastics. This process places very high demands on the extrusion system due to the diversity of base polymers being used and the variety of recipes. Coperion has already realized numerous systems for the production of bioplastics and therefore has comprehensive engineering know-how in designing the process steps needed to achieve the required mechanical properties of the bioplastic end product.

The STS 25 Mc<sup>11</sup> laboratory extruder that Coperion will show at Chinaplas, has a 25 mm screw diameter and features a simple design. It is operator-friendly and easy to clean. By having the same screw diameter ratio  $D_o/D_i$  of 1.55 and the same maximum specific torque  $M_d/a^3$  of 11.3 Nm/cm<sup>3</sup> as the entire STS Mc<sup>11</sup> extruder series, production parameters can be reliably scaled up to a larger STS model. To extend the process window, Coperion has increased the screw speed of the STS 25 Mc<sup>11</sup> to 1,200 min<sup>-1</sup>. This way the laboratory extruder is ideally suited for recipe development and basic scientific research with small batch sizes of 2 kg and achieves throughput rates of up to 110 kg/h. The STS 25 Mc<sup>11</sup> which Coperion will exhibit at Chinaplas will be shown with a Colormax Systems C/S-LW-NT28 twin screw loss-in-weight feeder.



### **Complete plastics recycling plants from a single source**

Together, Coperion and Herbold Meckesheim realize entire plants for plastics recycling. From mechanical processing – shredding, washing, separating, drying and agglomerating of plastics – to bulk material handling as well as feeding and extrusion all the way to compounding and pelletizing, their systems cover the entire process chain for reclaiming plastics.

Coperion and Herbold Meckesheim achieve solutions for mechanical recycling of post-industrial and post-consumer waste, chemical recycling, solvent-based recycling, and deodorization, tailored to the type of plastic being recycled. Together, they will be showing a PET recycling plant simulation at Chinaplas, demonstrating their expertise in numerous plastics recycling processes. Booth visitors can look directly into the process steps and view the construction and functionality of key technologies.

### **Coperion K-Tron feeders for maximum flexibility**

Also on display will be a high-accuracy Coperion K-Tron K2-ML-D5-T35/S60 quick change feeder, featuring the ActiFlow™ smart bulk solid activator and Electronic Pressure Compensation (EPC) in combination with a 2400 Series vacuum receiver for refill. The T35/S60 quick change feeder (QC) on display is designed for applications requiring quick changeover of materials and convenience of fast cleaning. The QC feeder allows for fast removal of the entire feeding module with screws in place for replacement with a second unit. Twin and single screw feeding modules are available.

The ActiFlow™ smart bulk solid activator offers an innovative method to reliably prevent bridging and rat-holing of cohesive bulk materials in stainless steel hoppers without internal hopper agitation. The smart flow aid applies gentle vibrations to the hopper wall, hereby carefully activating the contained material with the optimal amplitude and frequency. It is designed specifically to work with Coperion K-Tron's line of gravimetric loss-in-weight feeders.

2400 Series vacuum receivers provide a high-capacity sequencing system primarily used where larger conveying rates or long distances are required, in applications with one or multiple destinations. They are designed to high quality standards for pneumatically conveying powder, pellets and granular materials for most industries. Conveying rates range from 327 to 6,804 kg/h (720 to 15,000 lb/h). The 2415 pellet receiver will be on display at Chinaplas 2023.

### **Service**

Coperion conducts its intensive research & development work both for new plants and for their integration into existing systems. For this purpose, Coperion offers comprehensive main-

科倍隆 K-Tron K2-ML-D5-T35快速更换称重喂料机提供高精度和可靠的喂料，具有最大的灵活性(图片来源:瑞士科倍隆 K-Tron)

*The Coperion K-Tron K2-ML-D5-T35 quick-change gravimetric feeder offers high-accuracy and reliable feeding with maximum flexibility (Photo: Coperion K-Tron, Switzerland)*

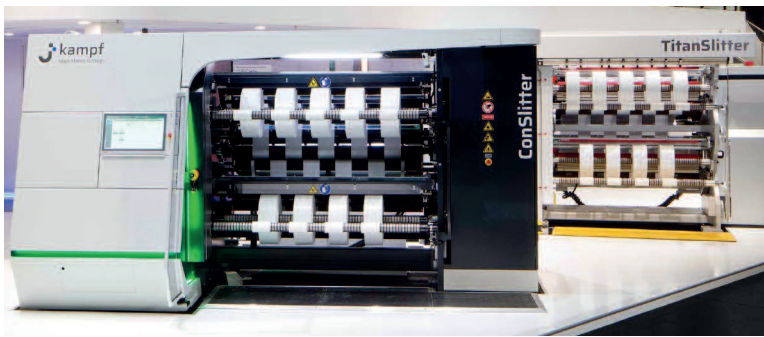
tenance and modernization packages for all its technologies, which increase the productivity, flexibility and reliability of the plants to a significantly improved level. Such services allow plant operators to fully exploit the improved performance potential of the plant after shortest time.

Coperion和Herbold Meckesheim在2023年中国国际橡塑展上：10号展厅，K31展位

Coperion and Herbold Meckesheim at Chinaplas 2023: hall 10, booth K31

► Coperion  
www.coperion.com  
► Herbold Meckesheim  
www.herbold.com

## 将在2023年中国国际橡塑展上展示全系列产品 United Portfolio to be Presented at Chinaplas 2023



康甫的ConSlitter 分切机和阿特拉斯的TitanSlitter 分切机(所有图片: 康甫)

中国国际橡塑展是康甫 (Kampf) 分切和卷绕技术和阿特拉斯纸制品加工 (Atlas Converting) 最重要的贸易展览会之一。卷绕专家团队期待着与行业观众的讨论。本次中国国际橡塑展展会的重点将是阿特拉斯和康甫的联合全系列产品。展台参观者将深入了解新开发的主分切机proslot BlackLine的新设计特点，其设备特性可最佳地满足加工BOPP、越来越重要的BOPE和其它材料的要求。新的康甫主分切机BlackLine具有高度自动化的最大灵活性，不仅仅使BOPET生产商感到高兴。对纸制品加工行业感兴趣的朋友可以了解更多相应的机器。consitter系列和titansitter系列的特点是具有极大的灵活性，由联合团队以一对一的方式处理，并为纸制品加工行业中的每种应用提供正确的解决方案。康甫和阿特拉斯在全球设有7个联合服务分支机构，服务团队规模不断扩大，服务知识和经验不断丰富。

全新的主分切机 / *The new Prime Slitter*



*The Kampf ConSlitter and the Atlas TitanSlitter  
(All images: Kampf)*

Chinaplas is one of the most important trade fairs for Kampf slitting and winding technology and Atlas Converting. The team of winding specialists is looking forward to the discussions with the trade visitors. The focus of the presentation at Chinaplas will be the joint portfolio of Atlas Converting and Kampf. Stand visitors will have an insight into the features of a newly developed primary slitter ProSlitter BlackLine in a new design with equipment features that optimally enable the processing of BOPP, the increasingly important BOPE, and other materials. The new Kampf PrimeSlitter BlackLine for maximum flexibility with a high degree of automation will not only delight BOPET producers. Those interested in the converter industry can find out more about the corresponding machines. The ConSlitter series and the TitanSlitter series are characterised by great flexibility, distributed by a joint team in a one-face-to-the-customer approach, and offer the right solution for every application in the converter industry. Kampf and Atlas offer seven service branches worldwide in the joint service and a considerably enlarged service team, which is constantly enriching its knowledge and experience in service.

Kampf和Atlas在2023年中国国际橡塑展上：10号厅，Q13展位

Kampf and Atlas at Chinaplas 2023: hall 10, booth Q13

► Kampf Schneid- und Wickeltechnik GmbH & Co. KG  
www.kampf.de  
► Atlas Converting Equipment Ltd.  
www.atlasconverting.com/en/

# 充分利用您的挤出模具

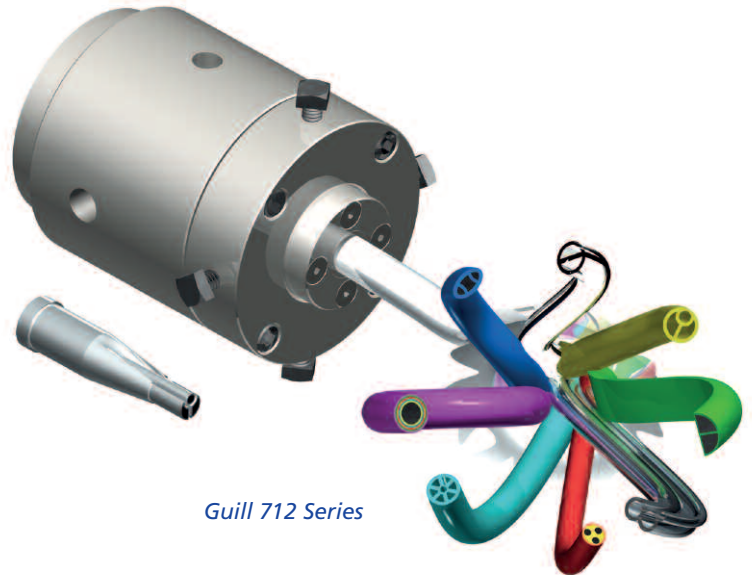
## Getting the Most from Your Extrusion Tooling

作者：Glen Guillemette，总裁

模具维护可以提高医用管材应用的挤出效率，提升质量及整体生产力。

By Glen Guillemette,  
President Guill Tool & Engineering

*Tooling maintenance improves extrusion efficiency, enhances quality and boosts overall productivity for your medical tubing applications.*



通过使用最先进的生产设备和工艺，当今多腔和多层医用管材的加工公差可以降低至最低。需要注意的重要一点是，模具的任何误差都可能在成品中被放大。清洁的零件，尤其是密封和定位表面，是保证产品性能和优质成品的关键。这些表面在制造过程中获得的关注最多，并且是确保整个管材一致性的控制表面。请记住，哪怕直径仅千分之几英寸的灰尘也会对精密机械加工的对位产生影响。人的发径约为0.003英寸（0.08毫米），由于高质量模具中有许多这样的表面，清洁度至关重要。

检查模具是否有任何变形也很重要。毛刺、划痕和刮伤通常是由粗心搬运和/或存放设备造成的。双层和三层挤出头的维护难度更高。密封和定心表面的数量倍增，从而会放大模具不洁净的影响。在更换时，您可以先拆卸挤出头，以便更换化合物和/或头端和模具。异物通常会在此时进入，您必须彻底清除残留物质。由于处理不当和储存技术不佳，通常会在此阶段给模具造成机械损坏。这些零件是精密零件，但同时也笨重、巨大，难以徒手拆卸。建议使用专门配备用于挤出头维护的专用工作车。该工作车配备有备件和硬件，建议购买和使用，特别是考虑到良好维护的模具可帮助您降低成本。您应当注意以下事项：1.) 使用柔软、干净、可恢复的工作表面，保持工作区域干净整洁 2.) 使用软钳口的钳子，例如铜制钳口 3.) 使用特殊设备，如刀尖清除工具等 4.) 标准工具包括扳手、软面锤等 5.) 常备柔软干净的抹布 6.) 使用瓶装喷雾清洁剂 7.) 使用工具供应商建议的妥善管理和储存的备件 8.) 将设备维修/维护手册保存在方便查阅的地方 9.) 使用小型平板，以提供平坦表面 10.) 使用一套适当的量规和顶针进行初始工具位置调整 11.) 确保您拥有所有适当的举升辅助工具，包括高架起重机、液压升降机等。

在大多数情况下，挤出头和模具将仍然处于高温，因此搬运时需要戴配衬里的手套。如今，管路制造商需要与全球的公司竞争。要想成为一家成功、盈利的公司，质量和效率至关重要。在挤出领域尤其如此，因为材料成本通常远高于人工成本。就像一辆身陷凹坑的赛车一样，许多挤出机由于模具不良或损坏而处于闲置状态，并且需要过多的维护时间。管理费用会迅速上升，最终造成亏损。有些挤出机能够快速启动，但只是在制造废料，而另一些挤出机制造的产品超大，无法达到最小容差的要求。10%到20%的材料被浪费，占产品成本的50%到90%。模具供应商在竭尽全力将头端和模具加工到确定的规格，以确保完美的同心度和对位。然后，材料将作为成品的一部分被安放到适当的位置。

### 了解维护程序

例1：在这个例子中，未能正确居中的模具导致计算出的超容差面积达到0.059平方英寸（38平方毫米）。比较这两个表面积时，计算出的材料浪费率占成品的11.8%。公式为：壁厚% = 最小壁厚 / 最大壁厚 × 100。例2：或者，如果壁厚%可以从80%增加到95%，则可以节约大约12%的总成本。当然，成本节约情况会因设计而异。处理沉重和笨重部件时，请寻求帮助。表面和边缘很硬，有点脆，因此零件坠落或相互碰撞可能导致损坏。将模具妥善存放在干燥清洁的地方——最好是每个模具都有专门的存放位置。这些区域应该有柔软的表面，每个器械在清洁后均应盖好。另外，模具应该彼此隔离，以免它们彼此接触。模具和所有器械在储存前应彻底清洁。

