

挤塑

EXTRUSION

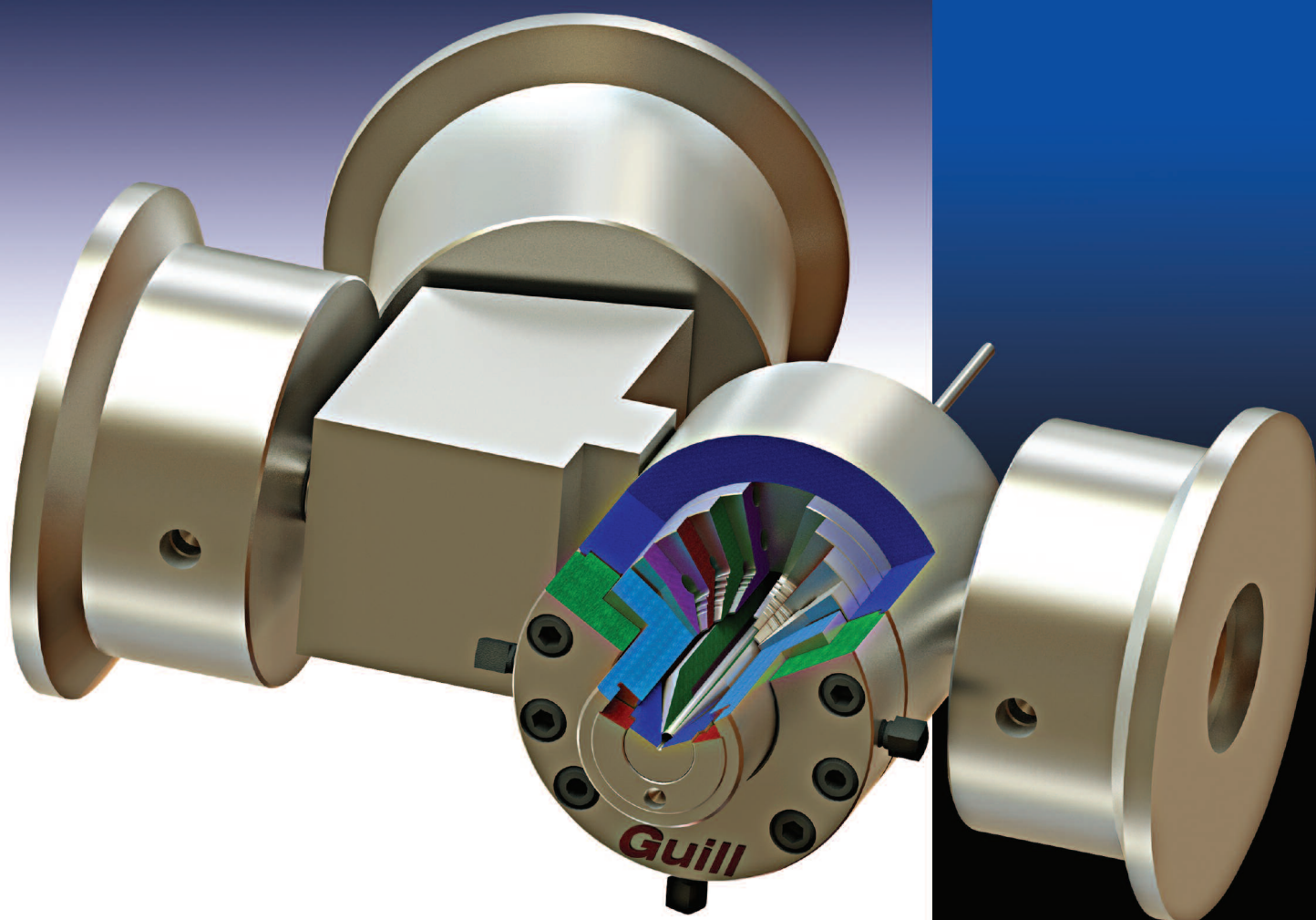
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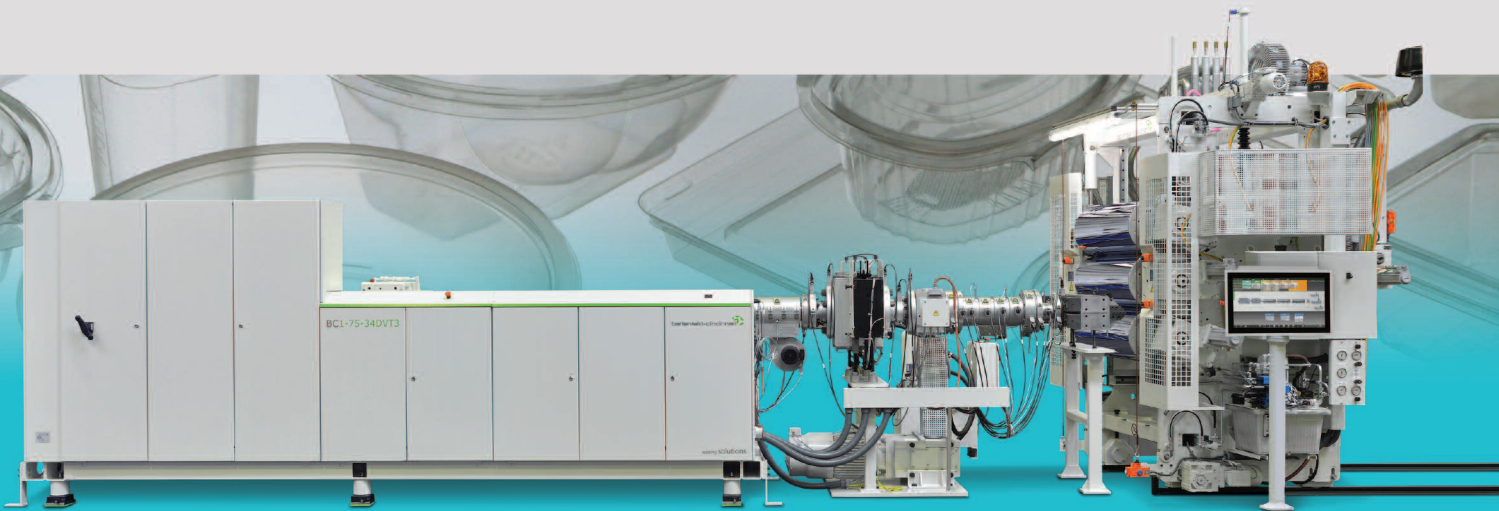
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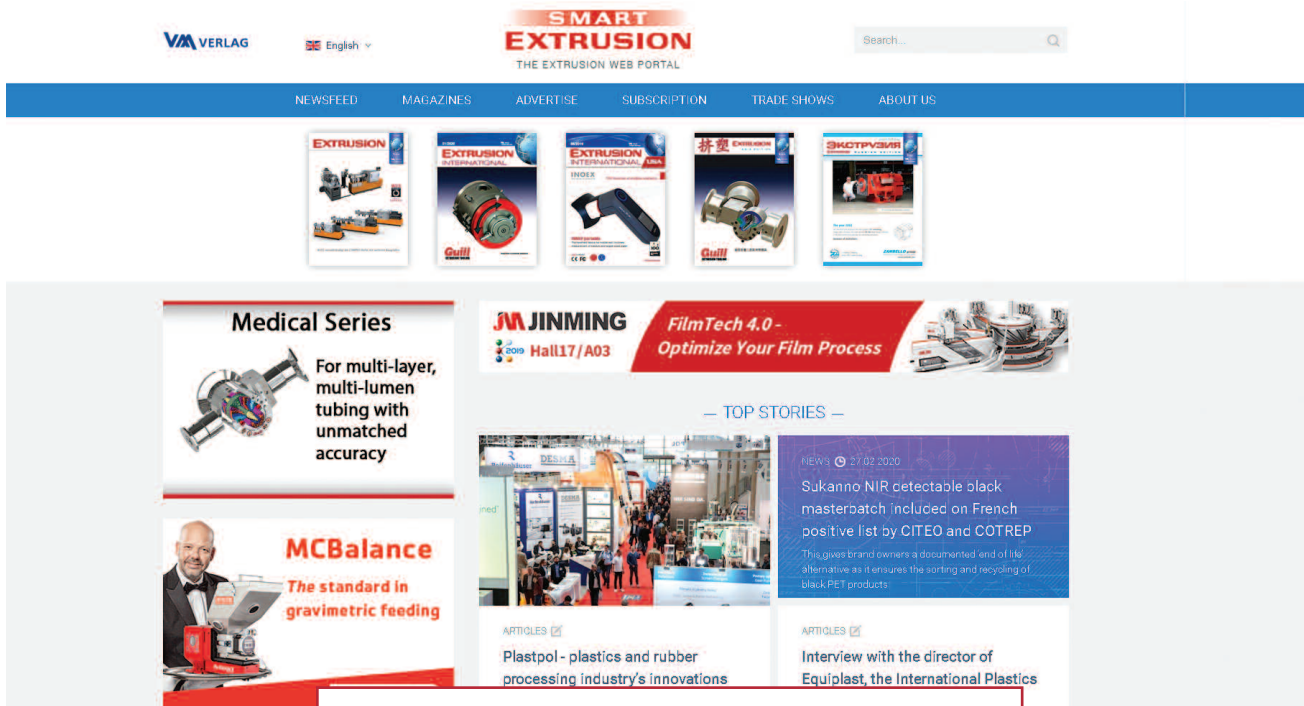


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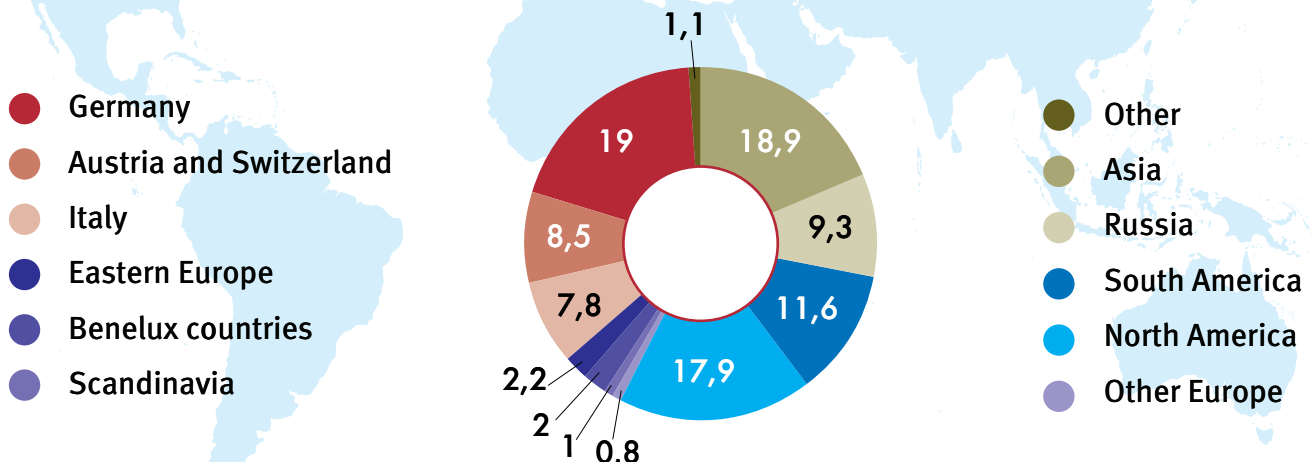


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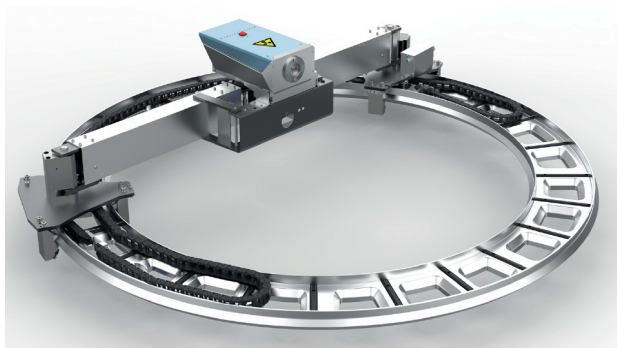
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www.guill.com

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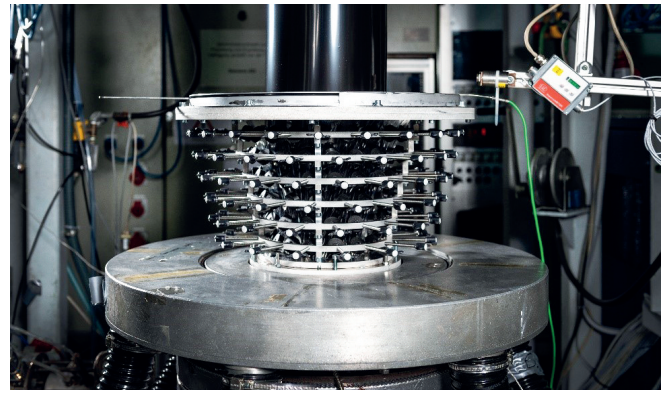
与汽车领域的设备供应商相反，废物处理和回收技术的供应商的订单量出现了真正的激增。Herbold Meckesheim已经有了2020年的全部订单。
Contrary to the equipment suppliers for the automotive segment, the suppliers of waste disposal and recycling technology see a real boom in incoming orders. Herbold Meckesheim has full order books for 2020.



44 K-XRAY Rotomat KT是第一个基于X射线，适用于吹膜线的测厚仪。K-XRAY使用Kündig的标准膜泡扫描系统，以确保快速的测量，这对于阻隔膜的厚度控制尤为重要。
The K-XRAY Rotomat KT is the first X-Ray based thickness gauge for blown film lines. The K-XRAY uses Kündig's standardized bubble scanning system to ensure quick measurements that are especially crucial for thickness control of barrier films.

SIKORA提供创新型的测量和控制设备，用于在医用管材挤出过程中的质量控制。

48 SIKORA supplies innovative measuring and control devices for quality control during the extrusion of medical tubes.



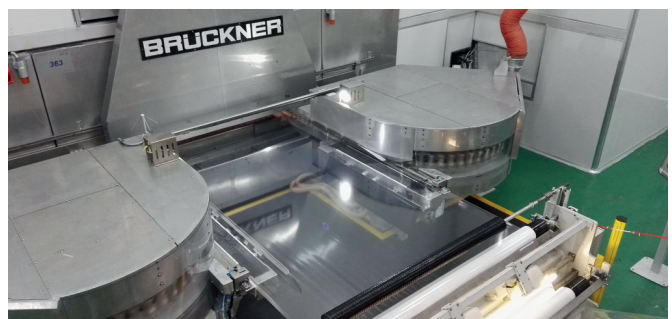
36 德国亚琛工业大学塑料加工研究所(IKV)开发出了一种创新的自适应空气控制系统，使挤出吹膜设备的产量提高了32%。
An innovative adaptive air control system developed by the Institute for Plastics Processing (IKV) at RWTH Aachen University enables the throughput in blown film extrusion to be increased by up to 32 percent.



31 减少和避免废料的产生已经显得越来越重要。由于法律的要求和公众的压力，生产商们面临着越来越大的挑战。
Waste reduction, avoidance of plastic materials and last but not least recycling are becoming increasingly important. Due to legal requirements and public pressure, manufacturers are faced with growing challenges.

当中国BOPA薄膜的领先者、全球最大的薄膜生产商厦门长塑投资时，整个塑料行业都在关注。刚刚从布鲁克纳机械有限公司订购了2条新的分次拉伸薄膜生产线，这是迄今为止同类产品中最快、最宽和最强大的。

54 *The Chinese BOPA film pioneer Xiamen Changsu just now ordered two new sequential film stretching lines from Brückner Maschinenbau which are the fastest, widest and most powerful of their kind so far.*





Vietnam Plas

23. - 26. 09. 2020
Ho Chi Minh City / Vietnam
胡志明市 / 越南
➡ www.chanchao.com.tw/Vietnamplas

wire Tube China

23. - 26. 09. 2020
Shanghai / PR China 上海 / 中國
➡ www.tubechina.net
www.wirechina.net

12th European Thermoforming Conference

30. 09. - 02. 10. 2020
Geneva / Switzerland 日内瓦 / 瑞士
➡ www.thermoforming-europe.org

PLASTPOL

06. - 09. 10. 2020
Kielce / Poland 凯尔斯 / 波兰
➡ <https://complastexpo.in>

Plastics Extrusion World Expo Europe

07. - 08. 10. 2020
Essen / Germany 埃森德国 / 德國
➡ www.manufacturing-expo.com

Fakuma 2020

13. - 17. 10. 2020
Friedrichshafen / Germany
腓德列斯哈芬 / 德國
➡ [Messe Düsseldorf Asia](http://MesseDüsseldorfAsia)
www.tplas.com

Central Asia Plast World

12. - 20. 11. 2020
Almaty / Kazakhstan
阿拉木图 / 哈萨克斯坦
➡ www.plastworld.kz/?lang=en

Plast Eurasia Istanbul 2020

02. - 05. 12. 2020
Istanbul / Turkey
伊斯坦布尔 / 土耳其
➡ <http://plasteurasia.com/en/>

ARABPLAST 2021

09. - 12. 01. 2021
Dubai / UAE 迪拜 / 阿联酋
➡ www.arabplast.info

第34届Chinaplas会议延期及场地变更



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■ 2020年4月6日，国务院发布《关于进一步控制和预防重点场所、重点单位和重点人群新型冠状病毒感染的通知》。根据《通知》中的“预防建议”，明确指出各类展览必须暂停。

在此情况下，第34届CHINAPLAS将无法如期举行，并将从2020年8月3日至6日推迟至2021年4月13日至16日，展会场地将由上海国家会展中心改为深圳世界会展中心。

深圳作为中国重要的创新技术制造和研发中心，被中国政府选为大湾区未来发展的驱动引擎之一。随着中国市场的进一步开放，第34届CHINAPLAS将移往深圳，这将使全球的塑料和橡胶供应商能够开发新的商机。

Postponement and Venue Change of the 34th Chinaplas

■ On 6th April 2020, the State Council of China issued the circular of "The Further Control and Preventive Measures of the Novel Coronavirus at Key Venues, Units and Groups". According to "Preventive Suggestions" in the circular, it

has clearly mentioned that all kinds of exhibitions have to be stopped for the time being.

Under such circumstances, the 34th CHINAPLAS cannot be held as scheduled and will be further postponed from 3 to 6 August 2020 to **13 to 16 April 2021**, and the show venue will be changed from National Exhibition and Convention Center in Shanghai to *Shenzhen World Exhibition and Convention Center in Shenzhen*.

As an important manufacturing and R&D center for innovative technology in China, Shenzhen has been chosen by the Chinese government as one of the driving engines in the future development of the Greater Bay Area. In shifting the 34th CHINAPLAS to Shenzhen, it will enable global plastics and rubber suppliers to tap into the emerging business opportunities in tandem with the further opening up of the China market.

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

印度孟买国际粉体工业展览会 (POWTECH INDIA) 延期至2021年2月举行

■ 鉴于目前的情况，POWTECH INDIA将从原定的日期2020年9月推迟到2021年2月。POWTECH INDIA现在将与印度孟买家居及个人护理用品展 (HPCI India) 一起，于2021年2月11日至12日在孟买同期举行。各家公司可以通过同期举行的代表大会和支持计划注册参加展会。自2010年以来，纽伦堡博览会印度公司 (Nürnberg Messe India) 一直参与组织印度粉末和散装固体行业的活动。

POWTECH INDIA汇集了来自生产和加工技术领域的印度专家。来自化



学、制药和食品生产行业的决策者，以及来自能源，回收和非金属矿物 (矿山和采石场) 行业的决策者，都可以在展览会和同期的代表大会上找到对他们重要的技术。展品范围广泛，国际市场领导者的出席使POWTECH INDIA (以前称为印度粉末和散装固体展) 成为重要的行业聚会。

POWTECH INDIA postponed to February 2021

■ POWTECH INDIA will be postponed due to current circumstances from its initial dates in September 2020 to February 2021. POWTECH INDIA will now take place parallel to HPCI India on 11 to 12 February 2021 in Mumbai. Companies can register for the trade fair with accompanying congress and supporting programme. Since 2010, NürnbergMes-

se India has been involved in organising events for the powder and bulk solids industries in India.

POWTECH INDIA brings together India's experts from the production and processing technology environment. Decision-makers from the chemical, pharmaceutical and food production sectors, but also from the energy, recycling and non-metallic mineral (pit and quarry) industries, can find out all about the technologies that matter to them at the exhibition and

accompanying congress. The wide range on display and the presence of international market leaders make POWTECH INDIA, which was previously known as Powder and Bulk Solids India, an important industry gathering.

➔ **NürnbergMesse GmbH**
powtech-india.com

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德国和中国的聚丙烯熔喷制造商已订购了许多诺信BKG®齿轮泵和换网器，以确保口罩和其他个人防护装备的医用纯度

■ 在抗击新型冠状病毒方面，塑料工业发挥关键作用的最新范例中，诺信公司向聚丙烯微纤熔喷布的生产商提供了大量的齿轮泵和换网器，这些熔喷布用于医护人员使用的口罩、防护服及其他个人防护装备用。

自COVID-19爆发以来，诺信已经向全球市场领先的欧洲挤出设备制造商交付了许多BKG® NorCon™换网器，同时向包括中国在内的世界各地的设备制造商交付了更多的BKG® BlueFlow™齿轮泵。据全球业务总监Sven Conrad表示，还有更多的订单正在交流中。

在熔喷工艺中，挤出的聚合物通过喷嘴被高速气流环绕的小孔，产生随机取向的超细纤维，从而制成无纺布。诺信BKG熔体输送部件安装在挤出机和熔喷模具之间。齿轮泵提供稳定的熔体流量和压力，以保证工艺的高效运行及均匀的高质量产品。换网器过滤杂质，以保护喷丝模具并产出医疗应用所需的纯净产品。

“在医疗专业人员应对COVID-19病例激增之际，继续迫切需要用于保护他们的超细纤维织物” Conrad先生说，“与塑料行业的其他公司一样，诺信提供的产品在全球努力减轻这种致命感染的蔓延中至关重要。这再次表明，只要处理得当，塑料在我们现代社会中的作用是多么重要。”

Many Gear Pumps and Screen Changers Needed to Ensure Medical Purity for Masks and Other PPE Ordered

■ In the latest example of the crucial role of the plastics industry in fighting the novel coronavirus, Nordson Corporation reports supplying large quantities of gear pumps and screen changers to producers of melt blown polypropylene microfiber



防护口罩

Respirator Mask

sheet for the masks, gowns, and other personal protective equipment (PPE) used by healthcare workers.