拆卸模具时，必须使用专用工具来帮助拆卸。您的供应商可以提供这些专用工具。如果他们不能提供专用工具，请联系

系信誉良好的工具厂商购买替换件。这些工具的成本很容易就被潜在的损坏所抵消，而损坏通常是由不适当的设备（如锤子）和位置偏移造成的。请遵循操作手册中的说明。个别模具可能会有特殊要求，所以，如果有任何不清楚的地方，请联系您的供应商。您的供应商明白，最佳性能取决于正确的保养和维护。这里提供一些有用的提示：1.) 请在设备还热的时候清洁设备，因为此时更容易清除残留物。一次应仅拆卸和清洁一个模具，这样可以保持模具具有较高的温度。2.) 清洁双成分十字头时（塑料和橡胶），先清洁塑料模具，然后再清洁橡胶模具。3.) 切勿使用刮刀或螺丝刀等钢制工具，因为这些工具可能划伤和损坏模具。4.) 不要使用明火，因为这会产生过多的热量，特别是在较薄的部分，从而影响部件的硬度、同心度和容差。推荐的清洁工具和材料包括：a.) 黄铜钳子，用于抓lao材料并协助拉动 b.) 不同宽度的黄铜刮刀，用于清洁平坦的暴露表面 c.) 黄铜丝管刷，直径从1/16英寸到1英寸，增量为1/16英寸（适用于清洁孔和凹槽）d.) 黄铜棒—不同直径的黄铜棒适用于将材料推出流孔 e.) 铜丝网，用于清洁和抛光暴露的圆形或圆锥形表面 f.) 铜刀，用于清除凹槽和其他难触及区域的残留物。另外，抛光化合物用于修复抛光表面 g.) 压缩空气可以更有效地吹除塑料，同时也有助于去除橡胶。小心不要用压缩空气将残留物压入凹槽 h.) 清洁剂也会有帮助，请记住使用新的干净抹布（旧抹布通常嵌有金属屑，可能会划伤抛光表面）i.) 清洁烤箱——仅限于塑料部件。遵循制造商的建议。如果没有指定温度，不要超过850华氏度（454摄氏度）。不要淬火冷却模具，这可能会影响模具的硬度、同心度和容差。j.) 清洗化合物—几种清洗化合物可以用来清洗挤出机螺杆/筒体残留的聚合物和橡胶化合物 清除过量材料以实现最佳的加工效率清洁的零件对挤出模具的性能和加工质量至关重要。密封和定位表面尤其如此，因为它们控制生产过程的一致性。对于工具的一般维护，在储存或工具转换之前，彻底清洁和清除多余材料可确保生产具有精准容差成品所需的精密加工对位。设备应在温度仍然很高时清洁，因为会更容易清除残留的聚合物和橡胶。加热工具时请务必遵守所有MSDS建议。请戴防热手套，以保护手部因接触加热工具表面而受伤。建议使用黄铜刮刀和黄铜或铜绒清洁布，因为它们足够柔软，不会划伤表面。

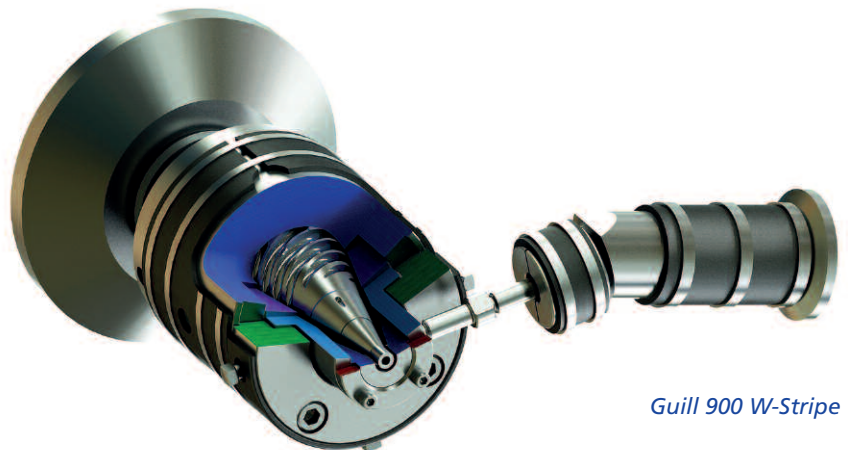
让清洁模具更容易 取出模具的最快方法是利用挤出机的压力将其推出。使用空气压缩机和黄铜钳清洁模具体部，以便材料冷却，从而增加熔体强度，使其成为一体，而不会成为难以去除的弹性胶状物质。使用压缩空气和黄铜钳清洁体部进料口，以同时冷却和去除进料口上多余的残留物。完成此步骤后，用圆形黄铜刷刷表面，以抛光表面。使用黄铜刷仔细清洁2英寸（51毫米）法兰接合器的流动区域。

检查所有表面是否有任何不平整的地方，如毛刺和划痕，因为在重新组装挤出头前必须修复上述现象。大多数制造商建议使用手工抛光石来去除有害的毛刺。使用抛光石清洁后，必要时使用600目砂布进行轻微磨光，但不要打磨本应锐利的边缘。平坦的密封表面也可以用抛光石清洁，然后用600目砂布磨光。将布放在干净、平整的表面上，最好是平板上，然后用手以画圆的方式施加摩擦，直至相应区域干净平整。这些部件应全部为硬化钢合金，不会因使用上述方法而受到不利影响。铬镍铁合金、蒙乃尔合金和哈氏合金通常没有经过热处理，因此需要特殊的养护和处理以避免损坏。

### 不要忽视维修

模具保养有助于确保高质量的挤出产品，即符合尺寸规格、保持指定的最小容差且经济实惠的产品。沾污、未经适当维护和未经妥善调整的模具会导致施用过多的化合物，从而使维持最小厚度容差变得更复杂。过多的材料会导致不必要的成本支出，这会直接影响贵公司的盈利能力以及客户关系。重要的最后一步—重新组装使用专用工具车，按照制造商的说明进行重新组装。在安装之前，请使用干净的抹布对每个部件进行最后的擦拭。必须清除哪怕是极微量的砂砾、污垢和残留物质。对于沉重和笨重部件，使用机械或请他人帮助，以避免不必要的事故。如果需要，在所有紧固件上重涂一次防卡化合物。按照制造商推荐的规格以及建议的顺序拧紧紧固件。手册应当规定了这种紧固顺序，通常以星形图的方式呈现。逐渐拧紧紧固件，直到达到适当的扭矩，以防止模具变形。模具制造商的一个主要目标是尽可能在挤出物刚刚从模具的分布毛细管中被挤出时，快速、准确地在模具的主要部分形成同心圆锥体。设计和制造适当的模具在挤出物入口点附近具有均匀分布，但是一旦模具被调整，这种分布就会受到影响，从而使挤出物向一侧偏移。在主要区域形成一个偏心圆锥体，并且在该过程中仅在一个点存在同心圆锥体，而不是形成体积逐渐减小的平滑连续的流动路径。正确制造和对位精确的挤出头以及良好维护的模具只需很少的调整甚至不需要调整。不必要的模具调整的另一个不利影响是不平衡流动对挤出物产生压力。最终结果是最终产品保留了所产生的这种不平衡，并且发生了不可预测的模口膨胀。

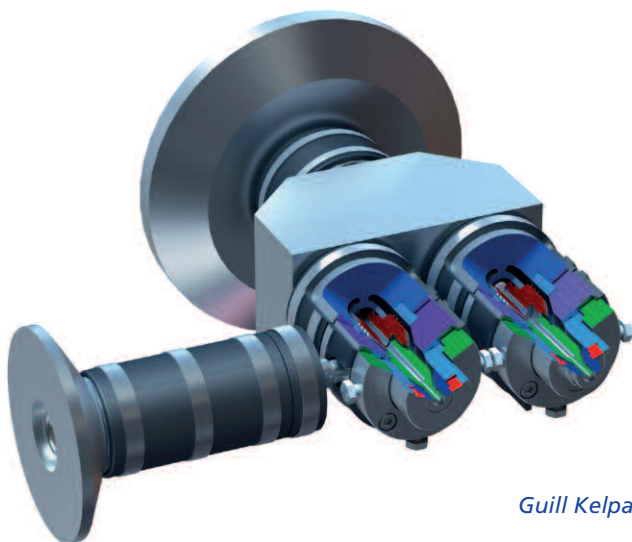
By utilizing state-of-the-art production equipment and processes, machining tolerances are held extremely close on today's multi-lumen and multi-layer medical tubing. It is important to note that any misalignment of the tools may be exaggerated in the final product output. Clean parts, especially with sealing and locating surfaces, are key to product performance and successful end products. These surfaces receive the most care and attention during manufacturing and are the control surfaces that ensure uniformity throughout the tubing.



Guill 900 W-Stripe

Remember, precision-machined alignments are affected by even a speck of dirt measuring only a few thousandths of an inch. A human hair is about 0.003" (0.08 mm), and since there are many such surfaces in a quality tool, cleanliness is critical. Checking of the tools for any deformities is also important. Burrs, scratches and scrapes are usually a result of careless handling and/or storage of equipment. Double and triple-layer extrusion heads pose an even greater challenge for maintenance. The number of sealing and centering surfaces multiplies and can magnify the results of dirty tools. During changeovers, the head may be disassembled in order to change compounds and/or tips and dies. Foreign matter is usually introduced at this point and residual materials must be thoroughly removed. Physical tool damage often occurs during this phase, due to mishandling and poor storage techniques. These are highly precise parts, but can also be heavy and bulky to remove by hand. Use of a dedicated work cart exclusively reserved and equipped for extruder head maintenance is recommended. This cart along with a supply of spare components and hardware is easily justified, especially when examining the potential cost savings that result from well-maintained tools. The following should be considered: 1.) Maintain a clean, organized work area with soft and clean renewable work surfaces; 2.) Use a vise with soft jaws, such as copper; 3.) Use special equipment, such as tip removal tools, etc.; 4.) Standard tools include wrenches, soft-faced hammers, etc.; 5.) Maintain a supply of soft, clean rags; 6.) Use cleaning solutions in spray bottle; 7.) Use spare parts as suggested by your tooling supplier, properly organized and stored; 8.) Keep handy your equipment's repair/maintenance manual; 9.) Have a small surface plate to provide a true flat surface; 10.) Use a set of appropriate gauge and tip pins for initial tool location adjustment; 11.) Make sure you have all the proper lifting aids available, including overhead hoists, hydraulic lifts, etc. In most situations, the head and tooling will still be at elevated temperatures, therefore lined gloves are needed when handling.

Today, tubing manufacturers compete with companies all over the world. To be a successful and profitable company, quality and efficiency are essential. This is especially true in extrusion, where material costs are usually much higher than labor costs.



Guill Kelpac

Like a racing car stuck in the pit, many extruders sit idle because of poor or damaged tooling, plus excess maintenance time. Overhead costs add up and losing money is the result. Some start up quickly and make scrap, whereas others start up and run a product oversized to hold minimum tolerance. They waste 10% to 20% of the material, which can run from 50% to 90% of the product cost. The tooling supplier goes to great lengths so that tips and dies are machined to a determined specification, ensuring perfect concentricity and alignment. The material is then distributed in the proper location as part of the finished product.

#### Understanding Maintenance Procedures

**Example 1:** In this example, with an improperly centered tool, a calculated out-of-tolerance area of 0.059 in<sup>2</sup> (38 mm<sup>2</sup>) was derived. When the two surface areas were compared, the calculated material waste was 11.8% of the finished product. The formula is % wall = min. wall thickness, max. wall thickness X 100. **Example 2:** Alternatively, if the % wall can be increased from 80 to 95%, a savings of about 12% of total cost can result. Savings will vary depending on the designs, of course. Get help for heavy parts and awkward situations. Surfaces and edges are hard and therefore somewhat brittle, so dropping a part or striking parts together can result in damage. Store your tools properly in a dry, clean area – a dedicated spot for each tool is best. These areas should have soft surfaces and each instrument should be covered after cleaning. Also, tools should be segregated so that they do not come into contact with each other. And tools and all instruments should be cleaned thoroughly before storage.

For disassembly of tools, it is imperative to use purpose-built tooling to facilitate disassembly. These should be available from your supplier. If they are not, consult with a reputable tooling house for replacements. The cost of these tools is easily offset by potential damages, frequently caused by improper equipment such as hammers and drifts. Follow the guidelines outlined in your operator's manual. Individual tools may have specific recommendations, so contact your supplier if anything is unclear. Your supplier understands that optimum performance relies on proper care and maintenance. Here are some useful tips: 1.) Clean your equipment while it is still hot as the residue is easier to remove. It helps to remove and clean one piece of tooling at a time in order to maintain elevated temperatures. 2.) When cleaning a dual compound crosshead, (plastic and rubber) clean the plastic tooling first; the rubber second. 3.) Never use steel tools such as scrapers or screwdrivers because these can scratch and mar the tooling. 4.) Do not use open flames because this generates excessive heat especially in thin sections, which can affect hardness, concentricity and tolerances of components. Recommended cleaning tools and materials include: a.) Brass pliers to grip material and aid in pulling; b.) Brass scrapers available in different widths for cleaning flat exposed surfaces; c.) Brass bristle tube brushes that are available in diameters from 1/16" to 1" in 1/16" increments (ideal for cleaning holes and recesses); d.) Brass rods – different diameter rods are good for pushing material out of flow holes; e.) Copper gauze for cleaning and polishing exposed round or conical surfaces; f.) Copper knives for removing residue from recesses and other hard-to-reach areas. Also, polishing compound restores polished surfaces; g.) Compressed air, which is more effective for relea-

sing plastic, but also aids in rubber removal. Be careful not to force debris into recesses with compressed air; h.) Cleaning solutions may be useful, so remember to use fresh, clean rags (used rags often have metal chips embedded in them, which may scratch polished surfaces); i.) Cleaning oven – for plastic only. Follow manufacturer's recommendations. If no temperatures are specified do not exceed 850 degrees F (454 degrees C). Don't quench tooling to cool, as this could affect tooling hardness, concentricity and tolerances. j.) Purging compounds – several are offered to purge the extruder screw/barrel of residual polymer and rubber compounds.

### **Removing Excess Material for Optimum Machining Efficiency**

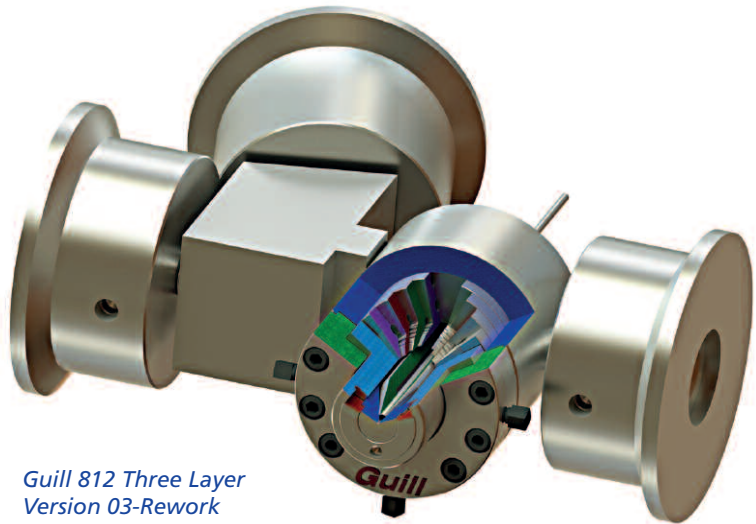
Clean parts are critical to extrusion tooling performance and quality manufacturing. This is especially true for the sealing and locating surfaces – that control uniformity of the production process. For general maintenance of the tools, before storage or tooling changeover, a thorough cleaning and removal of the excess material assures the precision machining alignments required to produce end products to the precise tolerances. Equipment should be cleaned while it is still hot, since residual polymer and rubber will be easier to remove. Be sure to follow all MSDS recommendations when heating the tooling. Thermal gloves are used to protect the hands from the heated tooling surfaces. A brass scraper, as well as a brass or copper wool cleaning cloth are recommended because they are soft enough not to scratch the surface.

**Make Tool Cleaning Easier** The quickest way to remove the die is to employ the pressure of the extruder to push it out. Clean the body by using an air compressor and brass pliers so that the material cools down which increases the melt strength, making it into one-lump versus an elastic, gummy-like substance that is harder to remove. Cleaning the body feed port using compressed air and brass pliers to simultaneously cool and remove the excess residue from the feed ports. This procedure is followed by brushing with a round brass brush that polishes the surface. The flow area of the 2" (51 mm) flange adapter should be cleaned by carefully using a brass brush.

Examine all surfaces for any irregularities such as burrs and scratches since these must be repaired before the head is reassembled. Most manufacturers recommend using a hand polishing stone to remove the offending burr. Follow stoning with a light application of 600-grit emery cloth if necessary, but avoid rounding edges that are intended to be sharp. Flat sealing surfaces can also be cleaned using a stone, followed by a 600-grit emery cloth. Place the cloth on a clean, flat surface, preferably a surface plate, then apply friction in a circular hand motion until the area is clean and even. The parts in question should all be hardened steel alloys and will not be adversely affected using these methods. Inconel, monel and Hastalloy® are typically not heat-treated, requiring special care and handling to avoid any damage.

### **Don't Overlook Repairs**

Tooling maintenance helps ensure a quality extruded product – one that meets dimensional specifications, maintains the speci-



*Guill 812 Three Layer  
Version 03-Rework*

fied minimum tolerance and is economically produced. Dirty, neglected and improperly adjusted tools contribute to excessive compound applications, which in turn complicate maintenance of minimum thickness tolerance. Excess material results in unnecessary costs and these directly affect the profitability of your company and the relationships with your customers.

### **The Important Final Step – Reassembly**

Working from your dedicated tool cart, follow the manufacturer's instructions for reassembly. Give each component a final wipe down with a clean rag before installing. Even the smallest amount of grit, dirt and residual material must always be removed. Use mechanical or manual assistance for heavy and awkward components to avoid unnecessary mishaps. Reapply anti seize compound to all fasteners if required. Tighten fasteners to manufacturer's recommended specifications as well as in the recommended sequence. This fastening sequence should be specified in the manual and is generally in a star pattern. Tighten gradually until the proper torque is achieved to prevent distortion of the tooling. One of a die manufacturer's main goals is to form a concentric cone as quickly and accurately as possible in the primary section of the die – when the extrudate first emerges from the die's distribution capillaries. A properly designed and manufactured die has even distribution close to the extrudate entrance point, but this effort is negated once the die is adjusted, shifting the extrudate off to one side. An eccentric cone is formed in the primary area, and a concentric cone exists at only one point in the process, rather than a smooth, continuous flow path with decreasing volume. A properly manufactured and aligned extruded head, along with well-maintained tooling should require little or no adjustment.

Another adverse affect of unnecessary die adjustment is the stress introduced to the extrudate caused by unbalanced flow. The net effect is the final product retains memory of this imbalance and unpredictable die swell occurs.

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# 高填充PVC管材挤出无需预混

## *Pipe Extrusion: Without Premixing to the Highly Filled PVC Pipe*



TwinEX 93R-34，配置在线添加系统

*TwinEX 93R-34 with inline addition system*

### 直接计量加入白垩支持可持续挤出工艺

灵活性、工艺稳定性和最小化磨损只是巴顿菲尔辛辛那提公司目前推出的高填充物含量的PVC管材生产的部分优势。在K2022展会的展位上，这家挤出专家展示了TwinEX 93-34型平行双螺杆挤出机，该机配有计量装置，可加工多达100份的白垩，无需预混。

### *Direct Dosing of Chalk Supports Sustainable Extrusion Process*

*Flexibility, process stability and minimized wear are only some of the advantages resulting from the production of PVC pipes with high filler content using the solution currently being presented by battenfeld-cincinnati. At its booth at K 2022, the extrusion specialist showcased the twinEX 93-34 parallel twin screw extruder model with a gravimetric dosing unit for processing up to 100 parts of chalk without premixing.*



高比例的填充物白垩使主要用作下水管道的PVC管不仅更便宜，而且还能减少化石材料的使用。在K2022展会上，巴顿菲尔-辛辛那提提出了制造高填充物含量的PVC管的理想解决方案。在生产线上，分别加入基本的PVC配方材料和填料。然后各个部分进入一个收集料斗，再在与其相连的冷混料器中相互混合。混合后，最终配混料通过一个立式计量加料装置传输到挤出机的进料口。混合比和整个物料加工量均以称重方式监测、控制。白垩输送和白垩计量加料线上的所有容器都配有搅拌器。因此，填料在整个路线上保持运动，以防止阻塞。

twinEX 93-34 平行双螺杆挤出机是理想的用于PVC配混料的加工设备。该加工设备采用经专门改造的螺杆几何结构，具有耐磨保护层，可均匀地输送、塑化配混料。这种解决方案的优点是白垩含量可在30份到100份之间变化，可以在任何时间在较短时间内轻松调整到特定产品所需的配方。直接称量计量供入白垩的另一个好处是工艺稳定性极高，可确保最终产品的高质量。而且该工艺无需在加热/冷却混料器中预混PVC和白垩。这种工艺变化有几个好处：集中加热/冷却混料器的尺寸可以较小，或者任何剩余混料能力可用于其他生产线。由于输送的填料直接送入生产线，所以可以防止材料在输送过程中分离。

展会上展示的挤出机和称重计量供料装置结合使用，可使用单层管材模头生产填充密实PVC管材。对于由填充中间层和不含填料的外层构成的三层管材，巴顿菲尔辛辛那提公司提供适用的三层管材模头和锥形共挤出机。采用这种方式可以经济、高效地生产直径达400mm的管材，而且，管材使用后还可再回收。



High proportions of filler chalk make PVC pipes, which are primarily used as sewer pipes, not only cheaper, but also reduce the use of fossil resources. At the K 2022, battenfeld-cincinnati presented the ideal solution for manufacturing PVC pipes with a high filler content. A basic PVC formulation and the filler material are fed separately to the production line. The individual components are then put together in a collection hopper and subsequently blended with each other in the cold mixer connected to it. After mixing, the finished formulation is passed on to the feed opening of the extruder via a vertical dosing unit. Both the mixing ratio and the entire material throughput are gravimetrically monitored and controlled. All containers along the chalk transport and chalk dosing line are equipped with agitators. Thus, the filler material is kept in motion along the entire route to prevent bridging. A twinEX 93-34 parallel twin screw extruder serves as processing unit for the PVC formulation. The processing unit features a specially adapted screw geometry with anti-wear protection to transport and plasticize the blend evenly and homogeneously. The advantage of this solution is its chalk content variability ranging from 30 to 100 parts, which can be

easily adjusted at any time and at short notice to the formulation required for the specific product. A further benefit of direct gravimetric chalk dosing is the enormous process stability, which ensures a high-quality end product. Finally, the process eliminates the need for premixing of PVC and chalk in a heating/cooling mixer. This process change involves several benefits. Central heating/cooling mixers can be kept smaller in size, or any mixing capacities which become free can be made available to other production lines. De-mixing during material transport can be prevented, since the filler material is fed to the production line directly after transport.

With the combination of an extruder and a gravimetric metering unit shown at the fair, solid PVC pipes with filler content can be produced using a mono-layer pipe die. For 3-layer pipes with a filled middle layer and external layers without filler content, battenfeld-cincinnati offers the appropriate three-layer pipe dies and conical co-extruders. In this way, pipes up to 400 mm in diameter can be produced economically and resource-efficiently, which of course can also be recycled after the end of their service life.

► **battenfeld-cincinnati**  
www.battenfeld-cincinnati.com

# 光伏组件封装薄膜的交钥匙挤出生产线

## Film Extrusion: Turnkey Extrusion Line for Encapsulation Film for PV Modules

### 封装用途的薄膜要求高质量

拜雷尔 (BREYER) 的挤出系统 “CellProtect” 能够以高速度高产量生产低收缩率的EVA和POE封装薄膜。另一个好处是没有退火能耗的和中间层，能够经济地生产薄膜，同时实现了节能。

### High Quality Film Requested for Encapsulation Purpose

*BREYER's extrusion system  
"CellProtect" allows the production of low  
shrinkage EVA and POE encapsulation film  
at high production speed – Another*



*benefit – no energy consuming annealing  
and no interlayer film makes the produc-  
tion economic and energy saving.*

光伏(PV)系统用于将阳光转化为电能。能源将继续成为全球经济增长和繁荣的催化剂，而太阳能是可再生能源革命的核心。预计全球光伏市场在未来几年将有相当大的增长。同样，封装材料的需求也在增长，但在生产速度方面存在着物理限制。在常规挤出生产线上生产的封装薄膜自然会有收缩，这不仅会影响到覆膜工艺，而且可能导致损坏集成电路块，因此产生浪费，从而增加了生产成本。

特别是如果为了满足市场的高要求而加快这些常规生产线的速度，收缩就会非常大。结果导致光电组件生产商面临着更高的模块报废率。由于常规的挤出系统，使用压延机或流延辊，受到一定的速度/产量的限制，拜雷尔正在为生产EVA和POE薄膜和其它粘性材料提供有利可图的系统- CellProtect生产线。

高质量和低收缩率的薄膜能够实现平滑和快速的覆膜工艺。薄膜收缩越严重，加热过程必须控制得越仔细，从而增加覆膜时间。

随着拜雷尔CellProtect首次开发的挤出工艺，可以在保持低收缩率的情况下高速挤出EVA薄膜和POE薄膜。这一工艺从一开始就避免了薄膜的张力。因此不需要后续的退火系统。这样，生产线消耗的能量也更少。

由于采用新技术后产量大大提高，因此封装薄膜生产商会拥有更高的盈利能力。对于使用这种低张力薄膜的模块制造商来说，这意味着他们可以采用尽可能高的速度稳定地运行他们的覆膜机。

他们将具有无故障生产与更可靠和高效的制造相结合的优势。因此，著名的模块制造商对低收缩膜非常感兴趣。

由于EVA膜的性能和特性的提高，它将在封装膜和覆膜过程中树立一个全新的标准。除EVA树脂外，还可加工POE等其它密封材料。POE的好处是水蒸气透射率(WVTR)降低10至20，以及不发黄，增加耐紫外线和耐候性能。在新的CellProtect设备上，多层挤出可用于生产采用EVA和POE的层状结构。例如，POE的中间层与EVA的两个外层结合在一起。(EVA / POE / EVA) 25/50/25。这样，EVA的良好粘接性能和POE的良好阻隔性能得以在一种产品中互相结合和补充。EPE薄膜的生产通常采用单层模头和给料块。为了更好的各层分布，拜雷尔也可以提供多层模头。

此外，由于薄膜表面的特殊设计，不再需要PE中间层。膜卷之间无需PE薄膜即可卷绕。此外，有时用于生产EVA薄膜的纸张也不再是必要的。来自切边条的粉碎材料可以再次加工。这不仅节省了成本，还节省了宝贵的资源。

最后，该工艺也可以算作“绿色薄膜生产线”，因为其工艺节省了中间层，离型纸，没有退火系统能耗，冷却回路为闭环，并采用低温挤出工艺。

一些不同的配方，如快速和超快固化，已成功由德国莱茵TÜV（德国技术监督协会）测试，并将成为拜雷尔交钥匙供货的一部分。

相当数量的系统已在全球范围内销售和安装。

Photovoltaic (PV) systems are used to convert sunlight into electricity. Energy will continue to be a catalyst for global economic growth and prosperity and the power of the sun is at the heart of the revolution in renewable energy. The global PV market is forecast with a considerable growth in the next few years. In the same way the demand of encapsulant material is growing. But there is a physical limitation in terms of production speed. Encapsulation film produced on regular extrusion lines has naturally a shrinkage which effects not only the process of laminating but can result in destroyed wafers and therefore creating waste and thus increased production costs.