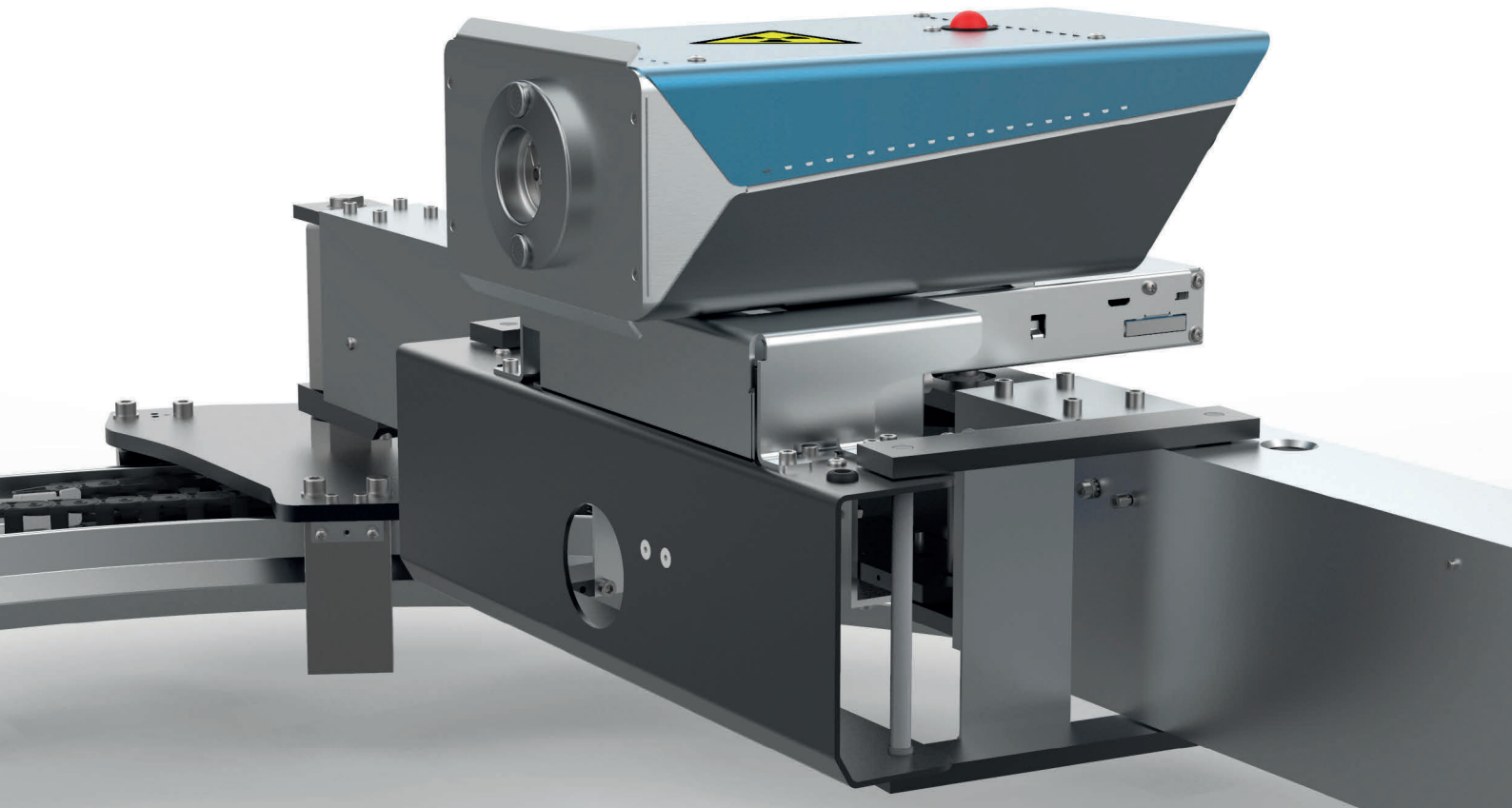
Since the COVID-19 outbreak, Nordson has shipped many BKG® NorCon™ screen changers to global market leading extrusion OEMs in Europe and even greater numbers of BKG® BlueFlow™ gear pumps to OEMs around the world, including China. More orders are in discussion, according to Sven Conrad, Global Business Director.

In the melt blowing process, extruded polymer passes through small holes in a nozzle surrounded by high-speed blowing gas, producing the randomly oriented microfibers that make up a nonwoven sheet. The BKG melt delivery components are deployed between the extruder and the melt-blowing tool. A gear pump provides the uniform melt flow

and pressure required for the process to operate efficiently and with uniformly high-quality product. A screen changer filters out impurities to protect the dispense tool and yield the clean product required in medical applications. “There continues to be an urgent need for the microfiber fabrics used in protecting medical professionals as they cope with the surge in COVID-19 cases,” said Sven Conrad. “Like other companies in the plastics industry, Nordson supplies products that are essential in the global effort to mitigate the spread of this deadly infection. It shows once more that, given proper handling and disposal, how important plastics can be in our modern society.”

➔ Nordson Polymer Processing Systems
www.nordsonpolymerprocessing.com

K-XRAY Rotomat KT



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KÜNDIG CONTROL SYSTEMS
The Gauge Manufacturer for Film Extrusion SWISS MADE

在中国建新工厂

■ 2019年11月8日，安科罗塑料在中华人民共和国新建混合料工厂的启动仪式在常州滨江工业园举行。安科罗塑料是费德森 (Feddersen) 集团旗下的公司，在过去十五年里一直不断地扩大在中国市场的活动范围。

新工厂位于常州滨江工业园，占地面积两万平方米，从2021年起将在这里为本地市场生产第一批混合料。主要用户来自汽车、电气、电子以及其它工业。

安科罗工程塑料 (苏州) 有限公司成立于2004年，2005年初在江苏省的同里投入运行，2010年工厂从江苏省同里搬迁到吴江。为满足增长的市场需求，2019年公司决定在常州建立新工厂，新工厂名称采用“安科罗工程塑料 (常州) 有限公司”。新公司将采用当代最先进技术，能够向更多的客户供应工程塑料，包括中华人民共和国以及其它亚洲国家。

安科罗工程塑料 (苏州) 有限公司董事总经理Wilfried Jobst说道：“安科罗从2004年就开始在中国运营，回顾过去的十五年，我们是成功的。我非常高兴，作为今天参加启动仪式的一员，我相信，我们在中国的业务将书写另一段非常有前途的新篇章。”

New Plant in China

■ On 8th of November 2019, AKRO-PLASTIC held a launch ceremony for its new compounding plant in Binjiang Industrial Park in Changzhou, People's Republic of China. AKRO-PLASTIC is a company of the Feddersen Group and has continuously expanded its activities in the Chinese market during the last 15 years.

The new plant is located in Changzhou Binjiang Industrial Park, with a land coverage of 20,000 m². The first compounds for the local market will be produced at this site in 2021. The automotive, electro- and electronics as well as various other industries will be the main customer industries.

AKRO Engineering Plastics (Suzhou) Co., Ltd. was founded in 2004 and started operation in the beginning of 2005 in Tongli, Jiangsu Province. The plant was moved within Jiangsu Province to Wujiang in 2010. In order to meet the grow-



右起: Qi Jiwei, 安科罗工程塑料 (苏州) 有限公司工厂经理, Ulrich Berlage博士, 安科罗工程塑料 (苏州) 有限公司监事, Wilfried Jobst, 安科罗工程塑料 (苏州) 有限公司董事总经理, Andreas Stuber, 德国Niederzissen安科罗塑料有限公司董事总经理以及常州市政府的代表出席了仪式

From right: Qi Jiwei, Plant Manager of AKRO Engineering Plastics (Suzhou) Co., Ltd.; Dr. Ulrich Berlage, Supervisor of AKRO Engineering Plastics (Suzhou) Co., Ltd.; Wilfried Jobst, Managing Director of AKRO Engineering Plastics (Suzhou) Co., Ltd.; Andreas Stuber, Managing Director of AKRO-PLASTIC GmbH, Niederzissen/Germany as well as representatives of Changzhou Government attended the ceremony

ing market demand, the company decided to build a new plant in Changzhou in 2019, which will operate under the name AKRO-PLASTIC Engineering Plastics (Changzhou) Co. Ltd. The company will be able to provide more customers in PR China and other Asian countries with engineering plastics from this new and state-of-the-art production site.

“AKRO-PLASTIC started its operation in China already in 2004 and we are look-

ing back to 15 successful years. I am very happy to be part of this ceremony today as I am convinced that it will open another very promising chapter for us in China”, says Wilfried Jobst, Managing Director of AKRO Engineering Plastics (Suzhou) Co., Ltd.

➔ AKRO-PLASTIC GmbH

www.akro-plastic.com
leander.bergmann@akro-plastic.com

循环塑料联盟的积极支持者

■ 莱芬豪舍集团成为了欧盟循环塑料联盟 (CPA) 的成员。2020年3月10日, Ulrich Reifenhäuser 签署了一项宣言, 承诺到2025年超过175家公司和协会将在新产品中重复使用1000万吨回收塑料。他还将在莱芬豪舍的可持续发展系统战略向前推进了一步。Ulrich Reifenhäuser 在解释公司支持CPA的步骤时说: “塑料是循环经济不可缺少的一部分。我们的行业被要求将塑料纳入循环经济。我们有责任建立回收系统, 回收

塑料垃圾, 将塑料垃圾的产生降到最低。莱芬豪舍已经为循环经济的运作提供了解决方案, 以确保具有优异性能的优秀产品具有可回收性。

莱芬豪舍集团从一开始就将可持续性融入到每一个产品中, 这已成为企业战略不可或缺的一部分。公司拥有多年的经验和庞大的专家及合作伙伴网络, 尤其是在研发可回收薄膜和含回收材料的薄膜方面。Tim Pohl是公司的可持续发展主任, 他总结了公司对循环塑料联

盟的承诺：“除了我们在生产线设备技术方面的专业知识以外，我们打算利用我们的能力为创新的配方和工艺寻找解决方案。我们与联盟的其它成员一起，可以在我们的现代技术中心研究可回收的包装解决方案。”

Active supporter of the Circular Plastics Alliance

■ Reifenhäuser becomes a member of the European Union Circular Plastics Alliance (CPA). On March 10, 2020, Ulrich Reifenhäuser signed a declaration that commits over 175 companies and associations to reuse 10 million metric tons of recycled plastics in new products by the year 2025. It also takes Reifenhäuser's systematic strategy of sustainability a step further. "Plastics are part and parcel of recycling," says Ulrich Reifenhäuser, explaining the company's step in supporting the CPA. "Our industry is

called upon to incorporate plastics into the Circular Economy. We bear co-responsibility to establish collection systems, recycle plastic waste, and minimize production waste." Reifenhäuser already offers solutions for a functioning Circular Economy to ensure that outstanding products with excellent properties are recyclable.

Sustainability in the Reifenhäuser Group is incorporated in every product from the start and is an integral part of corporate strategy. The company has many years of experience and a large network of experts and partners, especially in the field of research and development for recyclable films and films containing recyclable material. Tim Pohl, Director Sustainability, summarizes the company's commitment to the Circular Plastics Alliance: "Besides our know-how in the field of line technology, we intend to utilize our competence to find solutions for innovative recipes and processes. Together with



other members of the Alliance, we can research for recyclable packaging solutions at our modern Technology Center."


► **Reifenhäuser GmbH & Co. KG Maschinenfabrik**
www.reifenhauser.com

应用于高质量挤出的电晕技术

■ 泰国领先的软包装供应商之一 Prepack,在两条挤出生产线上使用了 Vetaphone电晕技术，这两条生产线位于首都曼谷西南约100公里的安帕瓦 沙穆松克兰。这家公司以其具有国际标准的高质量而闻名，以其全系列产品独家供货而列入A类客户清单。除了挤出设备以外，Prepack还具备凹版和柔性版印刷的能力，以及溶剂型覆合和成型的加工能力。


Prepac法国公司成立于1973年，其早期业务是在皇家资助下为 Nongpho Ratchaburi乳品公司生产巴氏灭菌牛奶包装。其它早期产品还包括 Prathum碾米磨坊的5公斤米袋。今天，公司的产品范围已扩大到食品、个人护理以及卫生、零食、化工和工业领域，以及多种其它消费领域。

设立这样高的产品质量标准并非没有问题，作为在工厂工作了20年的生产经理，Veraphan Thiampu解释道：“我们位置靠近大海，空气中总是含有高的盐份，这样湿度水平也增加了，我们在泰国南方所得到的体验形成了严苛的腐

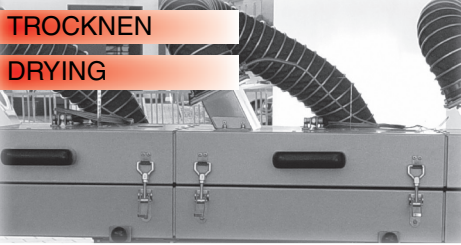


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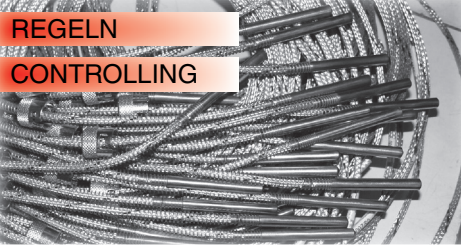
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HEATING



TROCKNEN
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REGELN
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蚀环境。这给生产带来了破坏性的影响，造成了大量的浪费。”

Prepack对自己与欧洲知名品牌电晕处理机之间出现的此类问题感到失望，于是与Vetaphone的泰国代理Techno Global Graphics联系。结果，在其中一台挤出机上采用Vetaphone VE2B处理站替换了原有的表面处理机。十二个月以后，由于对其性能感到满意，在另一台挤出机上的处理机也更换成了Vetaphone VE2C单元。B型处理机宽度1.8米，运行速度为每分钟90米，功率为6千瓦（2x3Kw）。C型处理机宽度1.6米，运行速度为每分钟80米。功率为8千瓦，配备了较大的支承辊筒。两套Vetaphone单元都用于双面处理。

Corona Technology for Quality Extrusion

■ One of Thailand's leading suppliers of flexible packaging, Prepack, has installed Vetaphone Corona technology on its two extrusion lines located in Amphawa Samutsongkram, some 100 km southwest of the capital Bangkok. The company, which is renowned for the international quality of its work, is set up as a single source supply for its portfolio of 'A list' customers. In addition to extrusion, Prepack has gravure and flexo print capabilities, as well as solvent-based lamination and forming.

Established initially in 1973 from Prepac France, the company's early work was for the Nongpho Ratchaburi Dairy Corporation for which it produced packaging for pasteurised milk under Royal patronage. Other early products included 5kg rice bags the Prathum Rice Mill. Today, the company has expanded its product range to supply flexible packaging to industries as diverse as food, personal care and hygiene, snacks, chemical and industrial, and various other consumer areas.

Setting such high standards of production quality is not without its problems, as Production Manager of 20 years at the plant, Veraphan Thiampu explained: "We are located close to the sea and there is always a high level of salt in the air, which added to the humidity levels that we experience in southern Thailand creates a perfect environment for corrosion. This was having a disruptive effect



(从左至右) Techno Global Graphics 的 Pakorn Chotikorn，Vetaphone 的 Finn Hinze 和泰国Prepack 生产经理 Veraphan Thiampu

Left to right: Pakorn Chotikorn of Techno Global Graphics and Finn Hinze of Vetaphone with Prepack Thailand's Production Manager Veraphan Thiampu

on production and creating high levels of waste."

Disappointed that it was incurring such issues with well-known European brands of Corona treaters, Prepack made contact with Techno Global Graphics, who represent Vetaphone in Thailand. The result was the replacement of the existing surface treatment unit on one of its extruders with Vetaphone VE2B station, and after twelve months of satisfactory performance, the replacement of the

treater on the other extruder with a Vetaphone VE2C unit. The B station is 1.8 m wide and runs at 90 m/min with a 6 kW (2 x 3) capacity. The C station is 1.6 m wide and runs at 80 m/min. It has an 8kW capacity and is fitted with a larger backing roller – both Vetaphone units are for double-sided treatment.

➔ Vetaphone
www.vetaphone.com

考特斯机械制造有限公司进一步推进战略重组一变革流程已经实质成形

■ 这家总部位于波恩的机械制造公司宣布2020年将继续投资，以扩张其包装、尤其制药和医疗包装领域的投入，大股东为此提供数千万欧元资金。在实施举措的过程中，汽车部门的人力资源将重新整合到这些包装领域。另外2019年宣布的裁员实施将在今年年底之前完成。

考特斯机械制造有限公司是全球领先的塑料加工挤出吹塑机制造商之一。凭借新近宣布的举措，公司将继续坚定不移地推进从去年开始的改组和重组流程。除组织方面改组之外，还包括将行业重点转移到包装领域，该领域在过去

几个月实现强劲增长。尽管这种增长不能完全弥补汽车领域的订单骤降，但清楚地表明公司已踏上正确的发展道路。长远来看，考特斯预计汽车市场的需求将复苏，并将进一步发展汽车领域，特别是复合材料的应用。

由于众多汽车供应商在全球领域的投资持明显的保留态度，结构性调整变得尤为必要。为此考特斯果敢采取相应措施，对其在塑料行业的根本变化作出了反应。除生产和服务流程的数字化之外，未来的主要课题还包括避免/减少产生废弃物和处理可回收料。2019年10

月首先担任该公司运营部门主管，自今年 2 月起以 CEO 身份领导公司的托马斯·哈特肯珀 (Thomas Hartkämper) 是公司变革流程的关键推手。

哈特肯珀还就此宣布进一步的人才决策：“在过去数月，我们在公司启动了众多流程，它们有助于长期确保并扩大考特斯机械制造有限公司在全球塑料市场的领先地位。面向未来的战略路线图已制定、通过并传达给全球各地的考特斯组织。我们从内部队伍中遴选杰出人才，并通过外部人才进一步强化我们的全球团队。”

Strategic Reorganization

■ Kautex, the mechanical engineering company, based in Bonn, Germany, has announced additional investments to extend its Packaging, Pharmaceuticals, and Healthcare Packaging businesses for 2020. This will be achieved using funds worth double-digit millions of Euros, provided by the majority shareholder. The measures concerned will see the reallocation of human resources from the Automotive division to these other businesses. The reduction in staff levels announced in 2019 should be completed by the end of this year.

Kautex Maschinenbau is one of the world's leading manufacturers of extrusion blow molding machines for plastics processing. The announced measures are a further, consequent step to build on the reorganization and restructuring initiated by the company last year. This involves organizational restructuring and shifting of focus to packaging solutions. Kautex has seen strong growth in this sector in the last few months. This growth cannot entirely compensate for the sudden drop in new orders in the automotive business, but does show that the company has taken the right approach. Despite the current downfall in the automotive sector, Kautex expects that demand in the automotive market will recover over time. The company will, therefore, remain committed to developing composite applications in this business as well.

The outlined structural adjustment became necessary due to a noticeable, worldwide reluctance of automotive suppliers to invest. However, by implementing the planned measures, Kautex

is also reacting to fundamental changes in the plastics industry. Alongside the digitalization of production and service processes, the dominant issues that affect the future direction of the company are waste prevention and the processing of recycled, raw materials. Thomas Hartkämper, who became COO in October 2019 and assumed the position of CEO in February 2020, has been decisive in leading the company's change process. In this context, Hartkämper has also announced additional decisions affecting staffing: "In recent months, we have launched a large number of initiatives in the company. These will help Kautex Maschinenbau secure and extend its excellent position in the worldwide plastics market in the long term. We have created and approved the strategic road map for the future, and informed the worldwide Kautex organization about it. We have delegated responsibilities to exceptional talents from within our own ranks and will bring in external experts to join our global team, to further strengthen it."

包装部门新的全球销售经理

■ Michael Müller 先生从四月份起接任考特斯机械制造有限公司包装业务的全球销售总监，成为公司全球管理团队的核心成员，负责管理与推进公司包装事业部的销售业务。作为全球领先的吹塑成型系统供应商，考特斯对 Michael Müller 先生这位硕士工程师的人事任命



是公司长远变革过程的组成部分，这一过程不仅包括重新定位业务领域，还包括去年开展的销售部门重组。

考特斯已从 2019 年开始扩展包装和汽车事业部，提供更多的客户定制解决方案。为能充分挖掘这两大应用领域的市场潜力，公司已将销售部门调整为事业部形式。

Michael Müller 先生十分期待他的新工作，他表示：“塑料行业面临巨大的社会、技术和经济挑战。作为交钥匙系统供应商，我们有机会成为客户价值链——从颗粒原料到成品的过程中重要的一环。”

New Global Sales Manager for the Packaging Division

■ In April Michael Müller took over the role of global sales director for packaging at Kautex Maschinenbau. Michael will be responsible for driving and managing company's sales activities in packaging division. With his degree in engineering, Kautex occupies another key role in its global leadership team. The recruitment is part of a far-reaching change process, which includes not only the realignment of the business areas but also a restructuring of the sales organization initiated last year.

Since 2019 Kautex had already begun to expand the packaging division in addition to the automotive division, and to offer more customer-specific solutions. In order to be able to optimally raise the market potential of both segments, the company had also converted the sales organization to a division model.

Michael Müller is looking forward to his new job: "The plastics industry is facing major social, technological and economic challenges. As a system provider, we have the opportunity to be an important part of the customer's value chain, from granules to the finished product."

Michael Müller
(© Kautex Maschinenbau GmbH)

昆山新厂服务中心

■ 液态食品行业顶尖灌装和包装系统的国际领先制造商KHS科埃斯计划在中国昆山设立新工厂及服务中心。昆山当地政府有关领导和德国KHS科埃斯集团代表出席奠基仪式。新工厂的成立充分表明了KHS科埃斯中国立足本地市场、寻求进一步发展的决心。

作为一家全球领先的灌装和包装系统制造商，KHS科埃斯从1904年就开始为中国的液态食品行业提供服务和解决方案。2008年，KHS科埃斯正式进入中国并在北京设立第一家代表处，2014年在上海成立中国总部。随着中国区业务进一步扩大，KHS科埃斯新生产工厂和服务中心计划在昆山建成，以便更加快速地响应本地市场。

新的生产工厂总投资约1000万欧元，总建筑面积达18785.29平方米，建成后将大大提高工程、生产、物流及服务效率。KHS科埃斯将作为昆山市重要合作伙伴，为当地工业的进一步发展升级提供强有力支持，而这座规模庞大的新工厂也将推动KHS科埃斯在整个亚洲范围内扩大投资。双方合作互利的长期共赢格局指日可待。

New Plant and Service Center in Kunshan

■ KHS plans to build a new plant and service center in Kunshan, China. VIP guests from the local government and KHS Group attended the groundbreak-



来自地方政府的客人和KHS的代表参加了在昆山举行的节日奠基仪式

Guests from the local administration and representatives of KHS took part in the festive ground-breaking ceremony in Kunshan (Source: KHS GmbH)

ing ceremony. The Kunshan plant project is a clear statement of the company's commitment to China and its Chinese customers.

As one of the leading global manufacturers of filling and packaging systems, KHS has been serving the Chinese beverage industry since 1904. In 2008, KHS entered the China market with its first representative office in Beijing. Following the opening of its headquarters in Shanghai in 2014, KHS now intends to build a new plant and service center in Kunshan, enabling the company to respond more quickly to the local market.

With a total investment of around 10 Mio. EUR, the new around 10.000 m² large factory will make engineering, production, logistics and service more efficient. KHS will be an important partner for the city of Kunshan and offer greatly enhanced support in the further development of the regional industry. Furthermore, the broad-scale plant will also help KHS expand its business within Asia as a whole. A continuous win-win situation can be expected for both sides involved.

► KHS GmbH
www.khs.com

ST中空模塑的网站有了中文

■ ST 中空模塑宣布其网站也有了中文页面。自K 2019以来，ST中空模塑已通过全新的图形设计以及一个全新的网站将自己展现给公众。公司在自己建立的网站上，必不可少要提供清晰而详尽的内容，是向用户提供信息的机会，针对特定需求提供客户化定制的方案。为此，ST中空模塑已经决定：专注于简单、直观并且易于理解的浏览，既美观又能吸引人。现在，中文页面也可供浏览了。在每个页面上，从照片到技术细节，客户都会找到自己的解决方案所必需的元素。

Website in Chinese Language

■ ST BlowMoulding launched its website also in Chinese language. Since K 2019 ST BlowMoulding has presented itself to the public with a totally renewed graphic design including a brand new website. It is essential for a company to be online with clear and exhaustive content, offering users the opportunity to get information on specific and customized solutions. For this reason, ST BlowMoulding has decided to focus on simple, intuitive



and understandable navigation, as well as aesthetically appealing, now also available in Chinese.

On each page, customers will find the elements necessary to find their own solutions going from photos to technical details.

► ST BlowMoulding
www.st-blowmoulding.com

在中国的工厂投资

■ 全球领先的苯乙烯系列产品供应商英力士苯领，宣布计划在中国宁波建立一座世界级规模的ABS生产基地。新生产基地将建在英力士苯领近期在宁波收购的聚苯乙烯工厂附近1。

在宣布收购中国两座聚苯乙烯生产基地不到一年后，英力士苯领就开始着手扩大中国地区产能的计划。该公司计划在其中国东部浙江省宁波市的聚苯乙烯工厂附近建设一座绿色环保型 ABS 生产基地。

其年产能规划为60 万吨。预计 2020 年动工，2023 年竣工。

该公告属于英力士苯领今日与宁波市人民政府签署的广泛战略合作框架协议的一部分。此框架协议将有助于促进英力士苯领与宁波市之间的互惠互利。

亚太区总裁 Steve Harrington 表示：“中国是全球最大的 ABS 市场。这项新投资为公司的进一步发展提供了巨大的机遇，让我们能够为该地区的客户提供本地生产的 ABS 产品。”

Investment in Plant in China

■ INEOS Styrolution, the global leader in styrenics, has announced plans to build a world-scale ABS plant in Ningbo, China. The new production site will be adjacent to the recently acquired polystyrene plant in Ningbo.

Less than a year after announcing the acquisition of two polystyrene production sites in China, INEOS Styrolution embarks on plans to grow its production capacity in the country significantly. The company plans to construct a green field ABS plant adjacent to the Ningbo polystyrene site in the Zhejiang Province in Eastern China.

Its annual capacity is planned to be at 600,000 tonnes. Construction is planned to start in 2020, completion is expected in 2023.

The announcement made by INEOS Styrolution forms part of a wider Strategic Cooperation Framework Agreement with the Ningbo Municipal People's Government signed

today by INEOS. This framework agreement will help facilitate mutual benefit between INEOS and Ningbo City.

“China is the biggest ABS market in the world. This new investment will give us a tremendous opportunity to provide our

customers in the region with locally produced ABS grades,” Steve Harrington, President Asia-Pacific said.

➔ INEOS Styrolution Group GmbH
www.ineos-styrolution.com



SIKORA
Technology To Perfection

品质见于点滴

基于对技术的不断追求，SIKORA 团队推出了前瞻性的在线和离线检测、分析及分拣系统，用于塑料颗粒的在线和离线质量保障，PURITY SCANNER ADVANCED 是其中一款产品。

- 在线检测并自动剔除含有杂质的颗粒
- 可对颗粒表面及内部小至 50 μm 的金属、有机污染物以及交叉污染颗粒杂质进行检测
- 专业的数据分析管理 (PDAM) 系统，可提供统计学数据、可视化趋势图并记录数据

www.sikora.net/purityscanner

香港首个PET及 HDPE循环再生工厂举行奠基典礼

■ ALBA 集团正在扩大亚洲的业务。香港特区环境局局长黄锦成出席了香港首个处理聚对苯二甲酸乙二醇酯(PET)和高密度聚乙烯(HDPE)废料循环再生工厂的正式动工仪式。这家工厂将由合资企业“新生命塑料有限公司”经营。ALBA集团在这方面的合作伙伴包括太古可口可乐有限公司和Baguio废物管理及循环再生有限公司。Baguio是香港领先的循环再生公司，是Baguio绿色集团有限公司的附属公司。

这家公司建设在香港的环保工业园，环保工业园是一个回收和环保技术基地。ALBA 2018年3月正式投入运作的香港旧电脑及电子废弃物循环再生工厂(香港电子电器废弃物工业园，WEEE-PARK)也位于这里。新工厂包括三个加工过程：高科技分拣，食品级PET片材生产，HDPE造粒。计划年生产能力超过3.5万吨，并计划在2020年下半年开始正常运行。

ALBA集团首席执行官 Axel Schweitzer博士表示：“ALBA集团在回收技术领域处于领先地位，而在香港的新建项目，正进一步增强其在亚洲市场的地位。继去年东南亚最大的电器及电子废弃物回收工厂成功启用后，我们更为现在新建的香港首家PET和HDPE循环再生工厂感到自豪。”

Groundbreaking Ceremony for Hong Kong's first PET and HDPE Recycling Plant

■ The ALBA Group is expanding its engagement in Asia. In the presence of Wong Kam-sing, Secretary for the Environment HKSAR, celebrated the official groundbreaking ceremony for the first recycling plant for the processing of polyethylene terephthalate (PET) and high-density polyethylene (HDPE) waste in Hong Kong. The plant will be operated by the joint venture “New Life Plastics Ltd.”. Here, the ALBA Group's partners are Swire Coca-Cola Limited and Baguio Waste Management & Recycling Limited (Baguio), a Hong Kong's leading recycling firm which is the subsidiary of Baguio Green Group Limited.

The plant is being built in the EcoPark in Hong Kong, an industrial site for recycling and environmental technology. The ALBA plant for recycling electrical and



从左至右：新生命塑胶有限公司代表 Nigel Mattravers, ALBA集团主席Axel Schweitzer 博士；香港特别行政区环境局局长Wong Kam-sing；Baguio绿色集团主席Ben Ng；太古可口可乐有限公司董事总经理Patrick Healy；以及汇丰银行（HSBC）亚太区国际业务主管、亚太区战略与规划主管Matthew Lobner（照片由新生命塑胶有限公司提供）

From left to right: Nigel Mattravers, Representative New Life Plastics Ltd.; Dr. Axel Schweitzer, Chairman of the ALBA Group; Wong Kam-sing, Minister of Environment of the Hong Kong Special Administrative Region; Ben Ng, Chairman of the Baguio Green Group; Patrick Healy, Managing Director of Swire Coca-Cola Limited; and Matthew Lobner, Head of International, Asia Pacific and Head of Strategy and Planning, Asia Pacific, HSBC (Source: New Life Plastics Ltd.)

electronic waste (Hong Kong WEEE-PARK), officially taken into operation in March 2018, is also located here. The new plant will consist of three process stages: the high-tech sorting, the production of food-grade PET flakes and the manufacture of HDPE pellets. The planned annual capacity amounts to more than 35,000 tonnes, with the commencement of regular operations planned for the second half of 2020.

“The ALBA Group is a leader in the area of recycling technology and with the new project in Hong Kong is further expanding its position in the Asian market,” says Dr Axel Schweitzer, CEO of the ALBA Group. “After the successful opening of the largest recycling plant for electrical and electronic waste in South-East Asia last year, we are very proud now also to construct Hong Kong's first recycling plant for PET and HDPE.”

■ ALBA Group
www.albagroup.com

扩展:新设立台湾公司

■ 美奎 (Maguire) 产品有限公司已经建立了美奎产品台湾有限公司，作为新建的子公司，在塑料辅机行业服务于成长中的广阔的台湾市场。

新公司将在美奎的产品销售和技术支持方面向当地的客户提供服务，包括 Maguire® 称重计量混料机，ULTRA® 低能耗干燥机、MGF™ 称重喂料机，-Clear-Vu™ 加料系统以及其它美奎品牌的设备。公司将储存经过挑选的全部组装完成的机器以及全范围的备件。台中市的工厂将包括演示设备，客户和潜在客户可以看到运行中的美奎设备。

美奎台湾是位于新加坡的美奎亚洲的子公司。美奎亚洲的董事总经理是 Hubert Nerlich，他说道：“美奎台湾公司的建立，向这个具有相当规模的重要市场提供直接的服务，而此前我是通过代理提供服务。台湾有许多塑料加工厂商，既有本地的，也有来自国际上的，再加上大量OEM供应商，他们指定在全套生产线上使用我们的辅助设备。”

新公司的总经理Danniel Hsieh 将领导这家工厂的员工，员工均经过培训、是销售和技术服务方面的专家。所有美奎产品都是在美国宾夕法尼亚州的Aston制造的。美奎台湾是展示美奎产品的第六个国际子公司。美奎中国是美奎亚洲的另一个子公司，此外美奎有三家子公司：美奎欧洲、美奎加拿大和服务于中东、印度和非洲的美奎IMEA。

Expansion: New Taiwanese Company

■ Maguire Products has established Maguire Products Taiwan Co., Ltd. as a new subsidiary to serve the large and growing Taiwanese market for plastics auxiliary equipment.

The new company will serve local customers with sales and technical support for Maguire® Weigh Scale Blenders, ULTRA® Low Energy Dryers, MGF™ gravimetric feeders, Clear-Vu™ loading systems, and other Maguire equipment brands. It will stock a select number of fully assembled machines and a complete range of spare parts. The Taichung City facility will include a demonstration facility where customers and prospects can see Maguire equipment in operation.

Maguire Taiwan is a subsidiary of Singapore-based Maguire Asia, whose managing director is Hubert Nerlich. "Maguire has created Maguire Taiwan to pro-



美奎台湾开业庆典。自左至右：Tony Tsai, 销售人员；Chua Poh Loon, 技术服务经理；Frank Kavanagh, 美奎产品公司销售和市場副总裁；Hubert Nerlich, 美奎亚洲董事总经理；Danniel Hsieh, 美奎台湾总经理；Carol Liao, 办公室管理员

Maguire Taiwan grand opening ceremony. From left to right: Tony Tsai, salesman; Chua Poh Loon, technical service manager; Frank Kavanagh, vice president of sales and marketing, Maguire Products; Hubert Nerlich, managing director, Maguire Asia; Danniel Hsieh, general manager, Maguire Taiwan; Carol Liao, office administrator

vide direct service to a market of considerable size and importance that until now we have served through agents," said Nerlich. "There are many Taiwanese plastics processors operating both domestically and abroad, plus a large number of OEM suppliers who specify our auxiliary systems for use in complete production lines. "The new company's general manager Danniel Hsieh will head a staff of factory-trained sales and technical service specialists.

All Maguire products are manufactured at facilities in Aston, Pennsylvania, U.S.A. Maguire Taiwan is the sixth international subsidiary representing Maguire Products. Maguire China is another subsidiary of Maguire Asia. Three additional companies are Maguire Europe, Maguire Canada, and Maguire IMEA, which serves the Middle East, India, and Africa.

► **Maguire Products Taiwan, Co., Ltd.**
www.maguire.com, mptw.mgmt@maguire.tw

供应链管理团队得到加强

■ 从2020年3月1日开始，Dhanny Mulyanto先生正式出任考特斯全球供应链管理总监，助力公司的改革团队。经验丰富的他将以客户为导向优化供应链，确保推广中的新产品的供应和质量。考特斯对Dhanny Mulyanto先生的任命为供应链管理这一重要岗位注入了新的血液。

Dhanny Mulyanto先生在流程和供应链管理方面拥有多年经验，深谙客户供应流程，他曾于一家中压配电柜制造公司担任供应链管理总监。考特斯正在实现变革，这一过程的决定性因素是始终关注每个客户的特定要求，同时注重

速度、可靠性及服务。因此，供应链亦须相应地调整，确保有效响应。

Supply Chain Management strengthened

■ As of March 1, 2020, Dhanny Mulyanto joins the change team at Kautex Maschinenbau as the new Head of Global Supply Chain Management. The experienced supply chain manager will optimize the supply chain, to make it even more customer-oriented, and to ensure the availability and quality of the new products announced in the current product promotion campaign. By select-

ing Mulyanto, Kautex has filled another key management position.

Mulyanto has many years experience in process and supply chain management and in-depth expertise in customer-to-customer supply processes. Kautex is currently in the middle of implementing a change process. The decisive factors in this process are a consistent focus on meeting the specific requirements of individual customers, speed, reliability and service. To ensure these requirements are met effectively, the supply chain must also be organized accordingly.

► **Kautex Maschinenbau GmbH**
www.kautex-group.com

执行委员会的新成员

■ SIKORA AG 是一家创新型的集测量、控制、识别、分析及分拣技术的设备制造商和全球供应商。自2020年3月1日起，Jörg Wissdorf 博士被任命为公司执行委员会的新成员。他将和执行委员会成员 Harry Prunk 先生一起工作，熟悉并接替 Harry Prunk 先生的工作。Harry Prunk 先生将于数月后退休，他已在SIKORA公司工作了45年，业绩优秀。

SIKORA AG监事会主席Thomas Sikora 博士说：“对我们而言，尽早进行交接以确保顺利过渡非常重要。”他进一步说道：“我们很高兴 Wissdorf 博士赢得了这一职位。”在与董事会成员 Harry Prunk 先生交接过后，Jörg Wissdorf 博士将负责销售、市场及服务领域。

Jörg Wissdorf 博士毕业于航空工程专业。在加入 SIKORA 之前，曾在销售和市场部门担任过多个领导职务，并担任过国内和国际公司的董事总经理。Jörg Wissdorf 博士说：“我期待着新的职责，并希望能在现有市场和新兴市场中进一步扩展公司的业务。” SIKORA 的产品包括面向未来带有领先技术的系统，可为客户提供过程优化、可持续性和效率方面的附加值。Wissdorf 博士解释说：“将SIKORA的特殊优势推向市-

场，以进一步提高公司的成功率将是我的核心任务之一。”

New Member of the Executive Board

■ SIKORA AG, manufacturer and global supplier of innovative measuring, control, inspection and sorting technology, has appointed **Dr. Jörg Wissdorf** as a new member of the executive board since March 1, 2020. He is familiarized for succeeding executive board, **Harry Prunk**, who will retire in a few months after 45 successful years with SIKORA.

“It was important for us to approach the succession at an early stage in order to ensure a smooth transition”, says **Prof. Dr. Thomas Sikora**, chairman of the supervisory board of SIKORA AG. He further says: “We are delighted to have won our ideal candidate with Dr. Wissdorf.” Jörg Wissdorf will be responsible for the areas Sales, Marketing and Service after a transition period together with the long-standing board member, Harry Prunk.

Before, the graduated aerospace engineer worked in several leading positions



SIKORA公司执行委员会的新成员：Jörg Wissdorf博士
New SIKORA AG executive board member: Dr. Jörg Wissdorf

in Sales and Marketing as well as managing director of national and international companies. “I look forward to the new responsibility and want to further expand the growths of the company in the existing as well as in the younger markets,” says Jörg Wissdorf. SIKORA’s portfolio includes future-oriented systems that offer the customer an added value with regard to process optimization, sustainability and efficiency. “To bring the specific advantages of SIKORA onto the markets in order to further increase the success of the company will be one of my core activities”, explains Wissdorf.

► SIKORA AG
www.sikora.net

包米勒中国迎来新任总经理

■ 包米勒集团在中国的两个子公司，包米勒自动化（苏州）有限公司和包米勒（上海）自动化设备贸易有限公司，有了一位新任总经理。从2020年4月1日起，在经过2个月的交接过渡后，Steffen Horn接替Fabian Krane先生领导公司。“我们感谢Krane先生在过去几年的杰出工作，他对包米勒中国的发展做出了巨大的贡献。”包米勒集团

管理董事Andreas Baumüller说道。

随着这两个子公司，包米勒集团在中国将提供有关驱动和自动化技术的全领域产品，包括销售、应用、服务和生产。从2003年开始，包米勒开始了它在中国的稳步发展。公司对客户在工业厂房和设备、车辆、船舶以及移动工作设备的整个生命周期中提供产品、系统和各种服务。

New Managing Director in China

■ The two Chinese subsidiaries of the Baumüller Group Baumüller Automation (Suzhou) Co., Ltd. and Baumüller Automation Equipment Trading (Shanghai) Co., Ltd. have a new Managing Director.

Steffen Horn



On April 1st, 2020 **Steffen Horn** took over the leadership from **Fabian Krane** after a two months transition period. “We would like to thank Mr. Krane for his excellent work and contribution to the very positive development of Baumüller China”, says Andreas Baumüller, Managing Partner of the Baumüller Group.

With the two subsidiaries, the Baumüller Group offers in China the complete range of drive and automation technology with sales, application, service and production. Baumüller started its steady growth in China in 2003. The company supports its customers with products, systems and services that cover the complete life cycle of industrial plants and machines as well as vehicles, ships and mobile working machines.

► Baumüller Gruppe
www.baumueller.com

APFE

第十六届

国际胶带与功能薄膜展

国际卷材与模切展

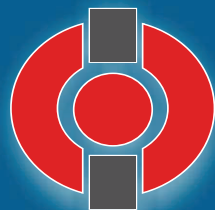
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高性能防护材料获得了认证

■ Walki的一次性医院防护服用高性能保护材料Walki®Apron45，达到了基于DIN EN 14126:2004规范所制定的标准的最高等级。

现在，该材料已准备好向客户供货，将在抗击COVID-19的过程中用来制造世界各地医院所需的防护服。

经过认证的Walki®Apron45可以抵抗带有压力的污染液体和有传染性的媒介体的渗透，这些污染物是由于与含有污染液体的物质进行机械接触所引起的。

对该材料进行的测试证实，这种材料对污染的气溶胶和固体颗粒具有抵抗力。

Walki工程材料业务发展经理Bart Vansteenkiste说：“这意味着Walki®Apron45符合所有必要的安全标准，并且该材料可以安全地用于医院工作人员的防护装备中。”

Walki®Apron45材料来自于高性能挤出涂层无纺布，适合于医疗应用。

医院防护服中使用的材料必须具有很高的抗撕裂性，以防止材料在制造过程中遭受损坏。由于医院工作人员在困难的条件下长时间工作，因此防护服的穿着舒适性也很重要。

Vansteenkiste说：“Walki®Apron柔软，穿着舒适。”

High-Performance Protective Material Certified

■ Walki's high-performance protective material for single use hospital aprons, Walki®Apron 45, has achieved the highest class according to the standard based on the DIN EN 14126: 2004 norm. The material is now ready to be delivered to customers, who will make the aprons needed in hospitals all over the world in the fight against COVID-19. The Walki®Apron 45 was certified to resist penetration by contaminated liquids under pressure and infective agents due to mechanical contact with substances containing contaminated liquids. The material was also tested and certified for resistance to contaminated aerosols and solid particles.

“This means that the Walki®Apron 45 meets all the necessary safety standards, and the material is safe to use in protective gear for hospital personnel”, says



Bart Vansteenkiste, Business Development Manager Engineered Materials at Walki.

The Walki®Apron 45 is based on a high-performance extrusion coated non-woven fabric suitable for medical applications.

The material used in hospital aprons needs to be highly tear-resistant to hinder the material from suffering damages

during the manufacturing process. As hospital personnel work long days in difficult conditions, it is also important that the apron is comfortable to wear.

“The softness in the Walki®Apron makes it pleasant to wear”, says Vansteenkiste.

Walki Group
walki.com

新建七万吨PP造粒生产线，配备了水下造粒机

■ 挤出机制造商南京越升挤出机械有限公司已经安装了一条年产7万吨聚丙烯的造粒生产线，其中包括来自诺信公司的BKG®水下造粒机。

这条新生产线在印度尼西亚客户的工厂里安装和运行，配备了越升公司的SAT-X 175同向双螺杆挤出机，挤出机电机功率2,000kW，以及拥有越升专利的高转矩齿轮箱。生产线产量为每小时8到10吨。越升公司的销售经理Allen Zhang说：“这次开机是这一大型聚烯烃造粒生产线项目的高潮，生产线由越升负责设计、制造、安装和调试。迄今为止，这个市场一直由西方供应商主导。该项目的规模和我们在其中的综合作用，为中国制造的双螺杆技术树立起了一个里程碑。”

由诺信提供的造粒组件包括BKG AH D 300水下造粒机，其生产能力可达每小时35吨，以及Optigon™ 5自动化自洁水和干燥机系统，其产量可达每小时15吨。

诺信中国销售总监 Aaron Kong指

出，BKG造粒机在中国和其它地方已被广泛使用。

“为了支持这个市场，去年我们在上海的工厂启动了一条新的造粒实验生产线，包括一台每小时300公斤的双螺杆挤出机。我们的直接客户和越升等OEM客户都使用它，他们的客户可以在我们的实验线上进行试验以验证我们的BKG设备。”

从2006年在中国南京创建以来，越升挤出机械有限公司已经成功地向全世界交付了超过2,600条双螺杆和单螺杆挤出生产线，应用于加工聚合物，包括混料、直接挤出、挤出成型、发泡挤出和回收利用。

New 70,000-Ton PP Pelletizing Line equipped with Underwater Pelletizer

■ Extruder manufacturer Useon (Nanjing) Extrusion Machinery Co., Ltd. has

installed a 70,000 ton per year polypropylene pelletizing line that incorporates a BKG® underwater pelletizer from Nordson Corporation.

The new line, which is up and running at the facility of an Indonesian customer, is powered by Useon's SAT-X 175 co-rotating twin screw extruder. The unit has a 2,000 kW motor and Useon's patented high-torque gearbox. The throughput of the line is 8 to 10 tons/hour.

"The start-up is the culmination of a mega-integrated polyolefin pelletizing project in which Useon was responsible for design, manufacturing, installation, and commissioning," said Allen Zhang, sales manager for Useon. "The size of the project and our comprehensive role in it marks a milestone for made-in-China twin-screw technology in a market until now dominated by Western suppliers."

The pelletizing component from Nordson includes the BKG AH D 300 underwater pelletizer, with throughput capability up to 35 tons per hour, and the Optigon™ 5 automatically self-cleaning

water and dryer system, with throughput up to 15 tons per hour.

BKG pelletizers are widely used in China and elsewhere, noted Aaron Kong, Nordson sales director for China. "To support this market, last year we started up a new pelletizing laboratory line at our facility in Shanghai, including a 300 kg per hour twin-screw extruder. It is used by our direct customers as well as OEM companies like Useon, whose customers can run trials in our lab to demonstrate our BKG equipment."

Since established in 2006 in Nanjing, China, Useon Extrusion has successfully delivered more than 2,600 twin- and single-screw extrusion lines worldwide for polymer processing applications including compounding, direct extrusion, foam extrusion, and recycling.

➔ **Nordson Polymer Processing Systems**
www.nordsonpolymerprocessing.com
➔ **Useon Extrusion Machinery Co., Ltd.**
Nanjing, Jiangsu, China
www.useon.com

在印度尼西亚的新聚丙烯造粒生产线，采用Useon的SAT-X 175同向双螺杆挤出机，最显著的位置是滑动底座安装的BKG® 水下造粒机

New polypropylene pelletizing line in Indonesia, with Useon's SAT-X 175 co-rotating twin-screw extruder; skid-mounted BKG® underwater pelletizer is in foreground



在中国的长纤维增强热塑性塑料粒子拉挤生产线取得成功

■ 系统供应商ProTec Polymer Processing的拉挤生产线用于生产长纤维增强热塑性 (LFT) 复合材料，在亚洲取得了越来越大的成功。来自江苏省苏州市的苏州双威聚合物有限公司，目前正在使用两条ProTec LFT拉挤生产线进行造粒，是对此满意的客户之一。

2017年，这家混料供应商从ProTec购买了第一条32股LFT拉挤生产线，该生产线的造粒生产能力为500 kg / h，在2019年他们又购买了第二条64股且产量加倍的装置。在过去的一年中，该公司还订购了两套SOMOS Gramix S9重力定量加料和混合系统，它们将于今年投入生产。

源自“拉”和“挤出”的“拉挤成型”工艺可用于生产各种纤维增强塑料。ProTec的拉挤生产线使塑料粒子制造商能够实现自动化高效生产LFT粒子。纤维和分子材料的组合实际上可以使用任何普通的热塑性塑料，并根据需要采用玻璃纤维、碳纤维、芳族聚酰胺纤维或碳纤维进行增强。

仅需对现有的生产线进行少许改动和增补，即可完成新的提速升级。改动包括添加预热器和对模具的几何形状进行优化。这样一来，可以更快地将纤维调节至所需温度，从而确保以显著提高的生产率进行完美的浸渍。第二个水浴槽也可提高冷却能力。ProTec同样修改了造粒机。在高速机型中，特殊布置的旋转刀可高速切粒，以达到6至12 mm的最佳切粒长度。

Success in China with LFT Pultrusion Lines

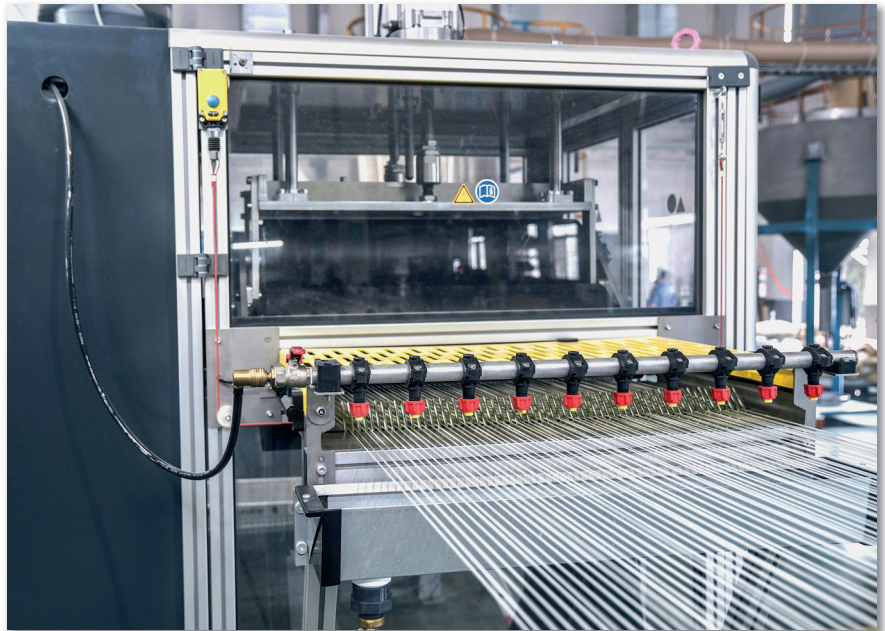
■ Systems supplier ProTec Polymer Processing is enjoying ever greater success in Asia with its pultrusion lines for producing long fiber reinforced thermoplastic (LFT) compounds. Suzhou Sunway Polymer Co. Ltd. from the city of Suzhou in Jiangsu Province is one of the satisfied Chinese customers and is now producing pellets using its two ProTec LFT pultrusion lines.