Especially if such regular lines are speed up in order to serve the high market request, the shrinkage becomes very high. The result is that PV-module producers are faced with a higher scrap rate of modules. Since the regular extrusion systems, using calendars or cast rolls, are limited to a certain speed/output, Breyer is supplying a profitable system for the production of EVA and POE film and other gluey materials – The CellProtect line.

A high quality and low-shrinkage film allows a smooth and fast laminating process. The more shrinkage a film has the more carefully the warm up procedure must be controlled and could increase the laminating time.

With the developed extrusion process of Breyer CellProtect the first time it is possible to extrude EVA film as well as POE at high speed by keeping the shrinkage low. The process avoids tension in the film right from the start. Post annealing systems are therefore not required. In this way the line consumes also less energy.

Encapsulant film producers are faced to a higher profitability by using the new technology since the output is much higher. For

the module manufacturers using such low tension film it means that they can run their laminators more stable and as fast as possible.

They will have the advantage of trouble free production combined with a more reliable and efficient manufacturing. Notable module manufacturers are therefore very much interested in getting low shrinkage film.

Cause of the improved properties and performance this EVA film is about to set a complete new standard in the encapsulation film and its procedure during laminating. Beside of EVA resin also other encapsulant such as POE can be processed. Benefits of POE are a 10 to 20 lower water vapor transmission rate (WVTR) as well as non-yellowing and increased UV and weather resistance. On the new CellProtect machine, multilayer extrusion can be used to produce a layered structure with EVA and POE.

For example, the middle layer of POE is combined with two outer layers of EVA. (EVA/POE/EVA) 25/50/25. This allows the very good adhesive properties of EVA and the good barrier property of POE to be combined/complemented in one product. Usually EPE film is produced with a single layer die and feed-block. For a better layer distribution, Breyer can alternatively also offer a multilayer die.

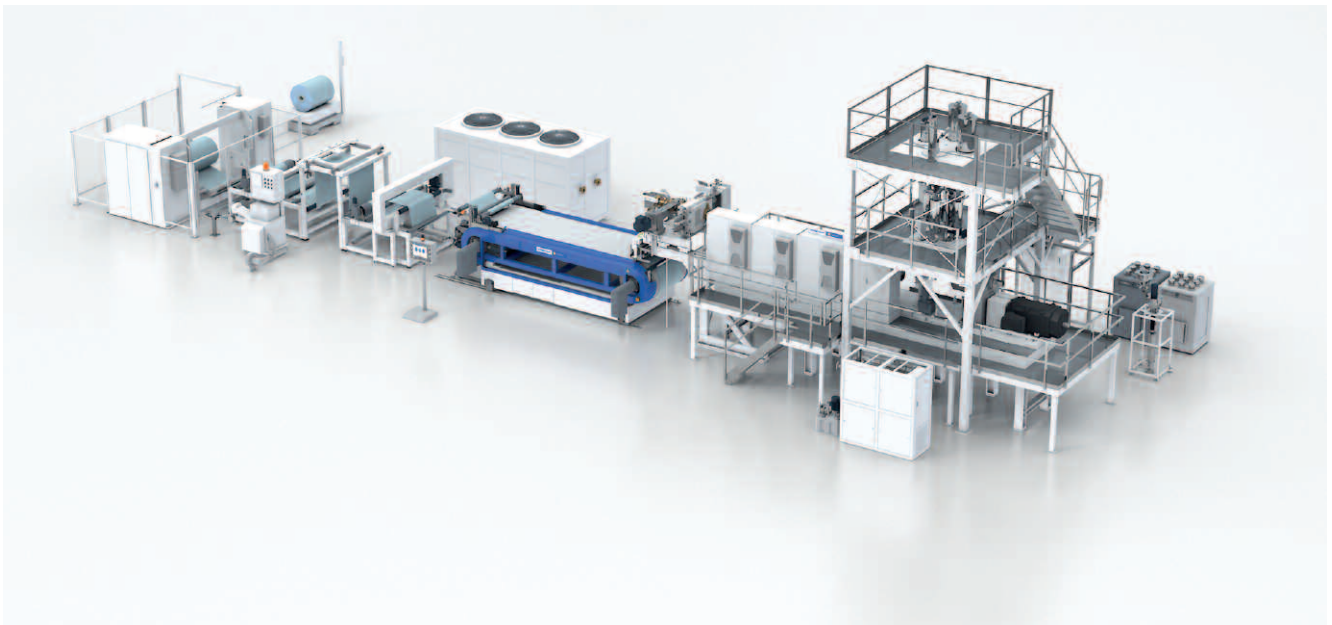
Furthermore, due to the special designed surface of the film, no PE interlayer is necessary anymore. The rolls can be wound without PE film in between. Also carrying paper which is sometimes used for the manufacturing of EVA film becomes unnecessary. Regrind material coming from the edge stripes can be processed again. This saves not only costs but also valuable resources.

Finally the process can also be count as “green film production line”, since its process saves the interlayer, the carrying paper, has no energy consuming annealing system, a closed loop for the cooling circuit, and works with a low temperature extrusion process.

Several different recipes, like for example fast and ultrafast cure, were successfully tested by the TÜV Rheinland Germany and will be part for the Breyer Turnkey supply.

A considerable number of systems were sold and installed worldwide.

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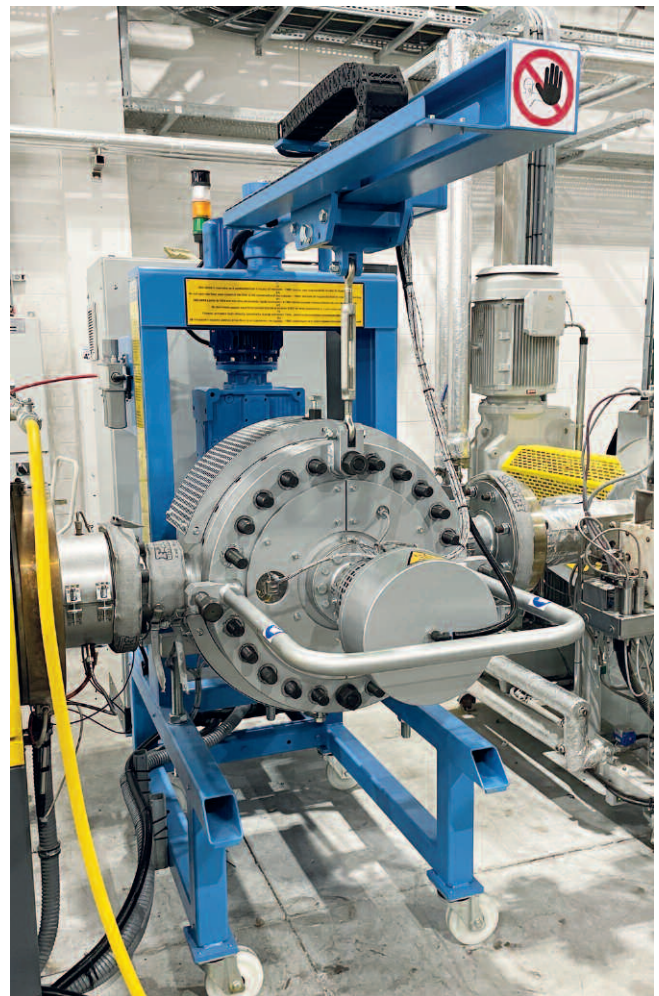


# 用于PET回收的过滤技术

## Recycling: Filtration Technology for PET Recycling

聚对苯二甲酸乙二醇酯，简称为PET，是可回收率最高的塑料之一，在世界范围内广泛应用于许多不同的领域。PET轻便、坚固、耐用且安全，具有许多优点，在塑料中几乎是独一无二的。它优越的性能和可回收性使其成为最具可持续性的包装材料之一。事实上，无论是以原生还是再生的形式，PET在整个欧盟以及许多其他国家都被批准可安全地用于直接接触食品。它的用途在食品、饮料、制药和医疗行业、服装、汽车等领域都有所不同，性能优于其他塑料包装。用于碳酸软饮料、果汁、可稀释饮料和瓶装水的包装瓶，有70%是由PET制作而成。

*PolyEthyleneTerephthalate or simply PET, is one of the most recyclable plastics, widely used world-wide in many different applications. Light, strong, durable and safe, PET offers a number of advantages being almost uniquely among plastics. Because of PET's incredible performance and recyclability it is one of the most sustainable packaging materials. It is in fact approved as safe for use in direct food contact all over EU, as well as many other Countries, both in virgin or recycled form. Its uses vary from food, beverage, pharmaceutical and medical sectors, clothing, automotives, outperforming other plastic packaging. 70% of carbonated soft drinks, fruit juices, dilutable drinks and bottled water are made of PET.*



PET几乎可被无限回收利用，因其可用于制成新产品，从而降低了对原生PET的需求，减少二氧化碳排放，更有助于实现完全循环经济。与原生PET相比，再生PET产品的二氧化碳排放量下降了90%。

大多数在其供应链中使用塑料的主要品牌已经开始评估他们的碳足迹，并采取相应缓解措施，如重新设计包装和轻量化、减少原生塑料的使用、提高可重用性，以及设立再生塑料最低含量目标。品牌商们为实现该目标，便共同扩大对rPET（回收的聚对苯二甲酸乙二醇酯）的需求，并越来越多地相互争夺可用的rPET。推动rPET需求和供应的另一个因素则是针对原生塑料/一次性塑料包装的新法规和税收。

根据欧洲塑料回收商协会（Plastics Recyclers Europe）、欧洲PETCORE协会、欧洲天然矿泉水协会（NMWE）和欧洲软饮料协会联盟（UNESDA Soft Drinks Europe）的一份报告显示，欧洲的PET回收装机容量增长了

21%，rPET不断增长的需求和价格正刺激着对新回收能力的投资，而全球rPET产能预计将在未来五年内大幅增长。

这种对rPET需求日益增长的趋势，导致PET包装产品（包括食品级和非食品级应用）的生产商寻找更多的受污染的PET废料源。

FIMIC的熔体过滤器被公认为是专用于受污染的消费后塑料的最佳过滤技术之一；为了从更多受污染的废物流中获得高质量的再生塑料，便需要使用自动技术来过滤掉熔体流中的杂质和污染物。多年来，FIMIC一直致力于改进其过滤技术，以满足回收商们的需求，包括不断增长的质量需求和不同的材料特性，并将其技术扩展到以前不需要使用连续刮削熔体过滤器的应用，正如PET。

FIMIC已经在PET回收线上安装了两台设备（RAS型过滤器），用于处理污染程度更高的PET废物流，即除来自热洗瓶片之外的废液，例如来自石化废料或用于捆扎带生产的PET

块、废纤维以及PET打包带。在这些情况下，输入材料的污染高达5%，远远高于食品级应用废料的普通“ppm”污染。连续刮削过滤有着显著的好处和优势。这些过滤器专门用于不同的最终应用，在两种情况下都具有优异的性能和卓越的质量效果：在第一个项目中作为预过滤器（激光筛网上应用的过滤为150或120微米），在第二个项目中则是唯一的过滤步骤（激光筛网上应用的过滤为80微米）。在差异较大且时而不一致的iV水平下，各自的产出性能分别为2,000公斤/小时和700公斤/小时。

与此同时，FIMIC增加了用于回收软质PVC的设备数量，而且在这种情况下，由于PVC在回收过程中的敏感性，FIMIC熔体过滤器被证实是最佳的选择，因材料可流动而非停滞不前，才不会降解。最近，FIMIC一直在测试一种适用于硬质PVC的替代解决方案。众所周知，硬质PVC是回收市场上对降解最敏感且硬度最高的材料之一。

对创新的持续研究和对发展进步的热情使FIMIC不断成长，并在日益苛刻的市场中开发创新技术、提供量身定制的解决方案，从而践行其全球使命：通过对塑料的适当回收和最佳再利用实现环境保护。

**P**ET is near-infinitely recyclable and because it can be made into new products, lowers the need for virgin PET, reducing CO<sub>2</sub> emissions and helping to achieve a fully circular economy. Recycled PET products show a drop of up to 90% in CO<sub>2</sub> emissions compared to virgin PET.

Most major brands using plastics in their supply chains have started to evaluate their carbon footprint and take mitigating actions like packaging redesign and light-weighting, reducing the use for virgin plastics, increasing reusability, and setting targets for minimum recycled plastic content. As brands strive to meet their targets, they are collectively expanding demand and increasingly competing for available rPET. Another factor driving the demand for and supply of rPET are the new regulations and taxes on packaging made from virgin plastics / single-use plastics packaging.

Rising rPET demand and prices are incentivizing investments in new recycling capacity – Europe has seen a 21% increase in the installed capacity for PET recycling – according to a report by Plastics Recyclers Europe, PETCORE Europe, Natural Mineral Water Europe (NMWE), and UNESDA Soft Drinks Europe – at the same time global rPET capacity is forecast to boom over the next five years.

This “run” towards ever increasingly demand for rPET, has led producers of PET packaging products (both food grade and non-food grade applications) to look for more contaminated sources of PET waste.



FIMIC's melt filters are recognized as one of the best filtration technologies dedicated to contaminated post-consumer plastics; to reach high quality recycled plastics from more contaminated waste streams, automatic technologies are needed to filter out impurities and contaminations from the melt flow. FIMIC has been working many years now on improving its filtration technologies in order



to meet and satisfy the needs (ever increasing quality needs, different materials characteristics) of recyclers, and expanding its technology to applications that previously did not require the use of continuous scraping melt filters such as, precisely, PET.

FIMIC has already installed two units (RAS-type filters) on PET recycling lines to work with more contaminated PET waste streams, i.e. not coming from hot-washed bottle flakes only, such as for example PET lumps from petrochemical waste or from strapping production, waste fibers as well as PET straps. In these cases the contamination of the input material was way higher than the typical “ppm” contaminations used for food grade applications, reaching levels as high as 5%. The benefits and the advantages of a continuous scraping filtration were significant. Dedicated to different end applications, these filter units are working with an excellent performance and great quality results in both cases: as a pre-filter in the first project (applied filtration is 150 or 120 micron on laser screen) and as the only filtration step in the second one (applied filtration is 80 micron on laser screen). The respective output performances are 2.000 kg/h and 700 kg/h, at very different and sometimes inconsistent iV levels.

At the same time, FIMIC has increased the amount of units installed for the recycling of soft PVC and, also in this case FIMIC melt filters are confirmed to be a winning choice due to the sensitivity of the PVC during the recycling process, as it allows the material to flow without stagnating and therefore without degrading. Most recently, FIMIC has been testing an alternative solution to be applied to hard PVC which we know is one of the most degradation-sensitive as well as the stiffest material in the recycling market.

The continuous research for innovation and passion for improvement keep FIMIC constantly growing and developing innovative technologies and tailored solutions in an increasingly demanding market to achieve its mission worldwide: the protection of the environment through the proper recycling of plastic and its optimal reuse.

► FIMIC SRL

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# 高效率、最先进的 安装了用于PET回收的挤压生产线

## Recycling: Highly Efficient, State of the Art Extrusion Line for PET Recycling Installed

位于韩国纤维制造区的中心，靠近韩国大邱的“韩国纺织发展研究所”KTDI最初成立于30多年前，旨在为纤维制造商提供集中研发。最初，它主要由政府资助，但今天KTDI的资金主要来自为纤维行业提供研发以及测试和培训设施，并得到韩国贸易，工业和能源部和大邱市的支持。

*Located in the centre of Korea's fiber manufacturing region, the „Korea Textile Development Institute“ KTDI near to Daegu, Korea was originally founded over 30 years ago, to provide central research and development for fiber manufacturers. Originally, it was largely government funded however today KTDI's funding comes primarily from providing research and development, as well as testing and training facilities for the fiber industry, with support from the Korean Ministry of Trade, Industry and Energy and from the City of Daegu.*



KTDI 技术中心的回收线，配备格诺斯 MRS 挤出系统、RSFgenius 旋转过滤系统，在线粘度计 VIS  
*Recycling line at KTDI technical center with Gneuss MRS Extrusion System, Rotary Filtration System RSFgenius, Online Viscometer VIS*

KTDI有一个大型技术中心，向公众开放，供一般使用。它对中小型企业特别有吸引力，因为他们可以在KTDI技术中心对设备进行试验，而无需自己投资设备。

随着对可持续性的日益重视，越来越多的纤维制造商正在寻找使用回收材料制造纤维的方法，无论是将消费后的PET瓶片回收为高质量纱线，还是回收纤维生产中的PET纤维废料。

为了在其技术中心使用，KTDI 决定购买一台格诺斯 MRS 70 挤出机，该挤出机带有定量喂料机、真空系统、自动熔体过滤系统和在线粘度计，用于将 PET 废料加工成颗粒，同时考虑到纤维纺丝。使用MRS挤出机，可以将PET废料直接加工成纤维，但对于试验线，加工颗粒/切片的中间阶段提供了更大的灵活性。

### KTDI被格诺斯MRS挤出系统所吸引有几个原因

当将消费后的PET瓶片加工成颗粒（切片）用于纱线制

造时，MRS挤出机提供了通过真空调节PET粘度的机会。MRS挤出机可以喂入未干燥的PET瓶片，并在挤出机的多旋转部分真空下提取水分。真空度决定了去除的水分量以及水解对来自挤出机的PET熔体粘度的影响。

通过在线粘度计的读数，KTDI 可以调整真空度大小，以准确提供所需的 IV，该真空度可能会根据纤维的应用（纺织品或工业等级）而有很大差异。自动粘度控制甚至可以自动改变真空度，以保持设定的粘度。在制造高质量纤维时，一致的粘度非常重要。格诺斯在线粘度计提供准确、可靠和可重复的动态粘度实时测量。

影响KTDI决定使用格诺斯MRS挤出机的另一个特点是能够处理PET工业后纤维废料，该废料具有高残留水分含量并涂有纺丝油。众所周知，这种纤维废料很难回收。

早在2011年，白俄罗斯的Mogilev Khimvolokno就率先使用MRS挤出机处理潮湿的，含有纺丝油并经过团聚的PET工业纤维废料。MRS挤出机的这一非常成功的应用表明，如何

在真空下在挤出机的多旋转脱挥部分高效可靠地提取水分和纺丝油。KTDI也对这一参考非常感兴趣。

KTDI认为MRS挤出机的脱挥性能也等同于良好的去污性能。消费后PET瓶片可以回收用于食品接触应用，符合FDA / EFSA标准。因此，挤出机上制造的颗粒/切片可用于食品接触应用。

为了完善包装，KTDI还指定了格诺斯RSFgenius熔体过滤系统。该系统是自清洁的，即使在处理消费后PET瓶片时遇到的相对较高的污染负荷下，也能提供非常精细的过滤。KTDI的重点是制造需要精细过滤的高质量纤维的颗粒/切片。格诺斯RSFgenius熔体过滤系统提供了这种可能性，而不会在过程中造成干扰，并且滤网片更换间隔较长。

在KTDI将PET回收到纤维级质量的格诺斯生产线引起了人们的兴趣，并在韩国电视上播放。

**K**TDI has a large technical centre which is open to the public and for general use. It is especially attractive to small and medium enterprises as they can run trials on the equipment at the KTDI technical centre, without having to invest in the equipment themselves.

With the increasing emphasis on sustainability, more and more fiber manufacturers are looking for ways of using recycled material for making fibers, whether it be recycling post-consumer PET bottle flake to high quality yarn, or recycling PET fiber waste from fiber production.

For use in its technical centre, KTDI decided to buy a Gneuss MRS 70 Extruder, with dosing feeders, vacuum system, automatic Melt Filtration System and Online Viscometer for processing PET waste to pellets, with fiber spinning in mind. With the MRS extruder, it is possible to process PET waste directly to fibers but for a pilot line, the intermediate stage of processing to pellets/chip gives more flexibility.

### *KTDI were attracted to the Gneuss MRS extrusion system for several reasons*

When processing post-consumer PET bottle flake to pellets (chip) for yarn manufacture, the MRS extruder offers the opportunity

to adjust the viscosity of the PET by means of the vacuum. The MRS extruder can be fed with undried PET bottle flake and the moisture is extracted under vacuum in the multi rotation section of the extruder. The depth of the vacuum determines how much moisture is removed and how much effect hydrolysis has on the viscosity of the PET melt as it comes from the extruder.

Using the reading from the Online Viscometer, KTDI can adjust the vacuum level to give exactly the required IV which can vary considerably depending on the application of the fibers (textile or technical grades). The automatic viscosity control can even automatically vary the vacuum depth in order to maintain the set viscosity. A consistent viscosity is important when high quality fibers are manufactured. The Gneuss Online Viscometer VIS provides accurate, reliable and repeatable real time measurement of the dynamic viscosity.

Another feature which influenced KTDI's decision in favour of the Gneuss MRS extruder was the ability to process PET post-industrial fiber waste, which has both a high residual moisture level and is coated with spin finish oils. This fiber waste is notoriously difficult to recycle.

Already in 2011, Mogilev Khimvolokno in Belarus pioneered the processing of agglomerated wet, spin finish oil treated PET industrial fiber waste with the MRS extruder. This very successful application of the MRS extruder showed how both the moisture and the spin finish oils could be efficiently and reliably extracted under vacuum in the multi rotation devolatilising section of the extruder. This reference was also of great interest for KTDI.

KTDI saw it as a bonus, that the devolatilization performance of the MRS extruder also equates to good decontamination performance. Post-consumer PET bottle flake can be recycled for food contact applications to FDA / EFSA standards. Consequently, the pellets / chip made on the extruder can be used for food contact applications.

To round off the package, KTDI also specified the Gneuss RSFgenius Melt Filtration System. This system is self-cleaning and offers the possibility of very fine filtration even with the relatively high contamination loads which are encountered when processing post-consumer PET bottle flake. The emphasis at KTDI is on manufacturing pellet / chip for high quality fibers, which require fine filtration. The Gneuss RSFgenius Melt Filtration System offers this possibility without causing disturbances in the process and with long intervals between filter element changes.

The Gneuss line for recycling PET to fiber grade quality at KTDI attracted such interest that it was shown on Korean television.



格诺斯MRS挤出系统、旋转过滤系统RSFgenius和在线粘度计VIS在KTDI实验室生产线中的应用  
*Gneuss MRS Extrusion System, Rotary Filtration System RSFgenius and Online viscometer VIS in KTDI lab line*

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# 为塑料垃圾的可持续处理定制的回收机器

## Recycling: Customized Recycling Machines for the Sustainable Processing of Plastic Waste

25年来，新一代回收机械公司(NGR)一直是可持续塑料回收机械领域的先驱之一。这家总部位于奥地利费尔德基亨(Feldkirchen)的公司开发和建造了按需定制的回收机器，用于可持续处理塑料垃圾，并将客户的废料重新转化为理想的原材料。在全球资源保护需求的推动下，这家塑料回收机械专家扩大了在费尔德基亨和多瑙(der Donau)的业务，为下一代回收机械创造出了新的空间。



粉碎机-喂料机-挤出机组合- NXT:GRAN将粉碎机，喂料机和挤出机结合在一起，高效的操作(一步技术)

*SHREDDER-FEEDER-EXTRUDER COMBINATION – The NXT:GRAN combines shredding, feeding and extruding in a single, highly efficient operation (ONE-STEP technology)*

*For 25 years now, Next Generation Recycling-maschinen (NGR) has been one of the pioneers in the field of sustainable plastics recycling. The Feldkirchen-based (Austria) company develops and builds customized recycling machines for the sustainable processing of plastic waste and turns its customers' waste products back into ideal raw materials. Fueled by the global demand for resource conservation, the plastics recycling*

*machine specialist expanded its operations in Feldkirchen an der Donau, creating new space for the next generation of recycling machines.*

### NGR开发和建造按需定制的回收解决方案

NGR的首席执行官Gerhard Ohler强调说：“随着全球对再生塑料需求的增加，对材料的质量要求也在提高。再处理的本效益越高、质量越好、越节能，实际上回收的塑料就越多。”因此，NGR在PIR(工业后回收)、PCR(消费后回收)和PET改进领域孜孜不倦地致力于创新解决方案和定制产品，为客户提供独特的市场优势。借助塑料回收的开创性发展，从“零废料生产”的小规模应用到生产高达3000公斤/小时回收物料的大型工厂，NGR在全球范围内赢得了声誉。全球已经有1500多台机器投入了使用，每小时可减少350至660公吨的二