In 2017, the compounder purchased its first 32 strand LFT pultrusion line from ProTec which has a pellet production capacity of 500 kg/h, while a second unit

with 64 strands and twice the output followed in 2019. Over the last year, the company also ordered two SOMOS Gramix S9 gravimetric dosing and mixing systems which will be brought into service on the lines this year.

"Pultrusion", derived from "pull" and "extrusion", can be used to produce a wide range of fiber reinforced plastics. ProTec's pultrusion lines allow plastics manufacturers to automate the high-efficiency production of LFT pellets. The fiber-polymer combination can include virtually any common thermoplastic with reinforcement being provided as required by glass, steel, aramid or carbon fibers.

The new high-speed retrofit requires only slight modifications and additions to be made to existing pultrusion lines. Modifications include the addition of a pre-heater and optimization of die geometry. As a result, the fibers can be adjusted to temperature more quickly, so ensuring faultless impregnation at a distinctly higher production rate. A second water bath also increases cooling capacity. ProTec has likewise modified the pelletizer. In the high-speed variant, specially arranged rotary knives chop the pellets at



实际上，任何常见的热塑性塑料均可用于生产LFT粒子，并根据增强作用的需要选用玻璃纤维、钢纤维、芳族聚酰胺纤维或碳纤维来提供增强作用（照片：ProTec Polymer Processing）

Virtually any common thermoplastic can be used to produce LFT pellets with reinforcement being provided as required by glass, steel, aramid or carbon fibers (Photo: ProTec Polymer Processing)

high speed to the optimum processing length of 6 to 12 mm.

ProTec Polymer Processing GmbH
www.sp-protec.com

www.smart-extrusion.com

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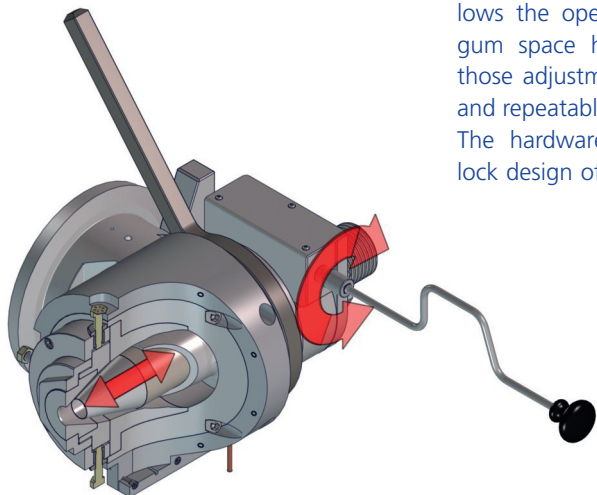
■ Guill Tool推出了具有MAGS胶空间调节系统的新型500系列十字头。500系列专为弹性体化合物的流动特性和独特的加工挑战而设计。Guill推出的这种新型十字头设计的关键特性之一是机械辅助胶空间(MAGS)调节系统。新的胶空间调节方法使操作员可以使用普通套筒扳手从单点进行轻松调节。调节胶空间时无需多个螺母和螺栓,这可以缩短调节时间。核心管上的视觉指示灯让操作员能够查看胶空间移动了多远,使调节更加准确且可重复。

Guill推出的新型500系列无需硬件并采用专利凸轮锁设计,无需浪费时间拆卸和重新固定紧固件,便于拆卸和重新组装。只需将凸轮螺母转半圈即可松开并自动从十字头体部取出导流板,这进一步节省了时间。此外,导流板上没有底切,在取出导流板时无需挂起任何材料,从而可以更快、更轻松地清洁和转换。

新型500系列还采用了最新的中央平台同心度调节系统,可显著降低工具压力,可以在不松动端面螺栓的情况下更轻松、更精确地进行同心度调节。用于调节螺栓的易取插件还允许轻松地更换锁定或损坏的调节螺栓,从而进一步减少维修费用并减少宕机时间。

这种新型橡胶/硅胶十字头的另一个创新特点是铸铝液体冷却套管,让用户可以在发生线路阻塞时切换冷却套管,与传统集成冷却系统相比,进一步减少了宕机时间。

Guill 500系列十字头,具有机械辅助胶空间(MAGS)调节系统.....专为弹性体化合物的流动特性而设计



带有MAGS胶空间调节功能的新型500系列十字头是大多数现有NRM生产线的直接替代品,但这种十字头设计也可以适应任何挤压机设计或生产线布局。

添加了新设计的流入口通道后,可减少材料加工时产生的剪切力和热量,这有助于降低十字头的压力,使材料以更平衡和均匀流动的方式穿过十字头。

Guill提供的所有十字头都配有用于装配和拆卸的工具套件以及详细的操作员说明手册。Guill工程团队可随时协助用户实施和操作新型500系列十字头。

有关具有MAGS胶空间调节系统的新型Guill 500系列十字头的视频,请访问:

<https://youtu.be/jeNovmMtcBs>

New 500 Series Rubber/Silicone Extrusion Crosshead

■ Guill Tool introduces the NEW 500 Series crosshead with MAGS gum space adjustment. The 500 Series is designed specifically for the flow characteristics and unique processing challenges of elastomeric compounds. One of the key features engineered by Guill on this new crosshead design is the mechanically assisted gum space (MAGS) adjustment system. This new method of gum space adjustment allows the operator to make an effortless adjustment from a single point using a common socket wrench. No more need to struggle with multiple nuts and bolts in order to adjust gum space, which leads to faster adjustments. The visual indicator on the core tube allows the operator to see how far the gum space has been moved, making those adjustments much more accurate and repeatable.

The hardware-free and patented cam lock design of the NEW 500 Series from

Guill Series 500 crosshead with Mechanically Assisted Gum Space (MAGS) adjustment...specially designed for the flow characteristics of elastomeric compounds

Guill means no time is wasted unbolting and re-securing fasteners for disassembly and re-assembly. Only half of a rotation of the cam nut is required to loosen and automatically extract the deflector from the head body, which is another time saver. Also, with no undercuts on the deflector, there are no material hang-ups when extracting the deflector, allowing for faster and easier cleaning and changeover.

The NEW 500 Series also features the latest Center-Stage concentricity adjustment system that significantly reduces pressure on the tooling, allowing easier and more precise concentricity adjustments without loosening the face bolts. Easy-Out inserts for the adjusting bolts also allow simple replacement of locked or damaged adjusting bolts, which further saves on repair and downtime.

Another innovative feature of this new rubber/silicone crosshead is a cast aluminum liquid-fed cooling sleeve that allows the user to switch out the cooling jacket in the event of a line obstruction, again reducing downtime compared to traditional integrated cooling systems.

The NEW 500 Series crosshead with MAGS gum space adjustment is a drop-in replacement on most existing NRM lines, however this crosshead design can also be adapted to fit any extruder design or line layout.

The addition of a newly designed flow inlet channel reduces the shear and heat that is generated as the materials are being processed. This leads to lower head pressures allowing the material to move through the head in a much more balanced and even flow.

All crossheads supplied by Guill are furnished with a tool kit for assembly and disassembly as well as a detailed operator's instruction manual. The engineering team at Guill will gladly assist users in the implementation and operation of the NEW 500 series crosshead.

For a video of the NEW Guill 500 Series crosshead with MAGS gum space adjustment, please go to:

<https://youtu.be/jeNovmMtcBs>

上海新的销售和技术服务办公室

■ 隆重举行的龙蟒佰利联集团新销售和技术服务办公室在上海正式开幕，CEO助理和销售执行副总经理屈海明先生主持了剪彩仪式。

新办公室位于上海中部黄浦江东岸的中信广场，距上海浦东国际机场仅43公里45分钟车程。

龙蟒佰利联集团副董事长谭瑞清先生、集团公司董事长助理姚革先生、集团总裁助理许冉女士、龙佰贸易公司总经理燕朝霞女士及焦作研究所所长张玉荣先生均出席了典礼。

谭总在仪式上说：“自龙蟒和佰利联合并以来，业务迅速发展。去年，我们收购了新立钛业，目前我们钛白粉产能已超过100万吨，使我们成为全球三大钛白粉制造商之一，并且在亚洲排名第一。

我们是一家全球化公司。我们的产品销往世界许多国家和地区。多年来，我们出口的钛白粉的销售比例连续超过50%。目前约为75-80%。在未来3-5年内，我们钛白粉的年度销售目标将超过100万吨。

随着公司的快速发展，我们的销售和技术团队将大大增加。我们的生产基地位于焦作，德阳，襄阳，楚雄和攀枝花，而我们在国际大都市上海的新办事处集中了我们的销售和技术服务团队。

全球市场需要一流的全球客户服务。我们在上海的办事处将吸引商业和技术人才，以帮助我们实现销售和研发的不断前进，并支持公司持续健康可持续发展，并进一步增强集团的国际竞争力。

我们将继续在未来进行投资以提高生产能力并加强我们的综合供应链。”

New Sales and Technical Services Office in Shanghai

■ The official opening of Lomon Billions' new sales and technical services office in Shanghai was held at the beginning of May, marked by a ribbon-cutting ceremony hosted by Haiming Qu, Assistant to the CEO and Executive Deputy General Manager of Sales.

The new office is located at CITIC Plaza in central Shanghai on the East bank of the Huangpu river, just 43 kilometers and 45 minutes' drive from Shanghai Pudong International Airport.



剪彩仪式在上海开设新的销售和技术服务办公室

Ribbon-cutting ceremony to open new sales and technical services office in Shanghai

The ceremony was attended by Ruiqing Tan, Vice Chairman of Lomon Billions Group, Ge Yao, Assistant to the Chairman, Ran Xu, Assistant to the CEO, Zhaoxia Yan, General Manager of Lomon Billions Trading Company and Yurong Zhang, Director of Lomon Billions' Research Institute in Jiaozuo.

At the ceremony Mr. Tan said: "Since the merger between Lomon and Billions, the business has developed rapidly. Last year we acquired Xinli Titanium Industry and our current titanium dioxide pigment production capacity now exceeds 1 million tonnes making us one of the world's top 3 titanium dioxide pigment manufacturers and No.1 in Asia.

We are a global company. Our products are sold to many countries and regions around the world. The proportion of our TiO₂ pigment sales that is exported has continuously exceeded 50% for many years. It is currently around 75 to 80%. Within the next 3 to 5 years our annual TiO₂ sales target will exceed more than 1 million tonnes.

With the rapid development of the company our sales and technology teams will grow considerably. Our production sites are located in Jiaozuo, Deyang, Xiangyang, Chuxiong and Panzhihua. Our new office in Shanghai, China's international metropolis, centralizes our sales and technical services teams.

The global market demands a first-class global customer service. Our Shanghai location will attract commercial and

technical talent to help us achieve continuous improvement in sales and R&D, support the company's continued healthy and sustainable development, and further enhance the Group's international competitiveness.

We continue to invest in the future to grow our production capacity and to strengthen our integrated supply chain."

► Lomon Billions Group
www.lomonbillions.global

在中国无锡的新工厂开业

■ 10月23日，普发（Pfeiffer）真空公司在中国无锡举行了盛大的开业仪式，庆祝工厂的扩建。扩建后的新工厂比原规模翻了一倍，这是普发真空在中国发展的一个重要里程碑，这使公司在支持本地涂料和半导体市场战略增长的同时，能够更好地满足当地客户的需求。

董事会管理层代表 Hugh Kelly 说道：“这是我们新增长战略的一部分，这个战略包括1.5亿欧元的全球投资计划。除了提供售后服务以外，现在也能生产干式泵等更大的设备和我们新的泄漏探测系统ATC，以及组装泵站。随着行业领先的技术和设备的引进，普发真空技术可以更好地对当地的客户需求作出响应。”

在2019年年度股东大会上，普发真空分享了公司的八个战略支柱，普发真空技术的CEO Eric Taberlet博士强调了中国市场对公司发展的重要性。作为长三角地区的重点城市之一，无锡在发展半导体、电子和太阳能产业方面得到了政府的大力支持。扩建后的工厂不仅加强了普发真空在中国的业务，同时也使其更接近中国的客户以及广阔的亚洲市场。

自从2007年进入亚洲市场，拥有150多名员工的普发真空保持了稳步增长，这在很大程度上得益于中国蓬勃发展的经济，以及市场对科学化的高精度真空技术的强劲需求。作为涡轮分子泵的发明者，普发真空已经投资研发了近130年，旨在为客户和广泛的行业提供当代最前沿的解决方案和创新的产品。

普发真空以其丰富的产品和专业知识，与国内一流企业、科研机构以及其它行业合作伙伴密切合作，为中国的真空技术产业提供支持。随着新工厂的扩建，普发真空将为本地客户提供更多的价值，并在未来深化对中国市场的承诺。

New Plant in Wuxi China opened

■ Pfeiffer Vacuum celebrated the expansion of its facility in Wuxi, China on October 23 with a grand opening ceremony. Double its original size, the new, expanded facility marks a significant milestone in Pfeiffer Vacuum's development in China, as it allows the company to better respond to local customers' needs while supporting its strategic growth in the local coating and semiconductor market.

"This is part of our new growth strategy which includes a global investment program of 150 million EUR", said Hugh Kelly, representative of the management

board, "In addition to providing after-sales service, the bigger facility will now also allow for the production of dry pumps and our new leak detection systems ATC, as well as the assembly of pumping stations. With the introduction of industry-leading technologies and equipment, Pfeiffer Vacuum is better poised to react to the needs of local customers."

At the 2019 annual general meeting, Pfeiffer Vacuum shared 8 strategic pillars of the company, with Dr. Eric Taberlet, CEO of Pfeiffer Vacuum Technology highlighting the importance of the Chinese market to the company's development. As one of the key cities in the Yangtze River Delta region, Wuxi has been receiving strong government support to develop its semiconductor, electronics and solar industry. The expanded facility not only strengthens Pfeiffer Vacuum's presence in China but also enables closer proximity to its customers in China as well as the wider Asia market. Since entering the China market in

2007, Pfeiffer Vacuum has maintained a steady growth with over 150 employees, largely part of the country's booming economy as well as strong market demand for scientific and high-precision vacuum technology. As the inventor of the turbomolecular pump, Pfeiffer Vacuum has been investing in Research & Development for nearly 130 years, with an aim to provide cutting-edge solutions and innovative products to customers and the wider industry.

In support of the vacuum technology industry in China, Pfeiffer Vacuum has been working closely with top local enterprises, scientific research institutions as well as other industry partners with its products and rich expertise. With the new, expanded facility, Pfeiffer Vacuum is set to deliver more value to local customers and deepen its commitment to the China market in the future.

➔ Pfeiffer Vacuum GmbH
www.pfeiffer-vacuum.com

图 普发真空在中国无锡建立新工厂

Pfeiffer Vacuum opens new plant in Wuxi China



挤压刀具的流动动力学

Flow Dynamics of Extrusion Tooling

作者：产品开发工程师Denis Finn
Guill Tool & Engineering

挤出工艺本身具有一些挑战，其中产品质量，特别是挤压式医疗产品质量，是许多行业面临的突出问题。生产的医用管和夹套产品必须确认符合非常严格的公差标准，通常会检查壁厚和直径，公差必须低于0.0004英寸/0.01毫米。用于医疗行业的聚合物可能还非常昂贵。必须严密控制和调整整个挤出系统，以便以具有成本效益的方式生产这些要求苛刻的产品。这对于多层和/或多腔结构产品尤其重要。



Denis Finn

By Denis Finn, Product Development Engineer Guill Tool & Engineering

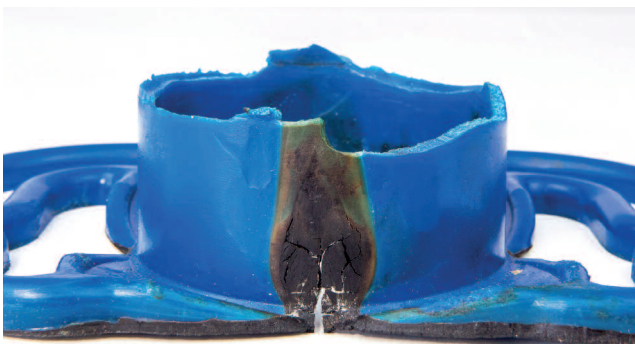
The extrusion process brings with it several challenges, product quality being the front-runner in many industries especially with extruded medical products. Medical tubing and jacketed products must be produced to confirm to very tight tolerances, often wall thickness(es) and diameter(s) being inspected to tolerances lower than 0.0004"/0.01mm. Polymers used in the medical industry may also be extremely expensive. The entire extrusion system must be carefully controlled and tuned to produce these demanding products in a cost efficient manner. This is especially important for multi-layer and/or multi-lumen constructions.

聚物流经的流道几何形状是精心设计的挤出系统的关键组成部分。应考虑停留时间（聚物流经模具组件的时间），以避免烧毁和停滞问题。如果流道过宽，则聚合物暴露于加工温度的时间可能会导致聚合物降解。如果几何形状过窄，则系统通常将在高压下运行，这通常会限制生产速度。此外，用户可能会遇到阻止材料自由流动的死角。如果这种情况未予纠正，材料可能会完全降解。（见图片。）虽然这些情况可见于任何聚合物，但由于使用昂贵的材料，这些情况在医疗行业中成为严重的问题。此外，医疗产品通常使用硫酸钡，这是一种不透射线的物质，允许通过X射线扫描观察成品。当硫酸钡与含氟聚合物等高温材料共同挤出时，流道

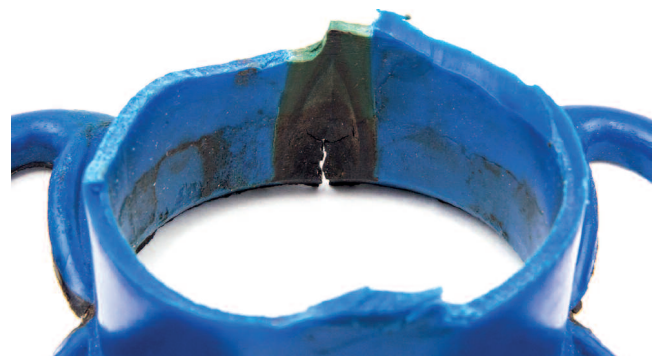
的设计必须确保硫酸钡不会降解。死点和停留时间过长会导致硫酸钡变黄并破坏产品。

应反复检查系统的传感器和反馈，以确保正确处理聚合物。流经模腔的聚合物的温度可能与热电偶读数有很大差别。众所周知，热电偶是测量模具组件温度的传感器。大多数情况下，传感器不直接读取聚合物的温度，而是安装在模具组件的外壳上。聚合物和热电偶之间可能出现相当大的热梯度，从而无法确定是否在正确处理聚合物。由于聚合物的实际温度可能比指示的温度更低或更高，因此在使用易损材料或建立生产线配方时，必须对熔体流进行物理测量。为此，您应该在生产速度下进行测量。聚合物开始穿过限制性

由于死点而被烧毁的材料



Material that's been burnt due to dead spots



流道时，会因粘性耗散而产生热量。如果其他因素保持不变，聚合物的流动速度越快，聚合物流动对系统贡献的热量就越高。密切监控对许多热敏材料至关重要，如乙烯-乙烯醇（EVOH），因为可能会发生凝胶和其他降解。例如，您可能看到热电偶读数为300°C，但直接测量时显示温度为330°C。在这种情况下，您需要调整热电偶设置以获得正确的熔体温度。材料也可能易于熔融破裂，这种现象会在产品上产生不理想的表面光洁度。使用适当尺寸的工具和加工参数将避免这些麻烦的问题。

根据全国销售经理Bill Conley的说法，如果挤出机运行速度非常慢，我们还可以提供双、三或四输出模头。这样，您不必使用另一条生产线就能够有效地将挤出系统加倍，使生产量达到两倍甚至四倍。通过这种方式，您可以在设备和加工人员方面节省大量资金。

50多年来，在设计和生产用于各种热塑性和弹性体应用方面，Guill始终是公认的挤出模具技术领导者。这包括医用管，多腔、多层、型材产品、橡胶、塑料、电线电缆、滴灌和光纤护套，以及用于条带和其他挤出涂层的定制工具。公司通过制造商代表公司网络以及与挤出机制造商合作将产品销售到全球市场。

The flow channel geometry the polymer flows through is a critical component of a well-designed extrusion system. Residence time, or the amount of time the polymer flows through the die assembly, should be considered in an effort to avoid burning and stagnation issues. Channels that are too large means the polymer's exposure time to processing temperatures could begin to degrade the polymer. Too restrictive of a geometry often means the system will run at high pressures, often limiting production speeds. Along with this, users can encounter dead spots that prevent the material from flowing freely. If this is not corrected, we can run into material that's been completely degraded. (See photos) While these situations can occur with all polymers, this becomes a serious problem in the medical industry due to the usage of expensive materials. Also, medical products commonly use barium sulfate, a radiopaque substance which allows the finished product to be visible on x-ray scans. When barium sulfate is co-extruded with high temperature materials like fluoropolymers, the flow channels must be engineered to ensure the barium sulfate does not degrade. Dead spots and high residence time will cause the barium sulfate to yellow and ruin the product.

The sensors and feedback the system provides should be checked and doubled checked to ensure the polymer is being properly processed. The temperature of the polymer flowing the die cavity could differ greatly from the thermocouple reading. As we know, the thermocouple is a sensor that measures the temperature of the die assembly. In most cases the sensor is not directly reading the temperature of the polymer but is installed on the outside housing of a die assembly. A considerable thermal gradient can occur between the polymer and the thermocouple, giving false confidence that the polymer is being properly processed. Since the polymer temperature could ac-



tually be colder or hotter than what is indicated, it is imperative to take physical measurements from the melt stream when working with fragile materials or establishing recipes for the line. To do this, you should take the measurements while at production speed. As the polymer begins to travel through the restrictive flow channels, it will develop heat from viscous dissipation. The faster you go the more heat the polymer's flow will contribute to the system, if everything else stays the same. Close monitoring is critical for many thermally sensitive materials like ethylene vinyl alcohol (EVOH), where gels and other degradation may occur. For example, you might look at the thermocouple and see 300°C but measure the direct temperature and get 330°C. In this case, you need to adjust the thermocouple settings to get the right melt temperatures. Materials may also be prone to melt fracture, a phenomenon that produces an unsatisfactory surface finish on the product. Utilizing proper tooling sizes and processing parameters will avoid these troublesome issues.

According to Bill Conley, our National Sales Manager, if the extruder is running very slowly, we can also offer dual, triple or quadruple output dies. Instead of getting another line, you are effectively doubling the extrusion system to double or even quadruple your production. In this way, you save a lot of money on equipment and processing personnel.

For more than 50 years, Guill has been a recognized technology leader in the design and manufacture of extrusion tooling for various thermoplastic and elastomeric applications. These include medical tubing, multi-lumen, multi-layer, profile products, rubber, plastics, wire & cable, drip irrigation and fiber optic sheathing, as well as custom tooling for striping and other extruded coatings. The company sells to the global market through a network of manufacturers' representative firms, as well as in tandem with extruder manufacturers.

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“丹麦托盘”高速生产线

Extrusion Technologies – Case Study: High-speed production line for “Danish trays”



高度现代化的3层平膜片材生产线

Highly modern 3-layer flat film sheet line

丹麦Staal og Plast公司董事长Jacob Sørensen先生的座右铭是：“我们始终领先于市场一步。我们不会半途而废。”看一下丹麦Ringe的生产车间就可以印证他的话。这是世界上最大的热成型生产线，占地面积20平方米，将大约3 mm厚的挤出HI半成品PS片材加工成用于温室大棚的潮汐苗床。为了生产长达8 m，宽2.5 m的半成品板，一年半之前德国巴顿菲尔辛辛那提公司（Bad Oeynhausen）安装了一条超现代的片材挤出生产线，该生产线生产能力高达3000 kg/h。

“We always keep a step ahead of the market. We don't do things by halves,” is the motto of Jacob Sørensen, Managing Partner of the Danish company Staal og Plast AIS. A glance into the production halls in Ringe impressively underscores his statement. Here stands the world's largest thermoforming line with a footprint of 20 square meters, which transforms about 3 mm thick, extruded, HI-semi-finished PS sheet into what is known as ebb & flow trays for green-houses/hothouses. To produce the up to 8 m long and 2.5 m wide semi-finished boards, battenfeld-cincinnati Germany, Bad Oeynhausen, installed an ultra-modern sheet extrusion line with throughput rates of up to 3,000 kg/h just under a year and a half ago.

除了世界人口增长以及随之而来的专业和业余园丁对花卉、灌木和蔬菜幼苗的需求增加之外，用于现代厨房的新鲜香草花盆和不断增加的大麻种植量，都为蓬勃发展的温室建设做出了贡献。丹麦Staal og Plast公司专门为这个小众市场提供量身定制的高抗冲击聚苯乙烯（HIPS）托盘。该公司由当今董事之父于1984年创立，从一开始就专注于温室产品的生产，在最初的几年中包括钢材和塑料托盘，正如公司名称所暗示。Jacob Sørensen解释说：“如今，由于我们坚信这是我们的核心竞争力，因此我们仅仅加工塑料。我们专注于我们能做到最好的事情，即只专业生产一种产品。”显然，对于一家只有15名员工，规模相对较小，却生产全球温室大棚所需全部片材60%至70%的公司而言，这是一个有意义的概念。并且该市场领军企业在继续增长。这就是公司安装高速

生产线将其在丹麦工厂的生产能力提高了三倍，并在美国芝加哥建立一家子公司的原因，该子公司首先配备了热成型生产线。Jacob Sørensen解释说：“特别是在北美，对我们所谓的‘丹麦托盘’有着巨大的需求。原因是大麻种植越来越多，不仅出于医学目的种植大麻，而且由于大麻在一些联邦州合法化，休闲场合的需求也越来越大。”并暗示他可能会在不久的将来进一步扩大其海外工厂，并在那里也安装挤出生产线。在此之前，公司将继续将其丹麦托盘运送到美国，在当地进行热成型。“这是我们向客户保证高质量标准的唯一途径。”

高质量标准和.....

对于2018年安装的巴顿菲尔辛辛那提3层片材生产

线，Staal og Plast公司首先建造了一个全新的车间，以容纳总长65米的生产线，并为大型热成型机提供足够的空间，还为加工最大的板材（尺寸为2500 x 8000 mm）提供额外的空间。在新共挤生产线中，高速挤出机1-75 T6.1作为主挤出机，总产能高达3t/h。对于HIPS，其单独就可达到约2 t/h的产量。高速挤出机结构非常紧凑，并以高螺杆速度达到其巨大的生产速度。熔体在挤出机中的停留时间足够长，以实现最佳均质化，但又足够短，可以防止机械或热损伤，从而确保最佳的熔体特性。在丹麦，高速挤出机塑化主层材料，因产品更换和切割、冲压而产生的内部废料加入到新材料中。3层复合材料的外层材料由两个1-75 T2.1共挤出机挤出。这些也都是高速挤出机，每台最高产量可达500 kg/h。该董事强调：“与花盆接触的外层是我们托盘的一大特色。其被批准用于食品生产，而且耐紫外线辐射和化学品。我们与丹麦合作伙伴公司合作开发了材料配方。”

...了解客户需求是成功的因素

尽管对于外层的食品安全性和耐紫外线的要求对于温室暖房托盘来说是理所当然的，但对于耐化学品的需求却是生产潮汐托盘的特定需求。这些装有花盆的托盘会定期注入含有植物所需肥料的水。在一段特定时间后，将水和其中包含的添加剂排干并返回到水箱中。自然，灌溉介质被回收以减少水的消耗。Jacob Sørensen表示：“为确保正确的剂量，每次注水前都要对水进行测试并补充肥料。”他还知道，移动台系统已成为当今现代温室的发展趋势。与传统滚动台（仍在使用，可以在框架上来回移动）不同，移动台可以在各个方向上推动。这极大地方便了操作人员的工作。Staal og Plast公司可为各类温室暖房提供所需尺寸，尤其是高质量的合适托盘。要保证托盘绝对平坦，从而可均匀浇灌每个植物。Jacob Sørensen充满信心：“凭借我们30多年的专业技术，我们的客户可以信赖我们。”他认为这是他取得市场成功的主要原因。

有望进一步增长

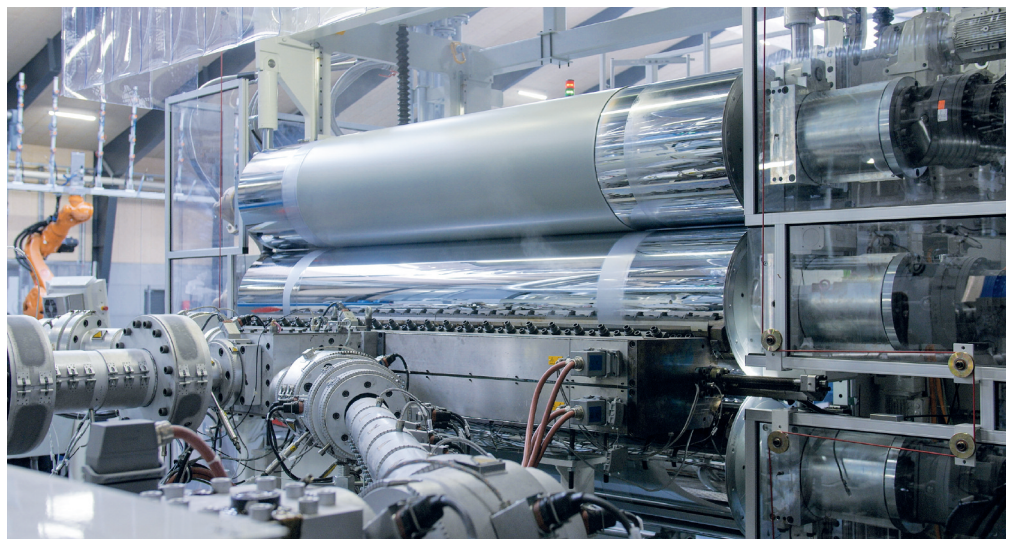
Jacob Sørensen说：“潮汐托盘市场正在蓬勃发展，我们的订单情况良好。目前，新生产线仍有一些空余产能。”因

此，他可以想象自己可以制造聚乙烯片材，作为其他行业的服务提供商。可能的产品是各种所需尺寸的单层、2层或3层板材，厚度范围为2到5 mm，如果客户需要，甚至可以有不同的颜色。顺便说一下，大多数潮汐托盘都是灰色的。在Ringe的设备除了新生产线外，还有另一条用于此目的的片材挤出生产线，以及总共4条热成型生产线。自2018年以来，新生产线已取代了第二条旧生产线，除了高产能外，其主要优势是能耗低，比旧生产线约低40%。除上述挤出机外，新生产线还包括一个3000 mm宽的平片材模头，一个有三个主辊和三个后冷却辊的辊组，以及一个带有测厚仪和纵向裁切锯的辊式输送机。最后，还有一个横向水平切割装置（用于长达8米的板材）和一个堆垛跨运车。Jacob Sørensen高兴地说：“巴顿菲尔辛辛那提的生产线甚至超出了我们的技术要求。我们非常满意，而且对客户未来需求做好了充分准备。”最后还赞扬道：“近年来，巴顿菲尔辛辛那提一直是我最可靠的合作伙伴之一。”

In addition to the rising world population and the resulting added demand for flowers, shrub and vegetable seedlings for professional and amateur gardeners, fresh herb pots for modern kitchens and the increasing cultivation of cannabis are all contributing to the booming greenhouse/hothouse construction. The Danish company Staal og Plast supplies precisely this niche market with made-to-measure high-impact polystyrene (HIPS) trays. The company, founded in 1984 by the father of today's Managing Partner, concentrated right from the beginning on greenhouse/hothouse products, which during the first years included steel profiles as well as plastic trays, as the company's name suggests. "Today, we process exclusively plastics, since we are convinced that this is our core competence", explains Jacob Sørensen. "We are concentrating on what we can do best, which means on just one product." Obviously a con-

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cept which makes sense, for the relatively small company with just 15 employees makes 60 to 70% of all sheet products required for greenhouse/hothouses worldwide. And the market leader continues to grow. This is why it increased its production capacity at the Danish facility fourfold with the installation of the high-speed line and established a subsidiary in Chicago/USA, equipped with a thermoforming line to start with. "Especially in North America, there is an enormous demand for our so-called 'Danish trays'. The reason is the increasing cultivation of cannabis, which is not only grown for medical purposes, but due to its legalization in several federal states also more and more in demand for leisure applications", explains Jacob Sørensen, suggesting that he may further expand his overseas facility in the near future and install an extrusion line there, too. Until that time, the company will continue to transport its Danish trays to the United States to have them thermoformed locally. "This is the only way we can guarantee our high quality standards to our customers."

High quality standards and ...

For the 3-layer sheet line from battenfeld-cincinnati installed in 2018, Staal og Plast first built an entirely new hall to house the line with a total length of 65 meters and also to provide enough space for the huge thermoforming machine and extra space for handling the largest boards, which measure 2,500 by 8,000 mm. In the new co-extrusion line, the high-speed extruder 1-75 T6.1 is responsible as main extruder for the total capacity of up to 3 t/h. It alone reaches an output of about 2 t/h for HIPS. High-speed extruders come with a very compact design and reach their enormous output rates with high screw speeds. The melt's residence time inside the extruder is long enough to achieve optimal homogenization, yet short enough to prevent mechanical or thermal damage and thus ensure optimal melt attributes. In Denmark, the high-speed extruder plasticizes the material for the main layer, with in-house scrap resulting from changeovers and cutting/stamping being added to the virgin material. The material for the outer layers of the 3-layer composite is provided by two 1-75 T2.1 co-extruders. These, too, are high-speed extruders, each reaching outputs of up to 500 kg/h. "The outer layer, which comes into contact with the plant pots, is a distinctive feature of our trays. It is approved for food production as well as resistant to UV radiation and chemicals. We developed its formulation in cooperation with a Danish partner company", the Managing Partner emphasizes.

... knowledge of customers' needs as success factors

While the requirements for food safety and UV-resistance of the outer layer are a matter of course for greenhouse/hothouse trays, the need for resistance to chemicals is a specific consequence of working with ebb & flow trays. These trays, on which the plant pots stand, are flooded at regular intervals with water containing the fertilizers needed by the plants. After a

specific period of time, the water and the additives it contains are drained and returned to the tank. Naturally, the irrigation medium is recycled to minimize water consumption. "To ensure the correct dosage, the water is tested and replenished with fertilizers each time prior to flooding", Jacob Sørensen reports. He also knows that mobile table systems are today's trend for modern hothouses. In contrast to conventional rolling tables, which are still being used and can be pushed to and fro on a frame, the mobile tables can be pushed in every direction. This enormously facilitates handling for the operators. Staal og Plast offers the right trays for every type of greenhouse/hothouse in the desired size and, above all, in high quality. For absolute flatness must be ensured as a prerequisite for even watering of every plant. Sørensen is confident: "Thanks to our know-how of more than three decades, our customers can rely on us", and he regards this as the main reason for his market success.

Set for further growth

"Although the market for ebb & flow trays is booming and we have a good order situation", says Jacob Sørensen, "at present we still have some free capacity on the new line." He can therefore well imagine that he could make polystyrene sheet as a service provider for other industries. Possible products are mono-layer, 2-layer or 3-layer boards in virtually any desired dimensions with thicknesses ranging from 2 to 5 mm, and even in different colors if desired by customers. By the way, most of the ebb & flow trays are gray. The equipment in Ringe includes another sheet extrusion line for this purpose in addition to the new line, as well as a total of four thermoforming lines. The new line has replaced the second older line since 2018 and, apart from its high capacity, its main advantage is its low energy consumption, about 40% below that of the old line. In addition to the extruders already described, the new line includes a 3000-mm-wide flat sheet die, a roll stack with three main rolls and three post-cooling rolls, as well as a roller conveyor with thickness gauge and longitudinal cutting/trim saws. At the end, there is a crosswise/horizontal cutting device for the up to 8m-long boards and a stacker/straddle carrier. "The line from battenfeld-cincinnati has even exceeded our technical requirements. We are perfectly satisfied and well prepared for our customers' future enquiries", Jacob Sørensen states with pleasure, and concludes with a big word of praise: "Over recent years, battenfeld-cincinnati has been one of our most reliable partners."

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高聚物包装产品中日益增长的回收物料加工使用的系统和交钥匙解决方案

Recycling: System and Turn-Key Solutions for the Increased Use of Recycled Materials in Polymer Packaging Production

减少和避免废料的产生已经显得越来越重要。由于法律的要求和公众的压力，生产商们面临着越来越大的挑战。一方面，塑料包装必须变成可回收使用的。另外一方面，消费后回收料的掺入比例必须增加，理想状态下可达100%。

Waste reduction, avoidance of plastic materials and last but not least recycling are becoming increasingly important. Due to legal requirements and public pressure, manufacturers are faced with growing challenges. On the one hand, the design of plastic packaging must be changed to ensure that the product is recyclable. On the other hand, the proportion of post-consumer recycled material in the product must be increased, ideally up to 100 %.

原先的在已知条件下按照原材料进行生产并得到稳定高质量的产品的设计，如今在掺入高比例回收料的情况下已受到严重影响，因为回收料中的杂质含量高而且波动性比较大，现有的生产线已不能实现高品质产品的要求。

另外，日益增长的回收料加工要求需要有充足的和规范的可行性，自然而然的，关注点转变到原先并不是关注点的原材料来源途径上。

格诺斯在包装回收方面的挤出技术和系统性解决方案方面的最高标准。

通过格诺斯挤出技术改造现有生产线

对于回收料的加工，新设备的投入不是绝对需要的-格诺斯是回收料加工方面的专家同时可以提供改造方面的技术创新以及系统解决方案。通过将挤出生产线上关键的单个组成结构元件更换为决定性的关键元件就可以实现加工回收料的目的。现在的关注点就是过滤清洁塑胶熔体：



图1:格诺斯旋转过滤系统RSFgenius 带反冲洗功能的滤网转盘

Picture 1: Screen disc of Gneuss Rotary Filtration System RSFgenius with back-flushing technology

- 格诺斯旋转过滤系统可以实现塑胶熔体高效和经济的过滤
- 格诺斯MRS多螺杆挤出机可在回收料加工食品级制品的过程中实现高效的排气和除杂功能

通过全自动操作,加工和压力稳定的格诺斯旋转过滤系统实现对高污染回收料的过滤

带有专利的过滤转盘技术的格诺斯旋转过滤系统是适合回收材料加工的理想化的过滤器，连续型生产，压力恒定，全自动化操作。由于特殊的设计，换网期间无需中断生产而且对正常生产没有任何影响：

- 根据过滤精度的不同，过滤网可被重复使用高达400次，这意味着可以几个星期都不用去更换网片。
- 更精细的恒定过滤可以实现产品高质量
- RSFgenius过滤系统通过自带的反冲系统来实现自动的在线滤网清洗，极少量的干净物料会从脏滤网的背面穿过去达到清洗滤网的目的。

通过使用正确的过滤系统比如压力和加工始终恒定的

RSFgenius过滤系统, 因为带有在线反冲功能, 可以将使用高比例的回收料从而产生的质量和产量的限制得到最小化。

高除杂功能的多螺杆MRS 挤出机在塑料包装的生产中可直接使用PCR

当消费后回收料和工业废品在加工过程中, 回收塑料中包含有化学添加剂比如干燥剂, 稳定剂, 乙醛净化剂, 油剂, 溶剂等等。对于用于和食物或皮肤接触的回收材料, 根据FDA, EFSA或其他当地的食物监管机构对纯度的要求规定, 所有的有机或无机的潜在的有毒物质必须要被清除, 因此必须要通过排气阶段的高除杂去污功能来得以实现。

10年以来, 格诺斯MRS多螺杆挤出机已经在高污染回收加工材料方面得到广泛的应用, 比如消费后回收料, 聚酯工业废丝和废膜等废料, 还有聚苯乙烯, 尼龙和其他的亲水高聚物。

MRS多螺杆挤出机的设计基础是单螺杆挤出机理念加上特殊设计的多螺杆排气段部分:

- 由于多螺杆段含有环绕着主螺杆旋转的8根行星单螺杆从而将排气的面积增加了无数倍
- 真空度仅仅为25-30mBar
- 高效去除挥发杂质, 油剂和异味
- 高聚物加工的水份含量可高达1%
- 有效加工100%回收料和瓶片料到食品级制品并得到FDA的无异议证明以及EFSA和数个当地的批准。

MRS 多螺杆回收技术是模块化的设计所以很容易的集成到现有生产线上。通过替换单个的结构组成元件或整合上格诺斯加工单元, (包括有旋转过滤器, 带有真空系统的多螺杆挤出机再加上控制系统组成) 现有生产加工可被改造成适合于回收料的加工生产线。

包装废料回收的系统性解决方案

格诺斯提供交钥匙生产线将回收料和各种各样的废料加工成热塑性片材和粒子:

其中有个非常成功的领域就是使用格诺斯MRS多螺杆挤出机加工PET片材。最近几年来已有超过30条以上格诺斯定制的生产线在全球被安装并顺利投入运行。可以同时加工原生料和回料并被应用在食品级包装行业已得到众多客户的认可:

- 不需要预干燥和预结晶
- 可加工各种原生料和回收料或混合料比如PET, PE和PETG

- 多年的在食品包装行业的加工经验比如食品级和非食品级透明片材, 气泡包装, 热塑性食品托盘等。
- 在发泡薄膜生产中灵活的转换可以将物理发泡密度减低50%以上。

Production processes that were previously designed only for the processing of virgin material and thus achieved consistently high quality under known conditions, are now severely disturbed or interrupted at higher recycling rates by contamination and strongly fluctuating material qualities. High quality requirements can often no longer be realised with the existing production lines.

In addition, the demand for the increased use of recycled materials in plastic products requires sufficient and regular availability of these. As a consequence, the focus is increasingly shifting to raw material sources that were previously not in focus.

Gneuss extrusion technologies and system solutions for highest standards in packaging recycling

Retrofitting existing lines with Gneuss extrusion technologies

For the processing of recycled materials, an investment in new production facilities is not absolutely necessary – Gneuss is an expert in the recycling of plastics and offers innovative technologies and system solutions for retrofitting. With the replacement of individual key components within the extrusion line, decisive key elements are supplied which make the existing line fit for the recycling cycle. The focus here is on cleaning the plastic melts:

- Gneuss Rotary Melt Filtration Systems for an efficient and economic filtration of plastic melts
- Gneuss MRS Extruders for highly-efficient degassing and decontamination of plastic melts for direct food contact



图2: MRS多螺杆挤出机的多螺杆部分

Picture 2: Multi screw section of Gneuss MRS Extruder

Filtration of highly-contaminated recycled materials with the fully-automatic, pressure-constant and process-constant Gneuss Rotary Filtration Systems

The Gneuss Rotary Filtration Systems with patented filter disc technology are ideally suited for the processing of recycled material, as they operate continuously, with constant pressure and fully automatically. Due to the annular screen arrangement a screen change takes place without disturbances or interruptions of the production process:

- Depending on the filter fineness, the screens can be reused up to 400 times, which can mean a fully automatic filtration process without the need for several weeks of personnel.
- Constant production process even with finer filtration to achieve high end product quality.
- Automatic screen cleaning of the RSFgenius Filtration System by means of an integrated backflush piston system, where a small amount of filtered melt is regularly shot through the dirty screen.

By using the right filtration system, such as the pressure-constant and process-constant RSFgenius Filtration System with back-flushing technology, the quality and productivity restrictions to be expected from a high use of recycled material can be considerably minimized.

MRS Extruder with high decontamination performance for the direct use of PCR in the production of plastic packaging

When post consumer and industrial waste is processed, the recycled plastics from previous use contain chemical additives such as dyes, stabilizers, acetaldehyde scavengers, carrier oils, solvents and many more. For the use of recycled material in contact with food or skin, the purity requirements set by food authorities such as FDA, EFSA or other local authorities apply.

图3: 100%回收料制作的PET最终制品

Picture 3: PET end products made of 100 % recycled material



All organic and inorganic potential toxins must be removed, which is achieved with a high decontamination performance during the degassing phase.

For more than a decade, the Gneuss MRS Extruder has been used for the recycling of highly contaminated recycled materials such as post-consumer waste, polyester industrial waste from fibre and film production as well as polystyrene, nylon and other hydrophilic polymers.

The MRS Extruder is based on a conventional single-screw extruder combined with a multiple screw section in the degassing zone:

- the melt surface area available for degassing is increased many times over thanks to the multi-screw element with eight individual satellite screws rotating against the extruder barrel
- vacuum degassing with a simple vacuum of 25-30 mbar
- extremely effective removal of volatile impurities, oils and odours
- processing of polymers with a moisture content of up to 1%
- effective decontamination of 100% post-consumer recycled products and 100% bottle flakes for use in food contact with, among others, the LNO of the FDA, the EFSA approval or several local approvals

The MRS recycling technology is modular and can be easily integrated into existing production lines. By replacing individual components or integrating the complete Gneuss processing unit, based on a Rotary Filtration System, an MRS Extruder with vacuum system and control technology, existing production processes can be made fit for the recycling cycle.

System solutions for recycling of packaging waste

Gneuss offers turn-key lines for the production of thermoforming sheet from recycled material as well as for the pelletizing of all types of plastic waste.