氧化碳排放。但这家总部位于费尔德基亨的公司绝不会满足于于此。“我们正在不断研发新的解决方案，为我们的客户和环境带来进一步的利益，以继续推动塑料价值创造的转变，”销售和财务总监Wolfgang Pössenberger强调说。“我们正在为更美好的未来而努力，并交付下一代高效回收机。”

### NXT:GRAN树立了新的标准-高效回收的一体化解决方案

新一代的机器，名字就说明了一切。NXT:GRAN使塑料加工业能够实现真正的零废料生产。它保证了剩余材料的全部



价值，并且由于新开发的技术，将劳动力和能源需求减少到绝对的最低限度。NXT:GRAN的使命是越来越多地简化塑料的回收，特别易于维护的NXT:GRAN还依赖于被称为“一步技术”的创新，与传统的回收系统相比，该技术允许塑料废料在一个高效的步骤中进行再处理。物料粉碎、挤出和造粒可由单一系统处理完成，省去了上游的粉碎过程和输送设备，不仅节省空间，而且最重要的是节省能源。这项技术的专利名称为“粉碎机-喂料-挤出机组”，并且减少了带来麻烦的粉尘的形成，并彻底改变了塑料回收过程。除了在粉碎机中增加了切割能力外，NXT:GRAN还通过优化物料进料到挤出机提供增强的动力，该物料进料口布置到挤出机螺杆上方。这种独特的设计在整个物料范围内都能实现显著增加产量。特殊的高质量回收物料可以直接用于各种新制作的终产品的制造，从而节省了原材料，减少了二氧化碳的排放，优化了制造工艺。

然而，NGR不仅发现了后工业材料的改进潜力，而且还发现了PET再加工领域的潜力，并正在用新技术处理废旧PET瓶。

### PET下一代也在改进- PET回收的未来

由于空瓶、薄膜或纺织纤维等PET材料也是制造新产品的宝贵原料，奥地利费尔德基亨的专家提供了一种革命性的解决方案。随着液态缩聚(LSP)工艺的发展，一种全新的可能性已经开发出来了，商品名称为P:REACT，可以利用一种极其高效的工艺将PET回收料再加工成食品级材料。

传统的PET再处理方法改变了材料在固相中的特性，需要花费数小时，而LSP工艺中材料的去污只需几分钟。在NGR的创新工艺中，PET在液相中进行再加工，这保证了塑料的升级和回收同时进行，达到品牌所有者的最高标准。通过熔体再处理，该公司超过了食品级的监管要求(升级回收)，并在全球市场上创造了一个独特的卖点。残存在PET中的杂质和有害物质，如苯，几乎完全被去除，将PET回收带到了一个新的维度。在再加工过程中，发生化学降解的材料性能可以完全恢复，甚至通过LSP工艺得到改善。因此，加工者接收到与通常预期的纯新粒子(原始材料)相同的高质量的回收物流。品牌商测试证实，如果需要，LSP处理后的材料性能甚至比输入材料的质量更高。FDA(美国食品和药物管理局)和EFSA(欧洲食品安全局)的食品级批准证明了LSP工艺可生产出最适合100%食品接触的再生物料。由于特殊的清洁性能，经过处理的PET可以很容易地多次回收，从而比原始PET节省更多宝贵的资源或比其他包装材料(如玻璃)节省更多的能源。



### 工厂扩建:为下一代回收机械提供新空间

在“为更美的未来而工作”的口号下继续提高全球塑料回收率，并能够为客户提供更高效的机器，NGR投资超过1000万欧元，用于费尔德基兴工厂的扩建。在位于费尔德基兴工业园区的公司总部附近，建造的一个新的节能运营设施，为下一代回收机提供了超过10,000平方米的空间。该公司首席运营官Erich Fürst解释说：“就像NGR生产的机器一样，可再生能源的使用和最高的能源效率也是基地扩张的前沿。为了提高能源效率，我们利用地下水热量和机器输出的热量来加热或冷却房屋。因此，我们不需要二次能源。”通过智能规划和可持续能源供应理念，该公司每年可减少288吨二氧化碳排放。15年前建造的第一座建筑物也正在重新设计，并配备了可持续技术。在这个过程中，一个全新的塑料实验室成立了，并广泛配备了比较和评估起始产品和最终产品的塑料质量所需的测量和分析技术。在专门为此目的设立的演示中心，客户可以充分评估设备，并使他们自己相信新获得的原材料的质量。

### NGR develops and builds customized recycling solutions

"As the global demand for recycled plastic increases, so do the quality requirements for the material," emphasizes Gerhard Ohler, CEO of NGR. "The more cost-effective, high-quality and energy-saving the reprocessing achieves, the more plastic will actually be recycled," claims Ohler. For this reason, NGR is working tirelessly on innovative solutions and customized products in the areas of PIR (Post Industrial Recycling), PCR (Post Consumer Recycling) and PET Improvement to provide its customers with distinct market advantages. With the help of pioneering developments in plastics recycling in small-scale applications for "zero-waste production" through to large-scale plants producing up to 3,000 kg/h of recyclate, NGR has made a name for itself worldwide. More than 1,500 machines are already in operation around the globe, saving 350 to 660 metric tons of CO<sub>2</sub> every hour. But the Feldkirchen-based company by no means wants to be satisfied with that. "We are constantly developing new solutions and further benefits for our customers and the environment in order to continue to drive the turn-around in plastics value creation," emphasizes Wolfgang Pösenberger, Director of Sales and Marketing. "We are working for a better future and delivering the next generation of highly efficient recycling machines."

PET回收的未来- LSP:液态缩聚- PET回收机P:REACT是PET再加工的革命

*The future of PET recycling - LSP: Liquid State Polycondensation – The PET recycling machine P:REACT is revolutionizing PET reprocessing*

**The NXT:GRAN sets new standards –  
The all-in-one solution for efficient recycling**

With this new generation of machines, the name says it all. The NXT:GRAN enables the plastics processing industry to achieve true zero-waste production. It guarantees full value retention of the material and, thanks to newly developed technology, reduces labor and energy requirements to an absolute minimum. With its mission to simplify the recycling of plastics more and more, the particularly maintenance-friendly NXT:GRAN also relies on so-called "ONE-STEP technology" which, in contrast to conventional recycling systems, allows plastic waste to be reprocessed in a single highly efficient step. Material shredding, extrusion and granulation can be handled by a single system, and upstream shredding processes and conveying equipment are eliminated, saving not only space but above all energy. This technology, patented under the name shredder-feeder-extruder combination, also reduces problematic dust formation and has revolutionized plastics recycling. In addition to the increased cutting capacity in the shredder, the NXT:GRAN provides additional power through an optimized material feed to the extruder, which is positively arranged to the extruder screw. This unique design achieves a significant increase in output across the entire material spectrum. The extra high-quality recyclate recovered can be fed directly into the manufacture of a wide variety of new end products, thus saving raw materials, reducing the CO<sub>2</sub> footprint and optimizing manufacturing processes. However, NGR has identified potential for improvement not only in post-industrial materials, but also in the field of PET reprocessing and is tackling used PET bottles with new technologies.

**Next Generation also in PET Improvement –  
The Future of PET Recycling**

Since PET materials such as empty bottles, films, or textile fibers are also valuable raw materials for the manufacture of new products, the specialists from Feldkirchen offer a revolutionary solution. With the Liquid State Polycondensation (LSP) process, a completely new possibility has been developed under the trade name P:REACT for reprocessing PET waste into food-grade material making use of an extremely efficient process. While conventional PET reprocessing methods change the material properties in the solid phase, taking many hours, the decontamination of the material in the LSP process takes only a few minutes. In this innovative process from NGR, PET is reprocessed in the liquid phase, which guarantees simultaneous upgrading of the plastic and recycling to the highest standards of brand owners. With melt phase reprocessing, the company exceeds regulatory requirements towards food grade (upcycling) and has created a unique selling point in the global market. Impurities and hazardous substances stored in PET, such as benzenes, are almost completely removed, taking PET recycling to a new dimension. The material properties, which are chemically degraded during reprocessing, can be completely restored, and even improved, by the LSP process. As a result, the processor receives a recycled material stream of the same high quality as is generally expected from the original granulate (virgin material). Brand owner tests confirm that, if required, the material properties after the LSP process are even higher quality than those of the input material. Food grade approvals by the FDA (Food and Drug Administration - USA) and the EFSA (European Food Safety Authority) certify that the LSP process produces the most



位于奥地利费尔德基兴/多瑙(Feldkirchen/ Donau)的新型节能NGR工厂为进一步推进循环经济的创新和个性化解决方案提供了足够的空间(图片©Kurt Hörbst)

*The new energy-efficient NGR plant in Feldkirchen/Donau (Austria) offers sufficient space for innovations and individual solutions to further advance the recycling economy (Photo © Kurt Hörbst)*

suitable recyclate for 100% food contact. Due to the extraordinary cleaning performance, the processed PET can easily be recycled multiple times and thus saves further valuable resources compared to virgin PET or energy than other packaging materials such as glass.

**Plant expansion: new space for the next generation of recycling machines**

In order to continue to increase plastics recycling rates worldwide under the slogan "Working for a better Future" and to be able to offer ever more efficient machines for its customers, more than 10 million EUR was invested in the expansion of the Feldkirchen site. Near the company's headquarters in the Feldkirchen industrial park, a new, energy-efficient operating facility was built offering over 10,000 m<sup>2</sup> of space for the next generation of recycling machines. "Just as with the machines produced by NGR, the use of renewable energies and maximum energy efficiency are also at the forefront of the site expansion," explains Erich Fürst, COO of the company. "For energy efficiency, we use both groundwater heat and the heat output of our machines to heat or cool the premises. As a result, we don't need a secondary energy source." Through intelligent planning and a sustainable energy supply concept, the company thus saves 288 tons of CO<sub>2</sub> annually. The first building, which was constructed 15 years ago, is also being redesigned and equipped with sustainable technology. In the process, a completely new plastics laboratory was set up and extensively equipped with the measuring and analysis techniques needed to compare and evaluate the plastic qualities of the starting and end products. In a demonstration center set up especially for this purpose, customers can fully evaluate the equipment and convince themselves of the quality of their newly obtained raw materials.

► **Next Generation Recyclingmaschinen GmbH (NGR)**  
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# 新一代AllRoundDia DualVision系统- 现在可用于所有颜色及哑光和有光泽 的表面

## Quality Control: Next Generation of the AllRoundDia DualVision System – Now for All Colours and for Matt and Glossy Surfaces

测量技术专家PIXARGUS对其圆形产品的小预算系统AllRoundDia DualVision进行了重大升级。这种二合一的检测系统，旨在连续360°测量软管、管材和电缆的整个表面和轮廓，采用了新开发的发光环和新的照明理念。有了这些新的先进功能，该系统现在还能够测量和检查光滑的圆形产品和透明、半透明的软管。

*Measuring technology specialist PIXARGUS has enhanced its small-budget system for round products – AllRoundDia DualVision – with a major upgrade. This two-in-one inspection system, designed to measure both the entire surfaces and contours of hoses, tubes and cables continuously and through 360°, has been fitted with a newly developed light ring and a new lighting concept. With these new advanced features, the system is now also*

新一代系统的外观略有不同——原因很充分：它不再是早期系统典型的欧米茄形状的开口式光环，而是一个完全闭合的照明场。一些内部组件也进行了修改：例如，测量头中的LED阵列采用了新的漫射材料，以优化光的扩散。



PIXARGUS的下一代AllRoundDia DualVision系统具有闭合的照明场。这提供了更均匀的照明，因此有着比以前更好的光输出。这样，光滑圆形产品或透明、半透明软管的表面检测不再是问题

*The next-generation AllRoundDia DualVision system from PIXARGUS feature a closed illumination field. This provides more homogeneous lighting and, as a result, an even better light yield than before. Therefore, surface inspection of glossy round products or translucent and semi-transparent hoses is no longer a problem*

*able to measure and inspect glossy round products and translucent, semi-transparent hoses.*

### 新的照明理念

该系统采用了一种全新的、经过根本性改进的照明理念。PIXARGUS负责系统技术升级的项目工程师解释说：“有了新理念，我们实现了测量场的均匀照明和明显更好的光输

出。”决定传感器对比度和细节层次的粗糙度参数可以更精细地调整。“无论我们检查的对象是白色、黄色、绿色、红色、透明、哑光或光滑的表面，该系统的设置灵敏度可达99.9%。”优化的检测和测量软件消除了所有反射干扰。

#### 组合或单独使用表面检测和尺寸测量

基础测量技术也得到了升级。以前的系统只能同时进行尺寸测量和表面检测，升级后的系统提供了根据需要开通或关闭几何测量模块的选项。

#### 用手指的滑动操作放大显示缺陷图像

新一代AllRoundDia DualVision进一步增强了其更舒适的集成人机界面（HMI）。早期系统的人机接口只能在10英寸屏幕上并排显示与尺寸和表面相关的信息，但现在也可以分别显示这些信息。操作员可以通过简单的导航手势调用特定的视图，比如某些表面区域。因此，只需用手指轻轻一划，就可以在显示器上将缺陷图像放大。

#### 经过验证的、广泛的产品应用范围-具备更多的即插即用能力

通过分析现有的参考样品和以前的客户样品，特别是具有光滑表面的样品，PIXARGUS已经将新一代的AllRoundDia DualVision产品建立在一个非常广泛的产品验证的基础上。

我们取得了明显的成功：“当我们现在收到来自客户的请求时，我们所需要的就是执行一个快速的抽样检查。PIXARGUS销售经理Michael Frohn说：“在90%以上的情况下，我们可以采用‘现货’非定制销售。对于各种各样的材料，系统参数是出厂前预先设定好的。因此，在客户现场调试通常只需要一天时间。PIXARGUS团队对这一结果感到非常高兴：“通过我们升级的系统，我们创建了即插即用的新标准。”在我们的客户现场进行的几次安装调试已经证明它是有效的。



如果系统需要重新校准，操作人员可以通过PIXARGUS专门为AllRoundDia DualVision系统开发的自动校准套件，客户能够以最小的工作量完成软件程序。因此，客户不再依附于可能影响生产过程的固定校准间隔

*If the system requires recalibration, the operator can perform this with minimum effort via the software program using the auto-calibration kit that PIXARGUS has developed specifically for the AllRoundDia DualVision systems. Thus, the customers no longer depend on fixed calibration intervals that may interfere with the production process*

The new-generation system comes in a slightly different look – for a good reason: Instead of the open light ring that gave the earlier system its typical omega shape, it now has a completely enclosed illumination field. Some of the interior components have also been modified: The LED arrays in the measuring head, for example, have been fitted with new diffuser material to optimize light diffusion.