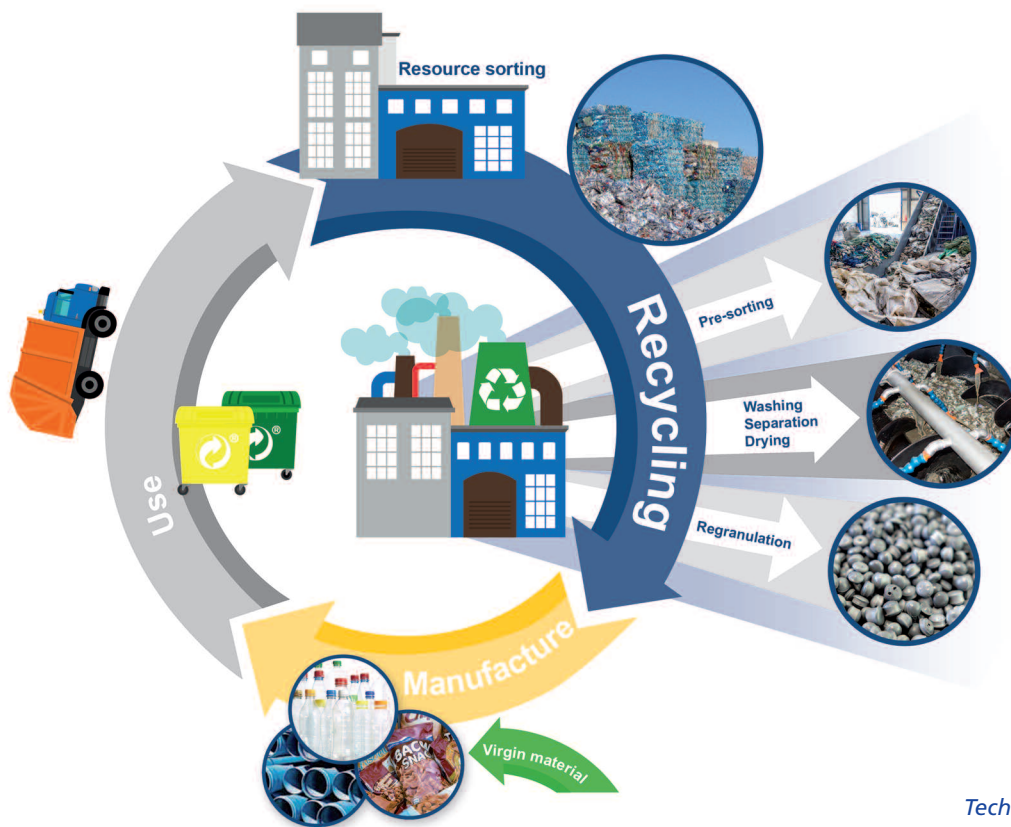
One area in which MRS extrusion technology is particularly successful is PET sheet extrusion. More than 30 tailor-made Gneuss sheet lines were installed worldwide in recent years. The enormous flexibility of the lines, which process both virgin and recycled material and which are also used for packaging articles with food contact, has convinced many processors:

- economically process without pre-drying and crystallization
- flexible processing of a wide variety of materials such as virgin material, post-consumer bottle flakes and mixtures such as PET and PE or PET and PETG
- many years of experience in processing into a wide variety of packaging products such as transparent film packaging for food and non-food articles, blister packaging, thermoformed trays and trays for food
- flexible conversion to foam film production by means of physical foaming with a density reduction of over 50%.

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

循环经济为成功作出贡献

Recycling: Circular Economy – A Contributing Factor to Success



循环经济技术

Technology for Circular Economy

与汽车领域的设备供应商相反，废物处理和回收技术的供应商的订单量出现了真正的激增。Herbold Meckesheim已经有了2020年的全部订单，更多的2021年的项目正在最后敲定中。对于一个过去交货时间不到6个月的市场来说，这是不寻常的。

Contrary to the equipment suppliers for the automotive segment, the suppliers of waste disposal and recycling technology see a real boom in incoming orders. Herbold Meckesheim has full order books for 2020 and even further projects for 2021 are already being finalized. That is unusual for a market that used to have delivery times of less than 6 months.

需求突然增加的原因，可以用区域驱动力和长期技术趋势的同时行动来解释。

这些驱动力包括欧盟的项目和补贴，不同国家弥补他们在回收塑料方面的明显不足，尤其是法国和德国。在该地区的推动力量中，还有一些国家过度依赖向中国出口垃圾，其中不仅有爱尔兰和德国，还有澳大利亚、新西兰和日本。

中国也是推动该地区发展的力量之一，他们开始在中国建设现代垃圾工业。俄罗斯与此类似，但规模要小得多。

另一点是，美国、加拿大和墨西哥兴起了一个自给自足的回收行业，根据难易程度分级，以及根据欧洲发展起来的回收知识来处理各种废物。在这个领域有相当数量的可用塑料薄膜废料、尤其重要的是找到了不同于填埋和焚化的处理方式。

目前存在的两种技术趋势：

1) 化学回收：不同的市场参与者正在研究解决方案。北美和欧洲正在建设许多更大的工厂。在这一领域，为了节省成本，采用高性能和高质量的方式处理废物。Herbold提供的工艺过程非常受欢迎。

2) 实现再生原料和纯新原料的一致：为了生产高质量的再生原料，Herbold开发了优化的洗涤程序，可以在新产品中使用高比例的再生塑料原料。与过去的程序相比。主要的标准是相当大程度的减少气味和几乎没有任何由于外来颜色和残留污染物所造成的外观误差。

这些解决方案是通过以下过程步骤的巧妙构思和组合而得以实现的：减小尺寸、洗涤、分离和干燥，以及减小颗粒、薄膜和纤维的尺寸。对于PET和聚烯烃瓶子的回收利用，Herbold成功地开发出了节能的尺寸减小和（热）清洗系统，具有质量高、运行成本低的特点。

The reason for this sudden rise in demands can be explained by the simultaneous action of regional driving forces and long-term technological trends.

Among these driving forces are EU programs and subsidies, the decision of different countries to make up for their obvious deficits in recycling plastics, above all France and Germany. Among the regional driving forces are also countries that all too much relied on the export of their waste to China. Among them are not only Ireland and Germany but also Australia, New Zealand and Japan.

Among the regional driving forces is also China where they started to build a modern waste industry. Similar, but much smaller in Russia.

Another point is that a self-sustaining recycling industry has risen in the US, in Canada and Mexico that, graded according to the degree of difficulty, treats all kinds of waste according to the recycling knowledge developed in Europe. In this area con-

siderable quantities are available, above all film waste looking for a different use than landfill and incineration.

Two technological trends have emerged:

1) Chemical recycling: different market participants are working on solutions and a lot of larger plants are being built in North America and Europe. In this field, the procedures supplied by Herbold are in demand in order to treat the flow of waste in a cost-saving, high-performance way and a constant high-level quality.

2) Equal to virgin recycled plastic: For the production of high-quality recycled material, Herbold has developed optimized washing procedures that allow to use a high percentage of recycled plastic material for new products. The main criteria compared with procedures of the past are a considerable odour reduction and hardly any visual errors caused by foreign colours or residual contamination.

These solutions are rendered possible by the clever conception and combination of the following process steps: size reduction, washing, separation and drying as well as compacting of fines, films and fibres. As far as film recycling is concerned, Herbold is one of the most successful plant manufacturers. For the recycling of PET and polyolefin bottles Herbold succeeded in developing energy-efficient size reduction and (hot) washing systems characterized by not only a high quality but also by low operating costs.

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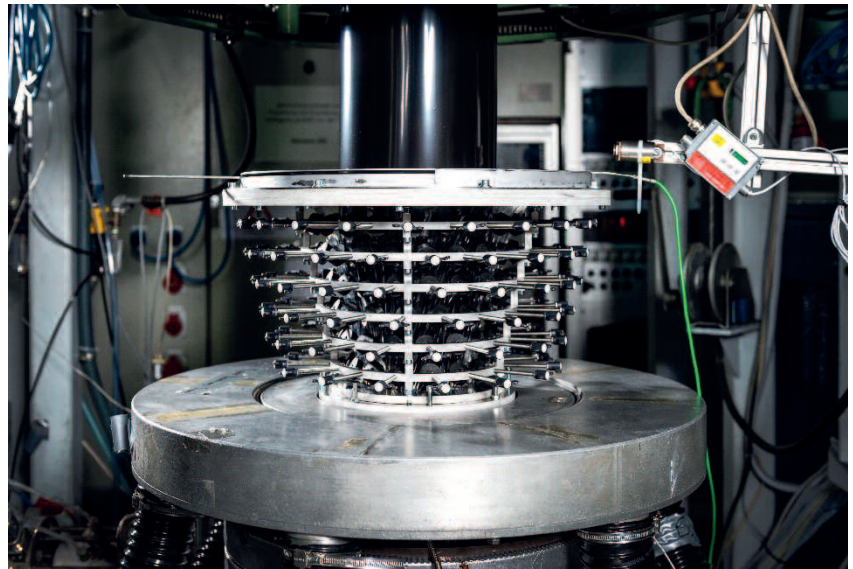
采用文丘里效应实现经济地生产挤出薄膜

Blown Film Extrusion: Using the Venturi Effect for Economical Blown Film Extrusion

通过对膜泡加速冷却提升设备的效能

德国亚琛工业大学塑料加工研究所(IKV)开发出了一种创新的自适应空气控制系统，使挤出吹膜设备的产量提高了32%。因此，研究小组为提高吹膜生产效率做出了巨大贡献，这在吹塑薄膜的生产中是非常重要的。

Increasing machine efficiency through conformal cooling of the film bubble



An innovative adaptive air-guiding system developed by the Institute for Plastics Processing (IKV) at RWTH Aachen University enables the throughput in blown film extrusion to be

increased by up to 32 percent. The research team is thus making an enormous contribution to greater efficiency, which is very important in the production of blown film.

市场上可能没有其他产品像吹塑薄膜一样无处不在。吹膜产品应用范围非常广泛，从简单的手提袋、包装产品和卫生用品（如尿布衬垫）一直到农用大棚膜。与此同时，吹膜市场目前面临激烈的竞争。来自西欧的产品经常被发现很难与外国产品竞争。因此，提高生产效率是绝对必要的。

在挤出吹膜过程中，熔体的产量和生产率在很大程度上取决于从膜泡中提取出来的热量。由于这个原因，现有的冷却系统正在不断地进一步发展和优化。随着吹膜挤出冷却技术的新发展，IKV在发展吹膜挤出技术的应用方面已经有了多年的历史。例如开发出使用湿空气和接触冷却套。

近年来开发出的柔性自适应空气引导系统对于提高挤出吹膜设备的冷却性能是极有希望的。这是安装在一个传统的冷却风环下游的装置。通过使用柔性膜片，它引导和加速了膜泡和膜片之间的冷却空气，从而导致文丘里效应的形成。文丘里效应增加了冷却空气的传热性，也增加了膜泡的稳定性。一个成功的过程控制，必须注意确保空气引导膜片和膜泡之间的流动间隙尽可能小。为了能够准确地观测流动间隙，IKV的研究团队设计了一种透明的空气导向系统。空气导流膜片的调整可通过压力螺栓来完成(图1)。

目前的研究结果证实了所开发的空气导流系统的潜力。

与传统工艺相比，具有几乎相同的薄膜厚度公差，而产量可增加32%。即使对现有的生产设备进行改造也是可行的，而且所需的投资也相对较小。

There is probably no other product on the market that is so omnipresent as blown film. The applications are highly varied and range from simple carrier bags, packaging products and hygiene articles such as nappy liners, right the way through to agricultural tarpaulins. At the same time, the blown film market is currently subject to heavy competition. Products from western Europe often find it difficult to compete with foreign products. Production efficiency is therefore absolutely essential. In blown film extrusion, mass throughput and thus productivity depend heavily on the level of heat extraction from the blown film. For this reason, existing cooling systems are being

constantly further developed and optimised. IKV has been occupied for some years with the development of new cooling technologies in blown film extrusion. Examples include the use of moist air and a contact cooling sleeve.

A highly promising new possibility to increase the cooling performance in blown film extrusion is the recently developed flexible and adaptive air-guiding system. This is installed downstream of a conventional air cooling ring. Through the use of a flexible membrane, it guides and speeds up the cooling air between the film bubble and the membrane, which leads to the formation of the Venturi effect. The Venturi effect increases the heat transfer of the cooling air and also provides increased bubble stability. For a successful process control, care must be taken to ensure that the flow gap between the air-guiding membrane and the film bubble is as small as possible. In order to be able to accurately observe the flow gap, the research team at IKV has designed a transparent air-guiding system. Ad-

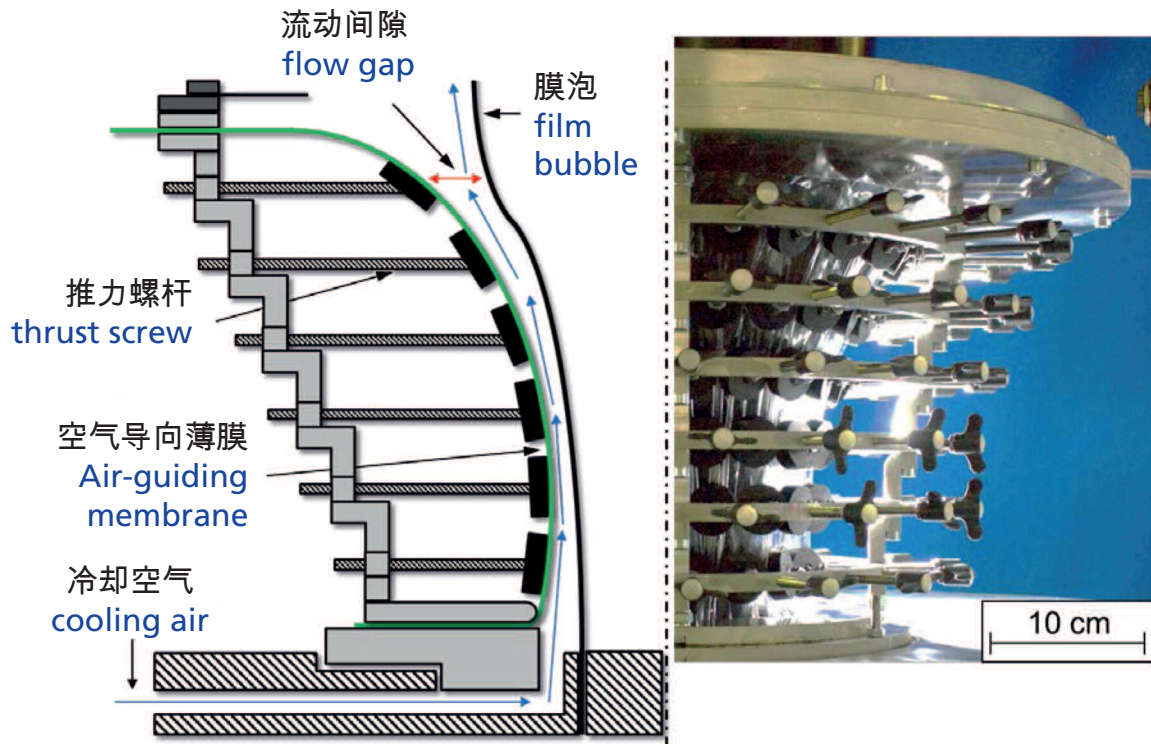
justment of the air-guiding membrane is carried out by means of pressure screws (Picture 1).

Current research results confirm the potential of the developed air-guiding system. The mass throughput with virtually identical film thickness fluctuations can be increased by up to 32 percent compared with the conventional process. Even the retrofitting of existing production machines is possible, and the required investment is relatively small.

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图1:新开发的气流导向系统在挤出加工过程中：侧视图

Picture 1: Side view of the developed air-guiding system during the extrusion process



超越市场的要求 – 采用高端表面检测系统提升了产品质量

Window Film: Exceeding the Market's Requirements – Product Quality with High-End Surface Inspection System Improved

中国最大的窗膜生产商之一康得新公司 (KDX) 已经在涂布加工生产线上配备了伊斯拉 (ISRA) SMASH检测系统,用于高级窗膜检测。康得新必须满足市场对于质量的严格要求。因此,物料上此前未能被识别的极为细小的划痕现在需要被检测出来。面对这一挑战,这家中国公司为了寻求最有效的解决方案,选择了伊斯拉作为其伙伴,伊斯拉拥有智能自动光学检测系统,可精确地分析和检测缺陷。

One of China's largest producers of window film has equipped its coating process line with the ISRA inspection system SMASH for high level window film inspection. KDX must meet the demanding quality requirements of the market. Therefore, extremely small scratches in the material need to be identified which until now could not be detected. The Chinese company chose ISRA as its partner in order to find the most efficient solution for those challenges, which is the intelligent automated optical inspection system, precisely analyzing and detecting defects.

康得新决定在江苏省张家港工厂配备 SMASH系统是有充分理由的。光学薄膜部对薄膜表面有着最高的要求。例如,用于汽车或建筑行业的窗膜要求能减低太阳辐射。即使非常细微的划痕都会影响到产品的预期功能,而客户对价格是敏感的。这两个方面都要求在交货前和进一步加工前对产品进行高级检测。因此,康得新认为有必要引入一种新的检测系统来提高产品质量。伊斯拉这家全球表面可视化行业领先的公司,是由业内的联系人和商业伙伴推荐给康得新的。生产总监胡先生说道:“伊斯拉的系统可以实时检测到微小划痕等表面缺陷,并对这些缺陷的形状和位置进行分类,它完



将100%缺陷检测和SMASH深度学习算法结合起来,显著地提高了生产效率,并确保了完美的产品质量

Combining 100% defect detection with deep learning algorithms SMASH significantly increases the production efficiency and secures perfect material quality

全取代了人工检测方法,大大提高了生产效率,降低了生产成本,保证了薄膜质量。”胡先生还指出,竞争对手的系统通常只能检测到划痕或部分缺陷。

伊斯拉的SMASH系统用于光学薄膜的表面检测和实时探测缺陷。该系统具有四项突出优点:第一,系统可确保终端客户所得到的是完美的物料。第二是减少了浪费,增加适销

SMASH 提供前所未有的精细程度，可探测的最小划痕减小到
<10 μm

SMASH provides a previously unattainable degree of precision in detection of smallest scratches down to <10 μm

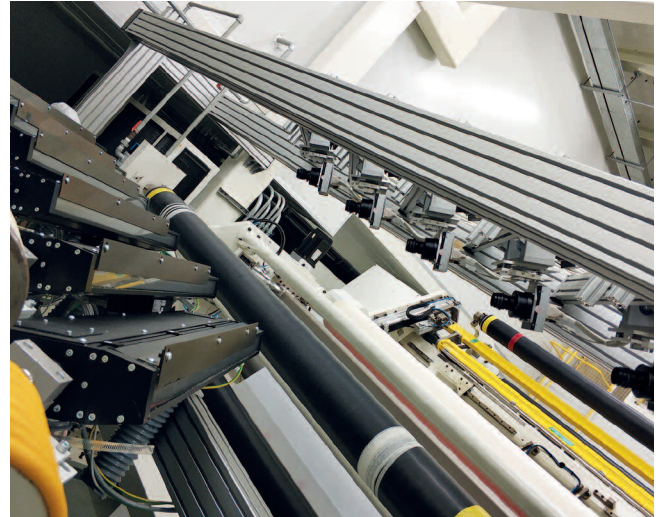
对路产品的产量。第三，产品的性能得到全面监视，可从产生缺陷的源头加以纠正。最后一点，工厂操作员可以有效地进行产品变换，从而节约了成本。胶线、气泡、颜色偏差、光畸变和划痕等缺陷全部都可以通过在线监测系统加以避免。

在康得新的案例中，伊斯拉特别针对这个项目开发了一套光学配置方案，并已被证实对客户非常有价值。康得新以最佳化的成本实现了质量控制的所有目标，这得益于其经济有效的解决方案：生产线短暂的调整时间和较低的废品率显著提高了产品产量。

在现场，通过伊斯拉服务工程师的合作以及在来自德国总部专家的协助下，系统顺利完成了安装。目前，生产人员非常有效地使用着该系统。伊斯拉定期检查系统的状态，并采纳客户宝贵的反馈意见，用于持续的性能改善和系统开发。远程访问可以方便地向客户提供服务和进行快速调整。

胡先生对于系统的性能和良好的分类结果感到非常满意，他说：“我们现在能够避免连续的缺陷，减少废料和在线调整的时间。伊斯拉的 SMASH 系统可以在线检测缺陷并精确定位。它可以根据历史记录和数据统计，显示每天的产品质量，并能根据数据立即进行调整。”

伊斯拉最近对系统进行了升级，从而获得了所能够实现的最佳性能。



detects the defects in real-time. Four advantages can be identified: First, the system, ensures that end customers receive only flawless material. Second, waste is reduced and the marketable production volume can be increased. Third, product properties are fully monitored and defect sources corrected. And last, plant operators can make product changes efficiently, thereby saving costs. Defects as glue line, bubbles, color deviations, light distortion and scratches can all be avoided with the inline inspection system.

In the case of KDX, an optical configuration was developed by ISRA especially for this project and has proven to be very valuable to the customer. KDX has reached all of its objectives in quality control at optimal costs due to the affordable and efficient solution: The short adjustment time of the production line and lower waste rate significantly increased output. With the cooperation on the on-site ISRA service engineers and additional expert assistance from the Germany headquarters, as well as the initial maintenance support, the system set-up smooth. Today the manufacturing staff uses system very efficiently. ISRA checks the system status regularly and applies the customer's valuable feedback for continuous performance refinement and system development. Remote access enables easy service and fast adjustments.

“We are now able to avoid continuous defects, to reduce waste and in-line adjustment time. ISRA's SMASH can detect the defects in-line and locate them precisely. It can show the product quality each day based on the history records and data statistics, which allow immediate adjustments,” Mr. Hu said about the very satisfying performance and the good classification results. Today, the technical department adjusts process parameters according to the data. ISRA upgraded the system recently, thereby the best possible performance.

The decision to integrate SMASH at the Zhangjiagang site, Jiangsu Province, was well-founded for KDX. The optical film branch works with the highest requirements for surface quality. For example, window film is used in the automotive or the construction sectors to reduce solar radiation. Even very tiny scratches affect the intended features of these products, which are cost-sensitive for customers. Both aspects account for a product that needs high-end inspection before it can be delivered and further processed.

Therefore KDX identified the need to introduce a new inspection system to improve quality. ISRA had been recommended to KDX by contacts and business partners in the industry as a globally leading company of surface vision. Mr. Hu, the Production Director, said: “ISRA's system can detect surface defects like small scratches in real-time and classify the shape and location of such defects. It replaces manual methods for inspection entirely, significantly increases the production efficiency, reduces the production cost, and ensures the film quality.” Mr. Hu added that competitors' systems are often just able to detect either scratches or parts of defects.

ISRA's SMASH is used for surface inspection of optical film and

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Tube and hose manufacturers are searching for fast, precise and cost-effective ways to measure and record tubular samples in the laboratory



GaugePro 8 离线式测量站

GaugePro 8 Off-Line Measuring Station

常规的接触式测量设备（例如游标卡尺、千分尺或千分表）无法提供令人满意的解决方案。较小的，有时是柔软的产品会因接触压力而变形，这会对获取测量值产生负面影响。另外，接触测量方法及其相关结果在很大程度上取决于使用这些量具的人。测量工具的不同使用方式以及灵敏度通常会导致结果发生重大变化。

采用仲巴赫（ZUMBACH）的GaugePro装置，可以完全无接触地进行管状样品的测量。借助最先进的超声波技术，可以立即测量壁厚、内径和外径。另外，还可以确定椭圆度和偏心率。

在四个固定测量点中间插入管状物的样品，测量就立即开始了。由于具有旋转功能，因此测量点可以扩展到八个。这样可以增加产品周围的测量覆盖率，并且所有壁厚的变化都可以看到。

自动进行自校准可确保即使环境条件在变化，也能准确可靠地记录测量值。

大型用户界面用于清晰显示所有测量值。若干管状物样品测得数据可以在常见的统计数据中汇总。因此，记录测量结果是快速、方便和可靠的。

GaugePro可以通过多种方式提供测量结果。除了常规的测量结果打印输出外，它们还可以存储在CSV文件中，或通过ODBC接口直接写入客户方MySQL数据库。

当前有两种GaugePro不同机型供选择。GaugePro 8的

测量直径范围从2.5毫米到8毫米。GaugePro 22可以测量6.8 mm至22 mm的管状物样品。

使用GaugePro可以显著地更快捷、更准确和更可靠地离线测量管状物样品。这种方便有效的工具的推出，可大大提高对每项质量指标的保证能力，并迈向了数字化的现代技术。

Conventional contact measuring equipment such as calipers, micrometers or dial gauges offer no satisfactory solution. The small, sometimes soft products are deformed by the contact pressure, which has a negative effect on the acquisition of the measured value. In addition, contact measurement methods and their associated results are heavily dependent on the persons making them. Different handling of the measuring tools as well as dexterity often result in significant variations in results.