升级版AllRoundDia DualVision经过验证，可以分析更广泛的产品。该系统出厂时提供大量产品和材料的预设参数。参数可以通过显示屏上的产品选择菜单调出

*The upgraded version of AllRoundDia DualVision is validated for analysis of an extended range of products. The systems are supplied ex works with data preconfigured for numerous products and materials. The data can be called up via the product selection menu on the display*

### **New lighting concept**

The system uses a new, fundamentally modified lighting concept. "With the new concept, we achieve a very homogeneous illumination of the measuring field and a significantly better light yield," explains the project engineer responsible at PIXARGUS for the technological upgrade of the system. The roughness parameters that determine the contrast and level of detail for the sensors can be adjusted much more finely. "The system's settings can be made with a sensitivity of 99.9%, no matter whether we are inspecting white, yellow, green, red, transparent, matt or glossy surfaces." The optimized inspection and measuring software eliminates all interfering reflections.

### **Combined or separate use of surface inspection and dimension measurement**

The underlying measuring technology has also been upgraded. While the previous systems could only perform dimension measurement and surface inspection in parallel, the upgraded system provides the option to switch the geometry measuring module on and off, as desired.

### **Display of defects magnified with a swipe**

A further enhancement of the new AllRoundDia DualVision generation is its more comfortable integrated HMI. While the HMI of the earlier systems were only able to show the dimensional and surface-related information next to each other on the 10-inch screen, it is now also possible to display the information separately. The operator can call up specific views, such as certain surface areas, with simple navigation gestures. Thus, defect images can be magnified on the display virtually with a swipe of your finger.

### **Validated for a wide product range – for more plug and play capability**

By analyzing existing reference samples and previous customer specimens, in particular specimens with glossy surfaces, PIXARGUS has put the new AllRoundDia DualVision generation on a well validated basis for a very wide range of products. With obvious success: "When we receive a request from a customer now, all we need to do is perform a quick sample check. In more than 90% of the cases, we can sell the system 'off the shelf'," says PIXARGUS Sales Manager Michael Frohn. For a wide range of materials, the product data are preconfigured ex works. Hence, commissioning at the customer's site takes just one day as a rule. The PIXARGUS team is very happy about this result:



现在还可以分别调看尺寸和表面信息。例如，可以选择某些表面区域的视图，并通过手指的滑动放大缺陷图像

*Dimension and surface information can now also be called up separately. It is possible, for example, to select views of certain surface areas and magnify defect images virtually with a swipe of your finger*

"With our upgraded system, we have created a new standard for plug and play." Several commissionings at our customers' sites have shown that it works.

#### ► PIXARGUS GmbH

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# 引领潮流的产品开发- 开始生产技术创新的复合建筑用膜材

## Composite Film – Case Study: Trend-setting Product Development – Production of Innovative Technical Composite Construction Films Started

在过去的几个月里，德国公司Dörken已经将SML的两条新生产线投入运营。高透湿性的屋顶和立面膜是公司产品组合的一部分。除了创新的性能外，大量的新型复合膜材由于其特别节省资源和高效的制造工艺而引起了人们的注意。在很大程度上，产品和生产工艺是在SML的技术中心开发的——甚至在Dörken的生产线规划或安装之前。

*In the past few months, the German company, Dörken, has put two new production lines from SML into operation. Highly permeable roof and facade membranes are manufactured as part of the company's product portfolio. In addition to innovative properties, a large number of the new composite films are making a statement due to their particularly resource-saving and efficient manufacturing processes. To a large extent, the products and production processes were developed in SML's Technology Center – even before the lines were planned or installed at Dörken.*



Dörken-首席技术官, Christian Harste

*Christian Harste, Dörken-CTO*

说到建筑行业的膜材，Dörken是欧洲市场的领导者。2022年秋季，该公司在北莱茵-威斯特法伦州的Hagen-Vorhalle开设了一个新的生产基地，来自SML的两条共挤涂布和复合生产线现已投入运行。这些量身定制的设施在功能、质量监控和自动化程度方面树立了新的标准。

### 提前在SML技术中心进行产品开发

SML 区域销售经理Dirk Beckendorff解释说：“这个项目的非凡之处在于，Dörken并没有在自己的工厂开展大量的产品开发过程，而是在安装于我们技术中心的工业规模FlexPack®生产线上进行。SML的产品开发过程持续了数年时间，其中包括SML DoubleCoat工艺的基本试验，Dörken最重要产品的一系列测试，以及新屋顶膜材的开发和采样的几次测试。由于在Dörken的生产线投入使用之前就可以对许多产品进行认证，从而大大加快了整个产品的开发过程”。Dörken的首席技术官 Christian Harste作了补充说明：“对我们来说，从SML提供的机会中获益很重要。除了确认已知的配方和工艺外，我们

还能够在非常早期的阶段使用SML的试验工厂进行创新。原则上，我们已经积极地将SML的设施整合到我们的Stage Gate工艺中。”在这两条生产线安装完成后，Dörken公司立即开始了正常生产。

### 产品的新标准

Dörken的两条多用途涂布和复合生产线之一配备了SML的专利DoubleCoat技术。该技术可以结合粘合剂和挤出涂布工艺生产超薄和高透气复合产品。它能够为建筑行业制造各种各样的技术复合材料，如防潮隔气或防水卷材。

第二条生产线是由两个一体化的粘合剂辊式涂布机组成的联合生产线，用于在同一个生产步骤中制造高透气性的屋顶和立面膜。

与市场上的传统产品相比，TPU膜材的厚度可以大大降低。由于新颖的系统技术，可以显著提高水气渗透值。同时在使用寿命方面，产品的性能优异。Dörken的首席技术官 Christian Harste作了说明“我们的新型衬底膜材其耐用性已得

到证明，长期保护的特性令人印象深刻。极高的质量和长期测试以及特殊的测试程序证实了其非凡的弹性。这种新一代产品具有高弹性和一体化自粘边缘，是各种应用的完美解决方案。它可以实现更高的能源效率和更高的生活舒适度，”

#### 直观的操作-综合检测系统

SML软件应用工程师开发的SMILE控制系统是两条生产线的核心要素。这使得生产线的操作非常直观，可以根据各自的生产过程和相关功能进行定制。SML产品经理Johannes Danter指出：“综合检测系统和我们的数据管理工具BitWise，确保对两套设施的整个工艺链进行全面监控。每个产品的生产参数都可以完全追踪”。对于Dörken而言，要遵守最严格的质量标准，特别是长期让产品满足市场的需求，这是一个巨大的帮助。

#### 现代化显著提高了效率

来自SML的两条生产线由于其较低的原材料消耗，使得效率大幅提高。与以前可用的设施和工艺技术相比，新一代高透气屋顶和立面膜材的生产只需一个生产步骤。此外，该生产线的生产速度相对较高，可达120米/分钟。在节省大量时间的同时，生产过程中产生的废料也减少到了最低限度。

SML的两条新生产线取代了现有的几家工厂，为Dörken提供了生产创新膜材的机会。他们强调：Dörken的目标是尽可能经济地制造、高效利用资源，并通过进一步的开发工作大大改善产品性能。

When it comes to membranes for the construction industry, Dörken is European market leader. In autumn 2022, the company opened a new production site in Hagen-Vorhalle in North Rhine-Westphalia, where the two coextrusion coating and laminating lines from SML are now up and running. The tailor-made plants are setting new standards in terms of functionality, quality monitoring and the degree of automation involved.

#### Previous product development at SML's Technology Center

"The remarkable thing about this project is that Dörken did not carry out substantial parts of the product development process at its own plants, but on an industrial scale FlexPack® line located in our Technology Center," Dirk Beckendorff, Area Sales Manager at SML, explains. The product development process at SML took several years: Among other things, it included basic trials with the SML DoubleCoat process, test series with the most important products of Dörken's portfolio and several test runs for the development and sampling of new roofing membranes. Since it was possible to certify a number of products even before the lines were commissioned at Dörken, the over-all product development process was accelerated quite significantly. "It was important for us to benefit from the opportunity offered us by SML. In addition to confirming the known recipes and processes, we were able to use SML's pilot plant for our innovations at a very early stage. In principle, we have actively integrated SML's plant into our Stage Gate process," Christian Harste, CTO at Dörken, clarifies. Immediately after the installation of the two lines, Dörken was able to start regular production.

#### New standards for products

One of the two multi-purpose coating and laminating lines at Dörken is equipped with SML's patented DoubleCoat technology. This technology enables a combined adhesive and extrusion coating process for the production of ultra-thin and highly breathable laminates. It allows the manufacturing of a wide variety of technical composites for the construction industry, such as vapor barriers or waterproofing membranes.

The second production line is a combined line with two integrated adhesive roll coaters for the manufacturing of highly breathable roofing and facade membranes in one production step.

The thickness of the TPU membranes can be considerably reduced, compared to conventional products available on the market. Thanks to the innovative system technology, significantly improved water vapor permeability values can be achieved, with, at the same time, excellent product properties with regard to longevity. "Our new underlay membranes are impressive with their proven durability and thus long-term protection. Extreme quality and long-term tests as well as special test procedures confirm their extraordinary resilience. With a high elasticity and integrated self-adhesive edges, this new generation of products is the perfect solution for a wide variety of applications. It enables a higher energy efficiency and a raised living comfort," Dörken-CTO, Christian Harste, states.

#### Intuitive operation – integrated inspection systems

A central element in both production lines is the SMILE control system developed by SML software application engineers. This enables the highly intuitive operation of the lines, tailored to the respective production process and the associated functionalities. "Integrated inspection systems and our data management tool, BitWise, ensure the comprehensive monitoring of the entire process chain at both plants. The production parameters of each product can be completely traced," SML product manager, Johannes Danter, points out. This is an enormous help to Dörken when complying with the strictest quality standards, especially regarding the long-term product guarantees the market demands.

#### Modernisation with a significant increase in efficiency

The two production lines from SML allow a massive increase in efficiency because of their lower raw material consumption. Compared to the plant and process technology previously available, the production of the new generation of highly breathable roofing and facade membranes takes place in just a single production step. In addition, the lines operate at a comparatively high production speed of up to 120 m/min. Along with considerable time savings, the waste generated during production is reduced to a minimum.

The two new lines from SML replace several existing plants and give Dörken the opportunity to produce innovative membranes. They emphasize Dörken's claim to manufacture as economically and resource-efficiently as possible – with greatly improved product properties achieved through further development work.