With ZUMBACH's GaugePro it is now possible to perform the measurement of tubular samples completely contactless. With state-of-the-art ultrasonic technology, the wall thickness, inside diameter and outside diameter are measured instantly. In addition, the ovality and eccentricity can be determined.

The inserted sample is measured immediately at four fixed measuring points. Due to the rotation function, the measurement can be extended to eight measuring points. This increases the coverage around the product and all variations in wall thickness become visible.

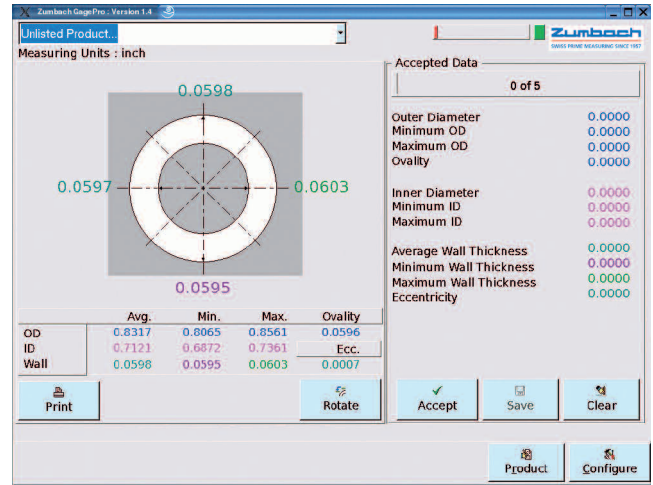
An automatic self-calibration ensures that the measured values are accurately and reliably recorded even under changing environmental conditions.

All measured values are displayed clearly in the large user interface. Several measured tube samples can be summarised in a common statistic. The logging of the measurement results is thus fast, easy and reliable.

GaugePro can make the measurement results available in different ways. In addition to a conventional printout of the measurement results, they can also be stored in a CSV file, or written directly to a customer-side MySQL database via the ODBC interface.

Currently two GaugePro variants are available. GaugePro 8 covers a diameter range from 2.5 mm to 8 mm. GaugePro 22 can measure tube samples from 6.8 mm to 22 mm.

Using GaugePro makes off-line measurement of tubular samples significantly faster, more accurate and more reliable. A handy and efficient tool has emerged that considerably increases the productivity of every quality assurance and supports modern digitization.



GaugePro 主显示屏

GaugePro Main Screen

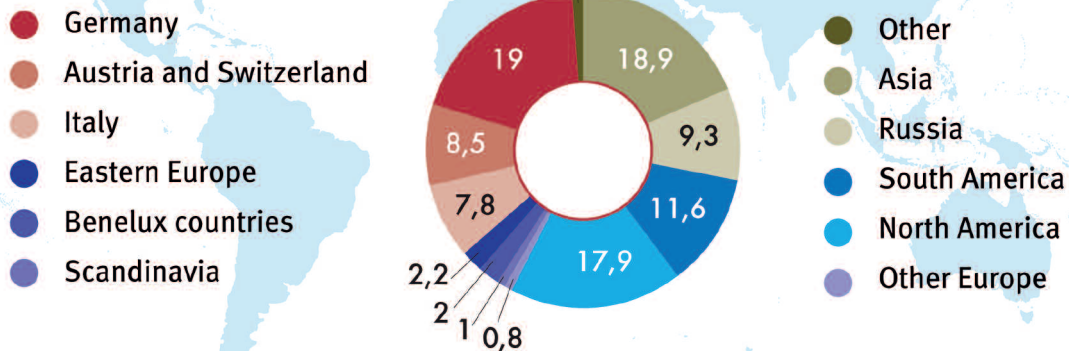
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Quality Control: 100% Inspection of Nonwoven Web Material for Medical Protection and Hygiene Products

在冠状病毒危机期间，对用于FFp2标准的防护口罩、防护罩以及其他用于医疗和卫生领域的无纺布产品的需求正在急剧增长。在如今快速增长的新生产线中，更可靠的100%控制是必不可少的。

The demand for protective masks according to FFp2 standard, protective covers, and other nonwoven-based products for both the medical and the hygiene sector is growing dramatically in the corona crisis. An even more reliable 100% control in the now rapidly developing new production lines is indispensable.

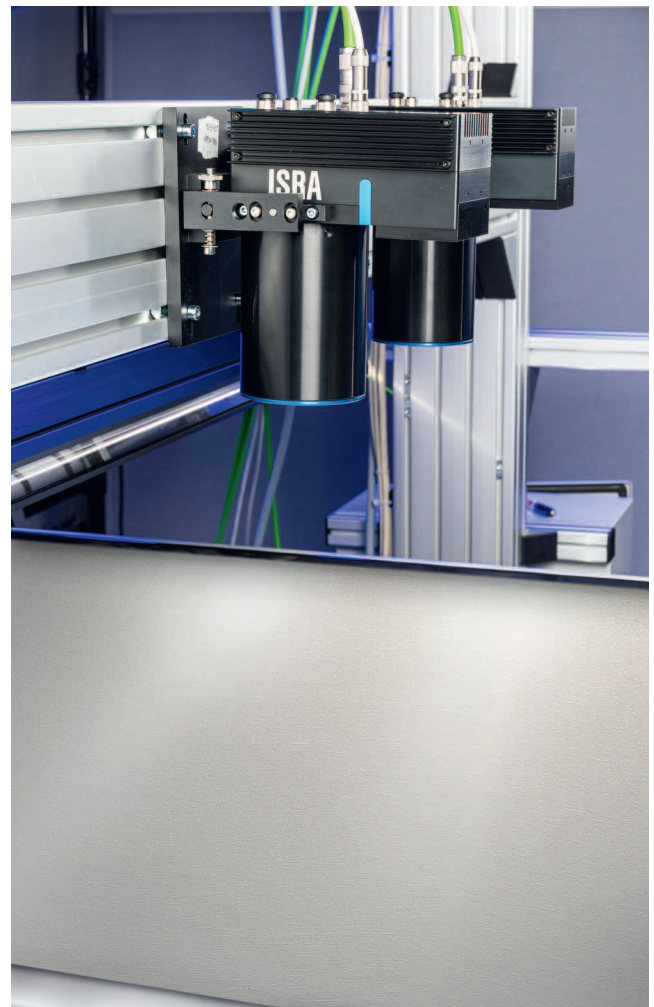
ISRA嵌入式彩色摄像机结合了黑白相机的优点，以及彩色相机的额外检测和判定功能以及HDR技术

The ISRA embedded color camera combines the benefits from black and white cameras with the additional detection and classification of color cameras and HDR technology

用于塑料薄膜的常规检测系统采用黑白相机来检测缺陷，因此无法正确识别严重的颜色缺陷（例如油斑），甚至可能完全遗漏。为了解决这个问题，伊斯拉视像现在已经开发出了一种市场上独有的解决方案：SMASH检测系统。这一系统现在已经通过新的嵌入式视觉彩色摄像机和HDR（高动态范围）技术得到了增强，该技术还可以检测材料的着色以及是否存在任何缺陷。最好的识别。除了紧凑的设计外，创新的多合一模块还具有很高的成本效益。这是通过使用越来越少的组件来实现更精简的系统并降低投资成本，同时帮助集成和简化维护来实现的。

未来属于彩色相机

为了能够可靠地检测并识别黑白和彩色缺陷，鉴于采用彩色LED照明的摄像技术有其局限性，有必要使用与其不同的真正彩色摄像机。伊斯拉现在推出了独有的8K分辨率嵌入



式彩色摄像机。革命性的智能彩色摄像机可在一次扫描中同时生成黑白和彩色图像。就分辨率而言，即使在高速下也没有任何逊色。

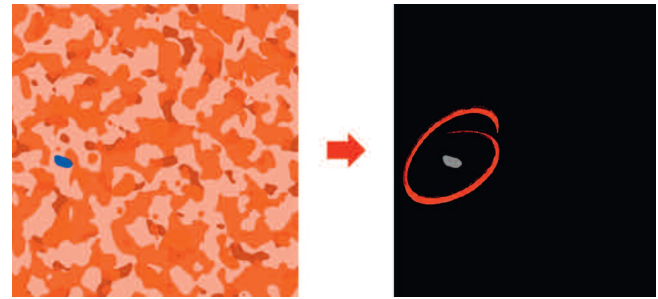
与仅提供彩色LED照明的黑白摄像机的竞争对手相比，伊斯拉的嵌入式真正彩色摄像机凭借其附加的HDR技术而具有确切的优势。可以可靠地检测和判定产品中的污垢、稀薄区域和孔，与竞争对手相比具有关键优势。不是仅提供一幅图像，而是可以从不同角度看到具有变化的光强度的多幅图像。该解决方案适用于各种带状材料产品的制造商，适用

于各种应用。与该公司的图像处理硬件和软件一样，伊斯拉的摄像机和照明技术都是由自己公司设计和制造的。这样，所有组件都可以精确地相互定制，并确保了最佳的视觉智能。

当今全球市场对于印刷有着高质量的要求，塑料薄膜制造商面临着越来越多的挑战。竞争在加剧，下游行业客户的期望也在增长。

现在，用于软包装的薄膜，电池产品中的隔膜层以及食品、无菌、卫生和制药行业的无纺布产品都必须具有无懈可击的质量。正如通过智能数据分析和分类来检测缺陷一样，根本原因分析对于作为生产过程中的一部分来识别和纠正生产中的缺陷原因至关重要。

“零缺陷策略”是长期满足高标准要求的唯一方法。这样的结果，生产商将能够提高产品质量并提高生产效率。



有了这种颜色报告，缺陷的检测和判定就容易多了

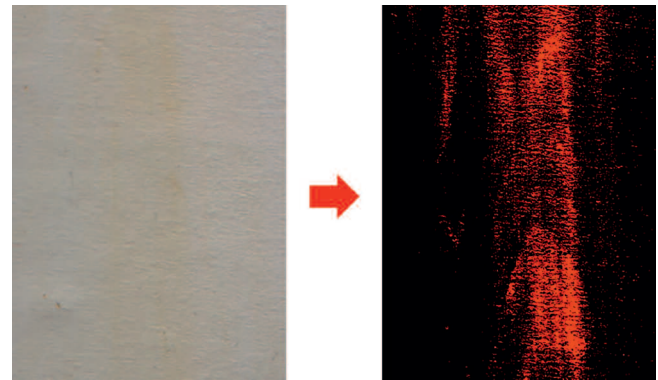
Detection and classification of defects is much easier with this kind of color reports

Since conventional inspection systems for plastic films detect defects using black and white cameras, critical color defects such as oil spots cannot be classified correctly and maybe even missed altogether. To tackle this problem, ISRA VISION has now developed a solution that is unique on the market: The SMASH inspection systems have now been enhanced with a new embedded vision color camera and HDR technology that also detects the coloring of the material and any defects for the best possible classification. In addition to their compact design, the innovative all-in-one modules are highly cost-effective. This is achieved by using fewer and smaller components to enable leaner systems and lower investment costs while aiding integration and simplifying maintenance.

The future belongs to color cameras

In order to be able to reliably detect and distinguish between black-and-white and color defects, it is necessary to have genuine color cameras as opposed to the color LED, given its limitations. ISRA has now introduced a unique embedded color camera in 8K resolution. The revolutionary, intelligent color camera enables a black-and-white and a color image to be generated simultaneously in a single scan. There are no concessions when it comes to resolution – even at high speeds.

Compared the competition, which only offers B/W cameras with colored LED lighting, ISRA's genuine embedded color cameras offer real advantages thanks to their additional HDR technology. Dirt, thin areas, and holes in the material can be reliably detected and classified, delivering crucial advantages over competitors. Instead of just one image, multiple images are captured with varying light intensities seen from different angles. The solution is for manufacturers of a wide range of web products and is suited for a variety of applications. As with the company's image processing hardware and software, ISRA's camera and lighting technologies are designed and manufactured in-house. In this way, all components are precisely tailored to each other and guarantee the optimum in visual intelligence.



ISRA检测软件使不可见的缺陷成为可见缺陷，以便及时优化生产工艺

The ISRA Inspection software makes invisible defects visible to optimize the production process in time

Quality printing for today's globalized markets poses increasing challenges for manufacturers of plastic films. The competition is growing, as are the expectations of customers in downstream industries.

Flawless product quality is now a must for films intended for use in flexible packaging, separator layers in battery production, and nonwoven products from the food and aseptic, hygiene and pharmaceutical industries. Just as detecting defects through intelligent data analysis and classification, root cause analysis is, therefore, essential in order to identify and remedy the causes of defects in production as part of a zero-defect strategy. This is the only way to meet the high standards required in the long term. By doing so, the producer raises both product quality and process efficiency.

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K-XRAY Rotomat KT –降低阻隔膜的壁垒

Measuring and Control Technology: K-XRAY Rotomat KT – Lowering the Barriers

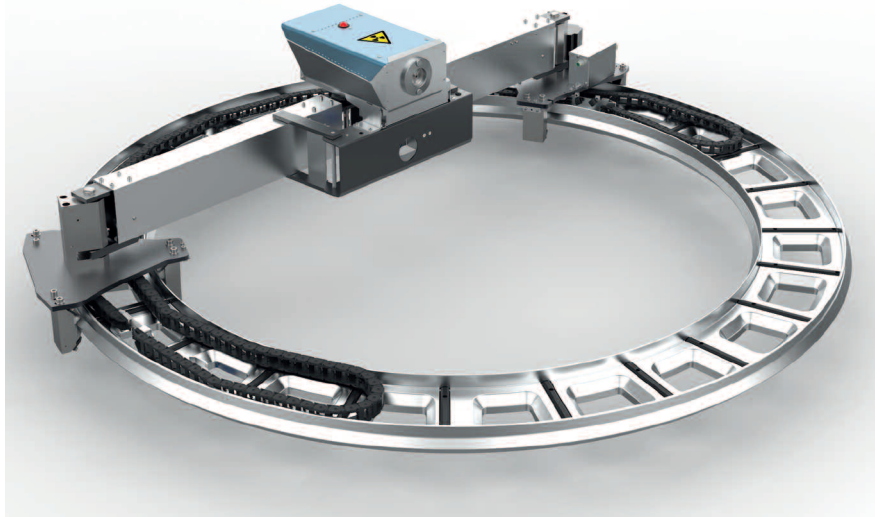
K-XRAY Rotomat KT是第一个基于X射线，适用于吹膜线的测厚仪。我们在德国杜塞尔多夫的K 2019塑料展上介绍了此系统。K-XRAY使用Kündig的标准膜泡扫描系统(见图1)，以确保快速的测量，这对于阻隔膜的厚度控制尤为重要。

The K-XRAY Rotomat KT is the first X-Ray based thickness gauge for blown film lines. It was introduced at the K 2019 plastics exhibition in Düsseldorf, Germany. The K-XRAY uses Kündig's standardized bubble scanning system (see Picture 1) to ensure quick measurements that are especially crucial for thickness control of barrier films.

执行政府规定的关于核元素贝塔射线和伽玛射线测厚仪的规章要求会带来极高的操作成本，K-XRAY的开发是为了在不损失任何测量能力的情况下，显著的降低操作成本。众所周知，核元素贝塔射线和伽玛射线测厚仪的运输时间长，场地准备要求苛刻，需要特殊的安全和维护协议。K-XRAY解决了所有这些问题，并带来了额外的好处，也就是在10微米以下非常薄的薄膜上提供高分辨率测量的能力。由于这些特殊的特性，K-XRAY Rotomat KT是目前测量阻隔膜的最佳解决方案。

与使用核元素厚度传感器的测量系统相比，K-XRAY射线最重要的优点是：

- 无运输限制
- 不需要进口许可证(有些国家需要授权的进口经纪人)
- 取得经营许可证的手续简单
- 更高的分辨率
- 更精确地测量薄膜
- 减少70%的耗气量
- 温控气垫
- 使用寿命结束后没有昂贵的处理费用



见图 1 / Picture 1
(见图 / Pictures: Hch. Kündig & Cie. AG)

辐射安全

引入K-XRAY Rotomat KT厚度测量系统无疑降低了对辐射安全要求，因为辐射暴露风险大大降低了。大多数国家对开源X射线辐射的操作都有一定的规章制度。客户需要向相关的地方当局澄清这些规则。以下各节介绍了防护和安全装置、紧急情况和暴露剂量。

屏蔽和安全装置

K-XRAY的峰值电压为19 keV。这个电压与x射线束的最大能量有关，其平均能量小于15 keV。这一能量与对成年人进行的x射线医疗照射相比非常低，后者胸部照射的电压接近100 keV，手部照射的电压为40 keV，肺部照射的电压为30 keV。

由于K-XRAY射线的辐射能量很低，而且波束很窄，屏蔽物成本非常便宜且安装方便。可使用普通的铁板或钢板，厚度约1毫米，高度最高1米，取决于保护区域的距离。

屏蔽围栏设计有金属门(未显示)，便于维修。正常情况下，门与系统x射线电源联锁，门打开后自动断电。安装在屏蔽区域外的双安全警示灯(红、绿)，连续告知工作人员系统状况(X光开启/关闭)。屏蔽工作区之外是无X射线的区域，没有任何辐射防护或监测要求。

紧急情况

对于K-XRAY系统，不需要考虑任何紧急情况，因为关闭系统可以立即消除任何辐射。相反，在使用像Kr-85或Am-241这样的持续放射源时，需要对紧急情况进行评估，公司必须实施一套系统，确保放射源不受任何火灾或其他事故的影响，在某些情况下，必须组织应急小组。

维护和运输

维护持续性放射源通常是比正常操作中受到更高剂量辐射的活动。事实上，维修人员的暴露剂量可能高达10-20 uSv/h。但是维护K-XRAY射线时，只需关闭X射线源电源，即可消除辐射。关闭设备电源后，X射线立即消失，也没有来自X射线源的残留辐射，周边地区也没有污染。金属门上的安全联锁确保当X射线打开时工作人员不能进入辐射区域。最后，对于运输和通用交通，K-XRAY系统没有任何限制，它是一个标准的电子设备，没有任何限制。这是因为在运输过程中没有电源，X射线不可能发射出任何辐射。

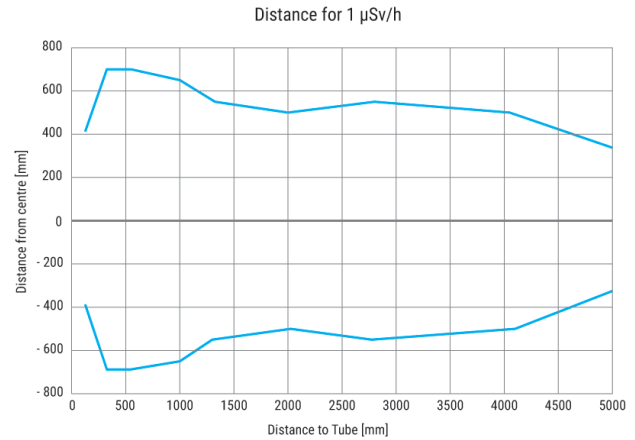
工人剂量

由于K-XRAY Rotomat KT的能量非常低，发射的辐射无法到达工作人员的深层器官(那些对电离辐射更敏感的器官)。唯一会受到X射线影响的器官是皮肤和眼睛。因此，即使在发生过度照射的情况下，预期的有效剂量也是很低的。在正常工作期间(生产线工作和维护工作的工人)，个人的剂量是无关紧要的(<0.1 mSv /年)，低于欧洲和全世界人口规定的个人剂量限值 (1 mSv /年)。工人可以被认为是不接触辐射的工人。

雇主的职责也被简化了。他们不需要组织任何个人剂量测量协议，也不需要安排辐射医疗访问。持续性核放射源需要地方当局的批准，这可能是一个耗时的程序(通常超过6个月)。然而，根据欧洲关于辐射防护的指令，K-XRAY Rotomat KT只要求向地方当局提交普通文件申请即可。

结论

K-XRAY Rotomat KT系统大大提高了辐射防护标准水平，也简化了公司保护工人和其他人群免受电离辐射的责任。



Development of the K-XRAY came about to significantly reduce the operational costs from implementing government regulations associated nuclear beta and gamma gauges without losing any barrier film measurement capabilities. Notoriously, nuclear beta and gamma gauges are known for lengthy transportation times, difficult site preparation requirements, and special safety and maintenance protocols. The K-XRAY solves all of these problems with an added benefit; namely the ability to provide high resolution measurements on very thin films down to 10 microns. Due to these particular features, the K-XRAY Rotomat KT is now the best solution to measure barrier blown films.

The most important advantages of the K-XRAY compared to a measuring system using a nuclear based thickness sensor:

- No restrictions for shipments
- No requirement for an import license (some countries require an authorized import broker)
- Simple procedure to acquire the operation license
- Higher resolution
- More precise measurement of thin films
- 70% less air consumption
- Temperature controlled air gap
- No costly disposal after end of life

技术参数

电力供应	110 – 240 VAC, 50 / 60 Hz
电力消耗	max. 350 VA
空气消耗	80 dm ³ / min
测量原理	X-Ray backscatter
X射线	max. 19 keV, 0.75 mA
测量范围	10 – 500 µm
测量精度	10 – 30 µm +/- 0.5 µm > 30 µm +/- 2%

Technical data

Power supply	110 – 240 VAC, 50 / 60 Hz
Power consumption	max. 350 VA
Air consumption	80 dm ³ / min
Measuring principle	X-Ray backscatter
X Ray tube	max. 19 keV, 0.75 mA
Measuring range	10 – 500 µm
Measuring accuracy	10 – 30 µm +/- 0.5 µm > 30 µm +/- 2%

Radiation Safety

The introduction of the K-XRAY Rotomat KT system for thickness measurements undoubtedly reduces radiation safety requirements, since radiation exposure risks are significantly lowered. Most of the countries have certain rules and regulations for the operation of an open source X-ray radiator. These rules need to be clarified by the customer with the local authorities associated with the installation country. The following sections describe shielding and safety devices, emergency scenarios, and exposure doses.

Shielding and safety devices

The peak voltage of the K-XRAY tube is 19 keV. This voltage relates to the maximum energy of the X-ray beam. The average energy is less than 15 keV. This energy is very low in comparison to medical X-Rays performed on an adult person, where voltages are almost 100 keV for a thorax exposure, 40 keV for hands and 30 keV for the chest.

Since the K-XRAY radiation energy is very low and the beam is narrow, the shielding is inexpensive and easy to install. It is made by normal iron or steel with a thickness of about 1 mm and max. 1 m high, depending on the source-protected area distance.

A metal door (not shown) allows easy access for maintenance. Under normal conditions, the door is interlocked with the system X-Ray energy source, powering it OFF automatically when the door is opened. A double safety warning light (red and green) installed outside the shielded area to continuously inform workers about the system condition (X-ray ON/OFF). Outside of the shielding working areas are X-ray free areas, without any requirement for radiation protection or monitoring.

Emergency scenarios

With the K-XRAY system, there are no emergency scenarios to be considered, since powering OFF the system instantaneously eliminates any radiation. On the contrary, when using radioactive sources like Kr-85 or Am-241, assessment of emergency scenarios is required. Using continuous radioactive sources, the companies must implement a system for assuring sources are not affected by any fire or other accident and, in some cases, an emergency team must be organized.