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# 瓶到纤维和瓶到瓶应用 –

## 印度回收品牌Go Rewrite的两条史太林格 PET回收线

### Recycling:

### Bottle-to-Fibre and Bottle-to-Bottle –

### Two Starlinger PET Recycling Lines for Indian Recycling Brand

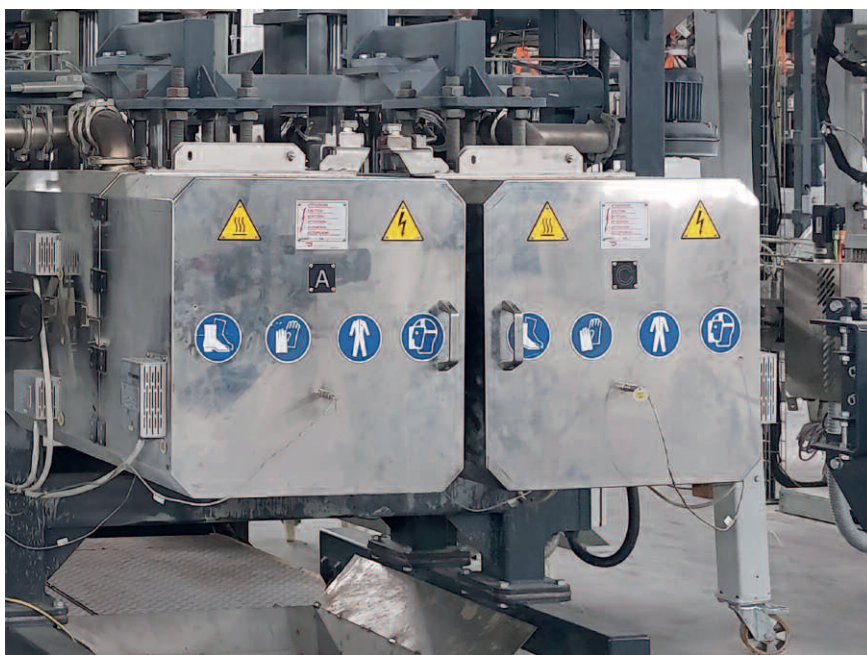
Ganesha Ecopet Private Limited是印度PET回收引领者Ganesha Ecosphere Ltd公司的子公司，最近以Go Rewrite品牌在瓦兰加尔开设了新的工厂，生产用于长丝纱线和纤维以及食品级包装的rPET。

*Ganesha Ecopet Private Limited, a subsidiary of Indian PET recycling pioneer Ganesha Ecosphere Ltd., has recently opened its new Warangal facility under the brand name Go Rewrite where it produces rPET for filament yarns and fibres, as well as for food-grade packaging.*

该公司在其位于特兰加纳州瓦兰加尔的工厂安装了两条史太林格PET回收线。Ganesha Ecopet计划在其新引进的品牌企业Go Rewrite下供应生产的rPET颗粒。Go Rewrite成立于印度rPET行业领导者之一的树荫下，将致力于提供以资源高效工艺生产的最高质量rPET产品。

#### rPET在纤维的应用

第一条史太林格回收线是recoSTAR PET 165 H-VAC，用于处理洗涤PET瓶片，用于Go Rewrite涤纶长丝应用，年产量约为14000吨。当使用回收PET生产长丝纱线时，必须符合最高质量标准。因此，在挤压过程之前，必须清除所有外来颗粒和其他聚合物。为了达到挤出的最佳熔体纯度，史太林格为纤维应用开发了一种特殊的烛式过滤器，称为快速套筒更换器（RSC）。它确保了最低15微米的最佳熔体过滤，并达到每



RSC过滤器是史太林格专门为纤维和纱线应用开发的烛式过滤器。它确保了最低15µm的最佳熔体过滤，这对于满足聚酯纤维生产的质量要求至关重要（所有图片©Starlinger）

*The RSC filter is a candle filter which Starlinger has developed especially for fibre and yarn applications. It ensures finest melt filtration down to 15 µm which is crucial in order to meet the quality requirements for polyester fibre production (Pictures © Starlinger)*

小时2000千克的产能。可以在不中断生产的情况下更换滤芯，从而显著减少熔体损失和机器停机时间。

#### 食品级保证

Ganesha拥有第二条史太林格回收线，用于生产食品级rPET颗粒。Go Rewrite高级副总裁Prashant Khandelwal表示：“通过比较冒险的方式进入瓶到瓶的回收领域，我们希望进行封闭式循环，从二次回收过渡到一次回收。瓶到瓶回收减少了对原生的需求，从而大大减少了地球上的塑料负担。与原生料相比，仅需要大约80%的资源即可生产出新的瓶子，包括水、能源等。早些时候，品牌所有者曾担心在其包装产品中加入rPET的食品安全问题，但随着新技术和政府的严格规定，市场对rPET的需求正快速增长。”

安装在Ganesha Go Rewrite工厂的史太林格recoSTAR



PET 165 HC iV+瓶到瓶回收系统具有SSP（固态缩聚）反应器，用于生产食品级洁净的rPET颗粒。2022年6月底，欧洲食品安全局对该工艺发表了积极的意见。该生产线已于2022年7月开始生产，每小时的回收PET颗粒产量高达1800公斤。这些食品安全级rPET供应给注重环境保护和质量的品牌商，这些品牌商在其品牌包装中使用它。

Khandelwal描述了公司在食品级应用方面面临的特殊挑战：“原料质量变化很大，尤其是在印度。废料含有各种杂质，进入工厂的每一批原材料都是不同的。我们花了30年时间来理解和掌握处理此类废料的艺术。凭借世界上最好的回收技术，我们现在可以达到食品级应用所需的质量。”

随着新的PET瓶到瓶回收工厂的建成，Go Rewrite跻身于印度首批回收PET品牌之列，为当地和国际包装市场提供更多食品级rPET。

据Khandelwal称，品牌所有者的高度接受度是Ganesha选择史太林格技术的原因之一。他表示：“史太林格的PET回收技术已经收到美国FDA的多封不反对函，以及欧洲EFSA对食品级应用的积极意见，并且已经在品牌所有者中广为人知。史太林格经过验证的质量、设备可靠性和技术标准，以及在提供最佳质量输出的同时有效的资源利用都是额外的亮点。”

史太林格回收技术商业主管Paul Niedl说道：“Ganesha Ecosphere在PET回收方面有着非凡的历史，该公司的创始人Shyam Sunder Sharma认识到，PET瓶在相当早期的阶段就具有巨大的潜力，可以作为二次资源使用，这使该公司成为瓶到纤维和现在瓶到瓶应用的先驱。我们很自豪地支持Ganesha Ecosphere在印度减少塑料废料和建立PET瓶废料闭环系统，印度在全球这一领域潜力巨大。”

### PET回收的先驱企业

Ganesha Ecosphere回顾了30年PET回收业务的经验，可以被视为可持续商业活动的榜样。

该公司成立于1987年，最初是一家纱线加工厂。1994年，该公司是印度首批开始对PET废料进行再加工，以生产再生聚酯短纤维（RPSF）和再生聚酯纺纱（RPSY）的公司之一。

截至今日，该集团已在全国各地建立了一个由300多家废品供应商组成的大型网络，并在印度运营了四家工厂，其中两家位于北方邦，一家位于乌塔拉坎德，另一家最近在特兰加纳开业。最近，该公司还在尼泊尔开设了印度境外的第一家工厂。

该公司拥有500多个客户，出口到18多个国家，是印度最大的rPET生产商之一，年产量为13万吨，目前回收的PET废料约占印度总PET废料的16-18%。

The company has installed two Starlinger PET recycling lines in its facility in Warangal, Telangana state. Ganesha Ecosphere plans to supply the produced rPET granulates under its newly introduced brand enterprise Go Rewrite. Launched under the umbrella of one of India's rPET industry leaders, Go Rewrite is committed to supplying highest quality rPET products that are produced in a resource-efficient process.

### rPET for fibre applications

The first Starlinger recycling line, a recoSTAR PET 165 H-VAC, processes washed PET bottle flakes for the Go Rewrite polyester



Go Rewrite为注重环境和质量的 品牌提供食品级rPET

*Go Rewrite supplies the food-grade rPET to environment-conscious and quality-focused brands*

filament yarn applications and reaches an output of approx. 14,000 tons per year. When using recycled PET for filament yarn production, it must meet highest quality standards. Thus, all foreign particles and polymers have to be removed before the extrusion process. To achieve optimum melt purity for extrusion, Starlinger has developed a special candle filter for fibre applications, called Rapid Sleeve Changer (RSC). It ensures finest melt filtration down to 15 µm and achieves a throughput of up to 2000 kg per hour. The filter elements can be changed without interrupting production, which significantly reduces melt loss and machine downtime.

### Going food-grade

With the second Starlinger recycling line, Ganesha is producing food-grade rPET resins. “Through venturing into bottle-to-bottle recycling we want to close the loop and move from secondary recycling into primary recycling”, said Prashant Khandelwal, Senior Vice President of Go Rewrite. “Bottle-to-bottle recycling reduces the need for virgin plastic and thus substantially decreases the plastic burden on the planet. It also uses approximately 80 % less resources – water, energy, et cetera – for producing a new bottle than it is the case with virgin resin. Earlier, brand owners used to be apprehensive about including rPET in their packaging product, but with the emergence of new technologies and strict regulations by governments the demand for rPET is increasing very fast.”

The Starlinger recoSTAR PET 165 HC iV+ bottle-to-bottle recycling system installed at Ganesha's Go Rewrite facility features an SSP (solid state polycondensation) reactor for food-grade decontamination of the produced rPET pellets. A positive EFSA opinion for the process has been issued end of June 2022. The

line has taken up production in July 2022 and has an output of up to 1,800 kg of recycled PET pellets per hour. The food-safe rPET is supplied to environment-conscious and quality-focused brands which use it in their brand packaging.

Khandelwal describes the special challenges the company is facing with regard to food-grade applications: "Raw material quality is highly variable, especially in India. The scrap has all kinds of impurities and every batch that enters the factory is different. It has taken us 30 years to understand and master the art of handling such waste. With the world's best technologies, we can now achieve the quality needed for food-grade applications."

With the new PET bottle-to-bottle recycling plant, Go Rewrite ranks among the first recycled PET brands in India to provide food-grade rPET for the local and international packaging market.

According to Khandelwal, the high acceptability by brand owners was one of the reasons Ganesha opted for Starlinger technology. "Starlinger's PET recycling technology has received several Letters of Non-Objection from the US FDA as well as positive opinions of Europe's EFSA for food-grade applications and is already well known among brand owners. The proven Starlinger quality, equipment reliability and technology standard, as well as efficient resource consumption while delivering best quality output were additional points," he stated.

With both new Starlinger lines operational, the rPET production capacity of Ganesha's Go Rewrite facility currently reaches 40,000 tons per year.

Ganesha Ecosphere has a remarkable history in PET recycling," said Paul Niedl, Commercial Head of Starlinger recycling technology. "The company's founder Shyam Sunder Sharma recognised the big potential that used PET bottles provide as a secondary resource at a remarkably early stage, making the com-

pany a trailblazer for bottle-to-fibre and now bottle-to-bottle applications. We feel proud to support Ganesha Ecosphere in reducing plastic waste and establishing a closed loop for PET bottle waste in India, a country with great potential in this sector."

#### **A PET recycling pioneer**

Ganesha Ecosphere looks back on 30 years of experience in the PET recycling business and can be considered a role model regarding sustainable business activities.

Founded in 1987, the company started out as a yarn processing facility. It was among the first companies in India to start reprocessing PET waste to manufacture recycled polyester staple fibre (RPSF) and recycled polyester spun yarns (RPSY) in 1994.

By today, the group has established a large network of over 300 scrap vendors located across the country and operates four factories in India – two in Uttar Pradesh, one in Uttarakhand, and the recently opened one in Telangana. It also recently operationalised its first factory outside India in Nepal.

With over 500 customers and exports to more than 18 countries, the company ranks among the largest rPET producers in India with 130,000 tonnes per year and currently recycles around 16 to 18 % of India's total PET waste.

► **Starlinger recycling technology**  
Furtherstrasse 47a, 2564 Weissenbach, Austria  
[www.recycling.starlinger.com](http://www.recycling.starlinger.com)

► **Ganesha Ecopet Private Limited**  
<https://ganeshaecosphere.com/>  
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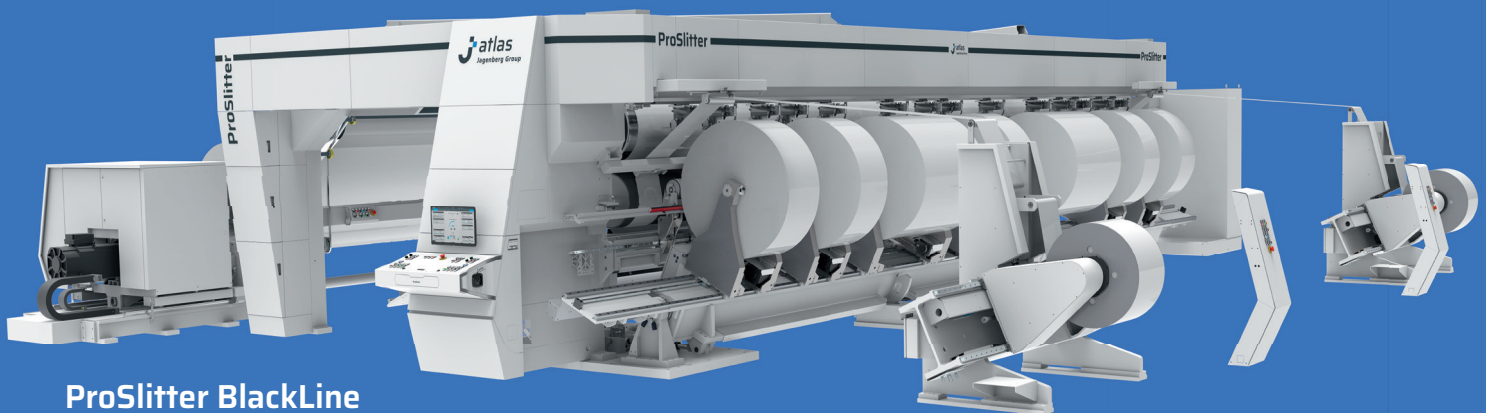
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