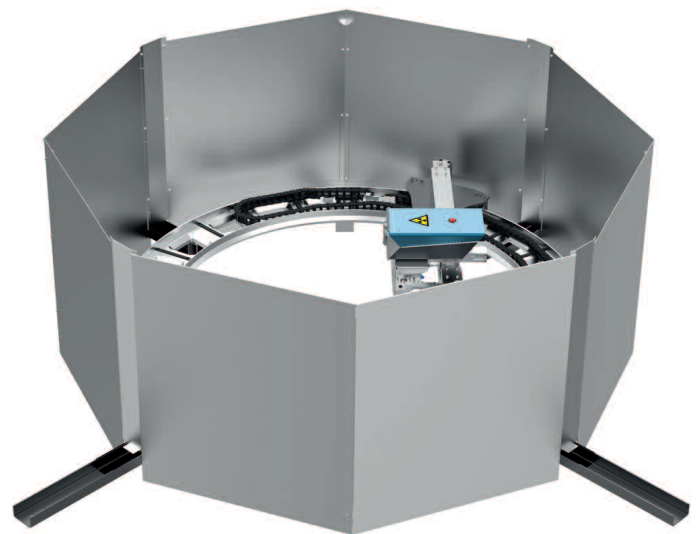
Maintenance and Transport

The maintenance of a radioactive source is typically an activity that imparts higher doses than during normal operations. In fact, maintenance people could be exposed to doses as high as 10-20 $\mu\text{Sv/h}$. For maintenance on the K-XRAY, the X-Ray source is powered OFF; i.e., the X-rays disappear instantaneously after turning OFF the equipment. There is also no residual radiation from the X-Ray source nor contamination of the surrounding areas. The safety interlock on the access door assures that worker cannot enter the radiation area when the beam is ON. Finally, for shipping and general transportation, the K-XRAY system doesn't have any restrictions as it is a standard piece of electronic equipment without any constraint. This is because with no power source during transportation, it is impossible for the X-ray tube to emit radiation at any level.

Worker doses

Since K-XRAY Rotomat KT energy is very low, emitted radiation cannot reach worker deep organs (the ones that are more sensitive to ionizing radiations). The only organs that could be affected by its X-rays are the skin and eyes. Because of this, also in case of an overexposure, the expected effective dose is low. During normal activity (worker working on the source line and maintenance) personal doses are insignificant (<0.1 mSv/year) and lower than the individual dose limits stated for the population in Europe and all over the world (1 mSv/year). Workers are considered non exposed workers.

Employer's duties are simplified, too. They don't have to organize any personal dosimetry protocols nor arrange for a radiation medical visit. A nuclear radioactive source requires the authorization of local authorities, which can be a time-consuming procedure (usually more than 6 months). However, the K-XRAY Rotomat KT only requires the submission of formal documentation to the local authorities, according to the European directive about radiation protection.



Conclusion

The K-XRAY Rotomat KT system greatly improves the radiation protection standard levels and also simplifies the company's responsibilities for protecting workers and the population against ionizing radiations.

使用完整的软件解决方案进行生产监控和优化

Process Optimization: Production Monitoring and Optimization with Complete Software Solution

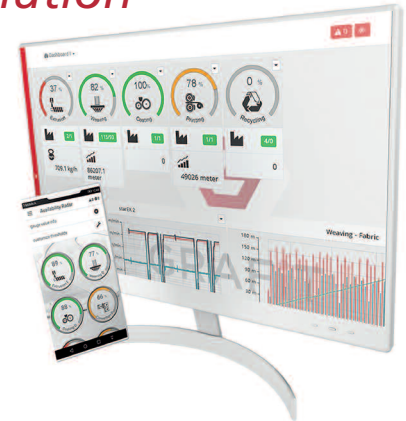
在机器出现故障之前检测它：听起来像科幻小说。但这在 GRAFiT 4.0 中是有可能的，GRAFiT 4.0 是一个用于集中生产监控和数字工艺优化的完整软件解决方案。该软件用于史太林格机械上，允许操作员集中实时监控整个机器园区—无论是在电脑上，通过 smartView 应用程序，还是在生产大厅的监视器上。的质量控制。

Detecting machine downtimes before they happen: sounds like science-fiction. But this has long been possible with GRAFiT 4.0, a complete software solution for central production monitoring and digital process optimization. The software is used on Starlinger machinery and allows the operator to centrally monitor the complete machine park in real time – be it on a computer, via the smartView app, or on a monitor in the production hall.

在生产中，这涉及到使用机器数据优化和自动化流程。现代软件解决方案（如 GRAFiT 4.0）以清晰、可访问的形式显示所有连接机器的数据，从而使操作员可以使用和分析这些数据。数据是实时显示的，例如通过 smartView 应用程序，它允许早期检测、分析和纠正错误。整个机器园区的中央监控具有许多优点，如生产率更高、生产废料更少和成本更低。该系统可用于整个史太林格产品系列，并在设计时考虑到了这一组合，但其他制造商的机械也可以通过标准化接口进行集成。

GRAFiT 4.0 拥有一个清晰的数据结构；将来，这个结构将面向机器学习，这意味着系统可以在早期阶段被训练来检测错误。由此产生的对机器的预测性维护会导致机器更高的正常运行时间，进而提高效率、减少生产废料并降低成本。smartView 应用程序具有用户友好的界面，其中包括单独调整菜单栏的选项。最受欢迎的功能是推送通知、菜单存储、将数据导出到计算机程序或 ERP 系统中，以及使用 RFID 锁限制对机器的访问。在线教程可用于操作员培训。

基于大约 15 年前由一家 IT 服务提供商开发的解决方案，GRAFiT 4.0 是一个精心设计的系统，与史太林格的客户进行完美的合作。随着 2018 年独立子公司 GRAFiT 的成立，史太林格集团将该产品放在了一个新的平台上，保证了持续发展和全面的技术支持。在一个世界市场领导者的支持下，GRAFiT 得以进一步扩大其产品范围：在前一年，rTRACK（一种用于在整个回收过程中进行批量跟踪的软件）被添加到产品组合中。交货时，货物上标记有二维码，该二维码在货物通过的每个站进行扫描。数据由系统记录，并提供有关材料接收、处理和交付的信息。



In production, this involves using machine data to optimize and automate processes. Modern software solutions such as GRAFiT 4.0 present the data of all connected machines in a clear, accessible form, and thereby make it available to the operator for use and analysis. The data is displayed in real time – for example via the smartView app – which allows for early detection, analysis and correction of errors. The central monitoring of the entire machine park offers numerous advantages such as higher productivity, less production scrap and lower costs. The system is available for the complete Starlinger product range and has been designed with this portfolio in mind, but machines of other manufacturers can be integrated as well by means of standardized interfaces.

GRAFiT 4.0 possesses a clear data structure; in the future, this structure will be geared towards machine learning, which means that the system can be trained to detect errors at an early stage. The resulting predictive maintenance of the machines leads to higher machine uptime, which in turn increases efficiency, reduces production scrap and lowers costs.

The smartView app features a user-friendly interface, which includes the option to individually adjust the menu bar. Popular features are push notifications, the storage of recipes, the export of data into a computer program or ERP system as well as limiting the access to machinery with an RFID lock.

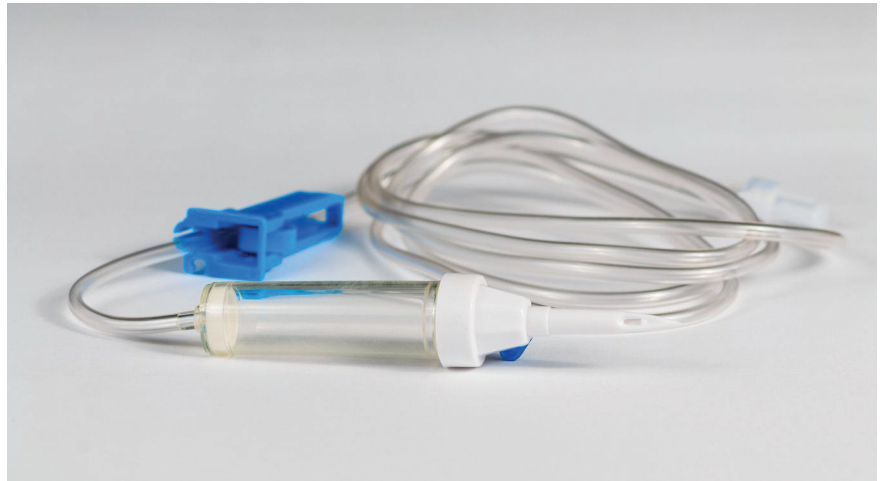
Based on a solution that was developed by an IT service provider roughly 15 years ago, GRAFiT 4.0 is an elaborate system that was perfected in cooperation with customers of Starlinger. With the founding of the independent subsidiary GRAFiT in 2018, the Starlinger Group placed the product on a new platform which guarantees continuous development and comprehensive technical support. With the backing of a world market leader, GRAFiT was able to further expand its product range: In the previous year, rTRACK, a software for batch tracking in the entire recycling process, was added to the portfolio. On delivery, the goods are marked with a QR code which is scanned at each station that the goods pass through. The data is recorded by the system and gives information about the receipt, processing and delivery of materials.

测量技术：医用导管的质量保证

Measuring Technology: Quality Assurance of Medical Tubes

SIKORA 提供可靠的测量及控制设备

医用导管的生产对制造商的要求相当高。医用导管有着极高的安全标准，因患者的安全与其息息相关，故必须经过严格的批准程序。在生产过程中，持续的品质控制对于确保可靠、耐用、精密加工的导管至关重要。此外，生产过程必须是可重复的，以确保一致的产品质量并节省成本，从而使生产过程更加高效和经济。SIKORA 提供创新型的测量和控制设备，用于在医用管材挤出过程中的质量控制。



质量保证是医用导管生产中的重中之重

SIKORA provides reliable measuring and control devices

Quality assurance has top priority in the production of medical tubes

The production of medical tubes places considerable demands on manufacturers. Because of the high safety standards, medical tubes are subject to strict approvals as patient safety depends on them. A continuous quality control during the ongoing manufacturing process is essential to ensure reliable, durable and precisely processed tubes. Besides, the

manufacturing processes must be reproducible in order to ensure consistent product quality and save costs, making production more efficient and economical. SIKORA supplies innovative measuring and control devices for quality control during the extrusion of medical tubes.

制造商在产品质量保证中要特别注意的两个典型方面是医用管的尺寸和表面质量。可以使用LASER 2000 XY 系列测量单腔或多腔彩色导管的外径和椭圆度。此外，3 轴2000 T 系列的装置（如 LASER 2010 T）可为透明医疗导管提供极高的精度。LASER 6000 系列可作为 LASER 2000 系列的替代产品。由于测量速度的提高，它还可以检测医疗管表面上的鼓包。

X-RAY 6020 PRO 的使用，可使单腔医用管的壁厚在生产过程中得到可靠控制。X 射线测量系统专为直径为 0.65 mm - 15 mm，最小壁厚为 0.1 mm 的医用导管设计的。该系统可持续记录医疗导管壁厚、偏心、内外径以及椭圆度的测量数据。X-RAY 6020 PRO 可以与3轴鼓包检测仪结合使用。在产品冷却后，LUMP 2000 T 测量头可以检测出产品表面上的极小的不合规之处。SIKORA 测量设备可以根据需要集成到水平式和垂直式挤出生产线中。由于设备的使用可获得精确而连续的测量值，就能够保证制造商生产出符合标准的产品。因此，医用导管作为确保重生命的医疗用品，其重要性无论如何强调也不过分，即便在新冠病毒出现之前。

Two typical aspects that manufacturers pay particular attention to in the quality assurance of their products are the dimension and surface of medical tubes. Single or multi-lumen colored tubes, for which an outer diameter and ovality measurement is relevant, are measured with a device of the LASER Series 2000 XY. Furthermore, the 3-axis 2000 T models, such as the LASER 2010 T, offer the highest precision for transparent medical tubes. As an alternative to the LASER Series 2000, the LASER Series 6000 is available. Due to a significantly higher measuring rate, it additionally detects lumps on the surface of the medical tube.

Single-lumen medical tubes, whose wall thickness has to be controlled during production, are reliably measured with the X-RAY 6020 PRO directly at the manufacturing process. The X-ray measuring system has been specifically designed for smallest medical tubes with a diameter of 0.65 up to 15 mm and a minimum wall thickness of 0.1 mm. The system records continuously measuring data about wall thickness, eccentricity,

inner and outer diameter as well as the ovality of medical tubes. The X-RAY 6020 PRO can be combined with a 3-axis lump detector. The LUMP 2000 T gauge heads detect even smallest irregularities on the product surface after the cooling. The SIKORA measuring devices can be integrated into horizontal as well as vertical extrusion lines depending on the required application. Due to the precise and continuous measuring values, they guarantee that manufacturers receive an immaculate and save product which specifications are met to 100 %. Thus, the life-sustaining functions of the medical tube can be ensured, the importance of which cannot be overestimated even before the current situation with the corona virus.

X-RAY 6020 PRO装置是专门针对医用导管的测量而设计的

The X-RAY 6020 PRO has been specially designed for the measurement of medical tubes

SIKORA AG
Bruchweide 2, 28307 Bremen, Germany
www.sikora.net



工艺：必不可少的齿轮泵

Processing: Essential Gear Pump

中国制造商南海南新无纺布有限公司生产口罩用纺粘织物（非织造布）时，信赖MAAG集团的extrex6增压熔体泵：“我们相信Maag为用于非织造布行业的熔体泵提供了最佳的解决方案。安装在我们非织造布生产线上的Maag泵在每周7天，每天24小时的运转中实现了高产量和出色的一致性，在熔体泵的可靠性和精确性方面超出了我们的期望，它大大提高了生产线的工艺稳定性。”

位于我们客户南海南新无纺布有限公司的
无纺布生产线

*Nonwoven production line at our
customer Nanhai Nanxin Wufangbu*



安装extrex6熔体泵使非织造布专家不仅可以满足高质量要求，而且可以更经济地生产无纺布产品。齿轮泵使热塑性聚合物的加工效率大大提高。

新型MAAG齿轮泵extrex6的低压缩齿轮装置在市场上是独一无二的，特别是允许在高压和低剪切应力下进行输送、增压和计量应用。在生产非织造布的特定情况下，这意味着比流量较之于其他泵的解决方案要高出10%，而驱动轴密封件的耐磨性和密封能力则提高了25%。密封件的冷却面积是传统泵设计的两倍。熔体通过泵的温度升高降低了40%，并且熔体泵输出时的脉动最小。实现了节能12%。

几乎无需维护的设计带来了高有效性和低运行成本。其他方面的优势还有：齿轮泵的总体的可靠性、高精度下长期运行所带来的好处，从而在任何时候都保证着南海南新无纺布生产线的工艺稳定性。

MAAG集团已经在中国市场上经营了多年，拥有自己的分支机构和工厂，尽管目前经济形势艰难，但MAAG集团在挤出设备熔体泵领域的发展仍有望成为创纪录的一年。仅在2020年第一季度，MAAG集团在中国的挤出设备熔体泵的销量就超过了2019年全年。这些泵主要用于生产非织造布和其他医疗产品。

MAAG集团的extrex产品组合在应用领域、泵送物料和附件方面具有很高的灵活性。所有组件均在内部制造，因此可以满足最高质量要求。MAAG集团的全球售后服务团队分布在全球超过18个地点，保证了合格和快速的本地支持。

only to meet high quality demands, but also to produce the material more economically. The gear pump makes the processing of thermoplastic polymers much more efficient.

The low compression gearing of the new MAAG gear pump extrex6 is unique in the market and in particular allows transfer, pressure-boosting and dosing applications at high pressure and with low shear stress. In the specific case of the production of nonwovens, this means a 10% higher specific flow volume relative to other pump solutions and 25% better wear resistance and sealing capability of the drive shaft seal. The cooling surface of the seal is double that of conventional pump designs. The temperature rise through the pump is 40% less, and the pulsations at the melt pump discharge are minimized. The energy saving is 12%.

Other advantages in terms of high availability and low operating cost result from the virtually maintenance-free design. In addition to the general reliability of the gear pump, its high accuracy delivers benefits in long-term operation, guaranteeing the process stability of the Nanhai Nanxin Wufangbu production line at all times.

MAAG Group has been operating on the Chinese market for a number of years with its own branch offices and plants, and is heading for a record year in the extrusion pump sector despite the current difficult economic climate. In first quarter 2020 alone, MAAG Group sold more extrusion pumps in China than in the entire year 2019. These will mostly be used for the production of nonwovens and other medical products.




The extrex product portfolio of the MAAG Group offers high flexibility in terms of application, pump materials and accessories. All components are manufactured in-house, and so meet the highest quality demands. The global After Sales Team of the MAAG Group with more than 18 locations worldwide guarantees a qualified and fast local support.




In its production of bonded fabrics (nonwovens) for face masks, Chinese manufacturer Nanhai Nanxin Wufangbu is relying on a MAAG Groups extrex6 pressure booster melt pump: "We believe Maag offers the best pump solution for nonwoven applications. The Maag pump installed on our nonwovens line has achieved high output and excellent consistency in 24/7 operations. Our expectations as to the reliability and accuracy of the pump have been exceeded, and it has significantly enhanced the process stability of the line."

The installation of the extrex6 allows the fabric specialist not

MAAG Group
Aspstr. 12, 8154 Oberglatt, Switzerland
www.maag.com

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考特斯用吹塑工艺生产320升氢气瓶内胆

Extrusion Blow Molding: Producing 320-Liter Hydrogen Liner in Blow Molding Process

考特斯的吹塑专家成功运用挤吹工艺生产出大容量的尼龙（PA）氢气压力容器内胆。该内胆长度超过两米，直径约500毫米，容量约为320升，这是首次以吹塑工艺生产如此大规格的氢气储存容器。

Kautex Maschinenbau's blow molding experts have successfully produced a large-volume polyamide liner for hydrogen pressure vessels using extrusion blow molding. The liner is more than two meters long, with a diameter of approximately 500 mm and a volume of 320 liters. This is the first time that a liner for a hydrogen container has been produced in this size by blow molding.



考特斯复合材料中心生产的原型产品

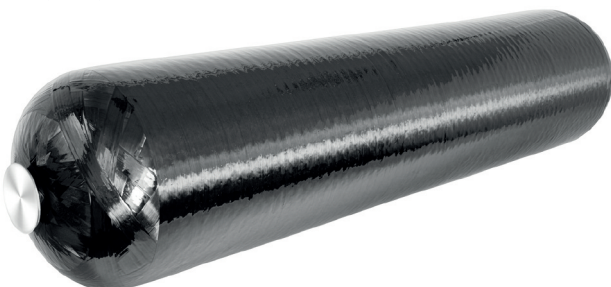
*Prototype production in the Kautex Composite Center
(All pictures © Kautex Maschinenbau GmbH)*

氢气对压力罐内胆材料的抗渗透性要求非常高。作为元素周期表上分子最小的元素，氢可以渗入几乎所有塑料材质。特殊尼龙（PA）具备最优越的阻隔性，但由于其低熔体刚度和复杂性，以前一直难以对这种规格的尼龙（PA）进行吹塑加工。如今，全新研发的尼龙（PA）和特殊挤出工艺可以满足这种加工需求。

“用尼龙（PA）材料生产这种尺寸的内胆是一项巨大的挑战，我们研究工作以及成果具有真正的开创意义。”负责研发新氢气瓶内胆的考特斯复合类材料业务发展部主管 Abdelah El Bouchfrati 先生说。

320升氢气压力容器

320 l hydrogen pressure vessel

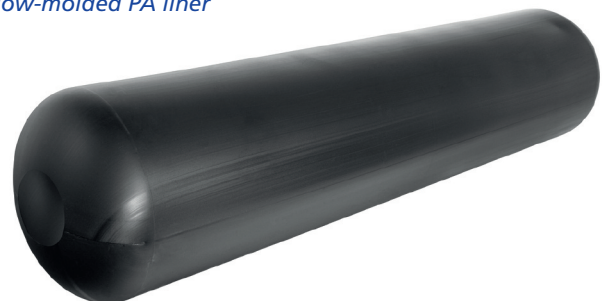


考特斯长期以来致力于深入研发适合不同应用领域的复合压力容器（CPVs），例如氢气、压缩天然气或液化石油气储罐。复合材料压力容器的组成部分包括热塑性塑料内胆、连接阀门的阀座和提高机械强度的纤维缠绕层；其中，内胆使用吹塑工艺制成。

复合材料压力容器中用于氢气的高压容器通常情况下设计的工作压力为700 bar，爆破压力是1750 bar。内胆是压力容器的核心部件，是整个气瓶的内层皮肤。它吸收气体，包裹着内容物，并将其与外界隔离。内胆可以承受较高的机械应力，可以承受工作温度范围为-60°C至+120°C。如今，首

吹塑PA内衬胆

Blow-molded PA liner



次由考特斯和原材料厂商合作研发的技术使通过吹塑工艺生产工业应用规格的氢气内胆成为可能。

“目前能够生产的内胆尺寸对我们而言只是开始。我们有信心，未来利用这种新工艺还能生产出更大的氢气压力容器。”Abdellah El Bouchfrati 先生说。

考特斯机械制造有限公司研发的用于生产大容量氢气瓶内胆的技术，意味着为运输需求和基础设施建设需求提供经济有效的解决方案变得触手可及。专家一直认为，仅仅依靠电池技术的发展来解决未来的出行问题不足以长远实现“碳中和”的目标。

乘用车领域的燃料电池技术目前由于生产成本高和基础设施缺乏，尚无经济可行性，而氢气驱动系统和生产技术已在其他领域成功应用。目前，这项技术在重型载货运输业、地方公共交通运输业、造船业和航空业引发了特别关注。对上述行业而言，最基本的要求是安全、轻便和密封的容器系统。CPV 这类容器不仅重量明显轻于钢罐，而且完全耐腐蚀。

氢气是一流的储能介质，由可再生能源生产的氢气尤其表现突出。同样的，能够承受相应压力，且安全存储极轻气体的容器系统也是必须的。

除了为包装和汽车产品设计的高科技机器外，考特斯机械制造有限公司研发热塑性塑料压力罐的生产设备，服务包括研发和生产样品和小批量产品以及打造完整的复合压力罐生产线。考特斯与客户和材料制造商合作，坚持不懈地致力于发展 CPV 技术，目前首次推出的氢气瓶内胆正是合作的最新成果。

Hydrogen presents considerable challenges in relation to the liner material's permeability. Being the smallest molecule in the periodic table, hydrogen can diffuse through virtually every plastic material. Special polyamides (PAs) have the best barrier properties. However, due to their low melt rigidity and complexity, they have previously been difficult to process on this scale by blow molding. Newly developed polyamides and a special extrusion technique have now made this possible.

“Producing a liner of this size from polyamide has been a major challenge. The work we are doing here is truly pioneering”, said Abdellah El Bouchfrati, Head of Kautex's Composite Business Development, where the new hydrogen liner was developed.

For some time now, Kautex has been putting its efforts into ongoing development of composite pressure vessels (CPV) for various applications such as hydrogen, CNG and LPG tanks. Composite tanks consist of a thermoplastic liner, a boss part, to which the valve is connected, and a fiber winding which adds mechanical strength. The internal liner is produced by blow molding.

CPV high-pressure containers for hydrogen are generally designed for an operating pressure of 700 bar and a burst pressure of 1750 bar. The liner is a core component of the container. It is the inner skin of the tank. It absorbs the gas, surrounding the contents and sealing them off from the outside. The liner is subjected to high mechanical stresses and temperature ranges from -60 °C to +120 °C. Now, for the first time, the method developed by Kautex in cooperation with a plastics manufacturer enables hydrogen liners in sizes with industrial applications to be produced by blow molding.

“The liner size we have now achieved is just the start.

We are confident that, in future, we will also be able to use this method to produce

considerably larger liners for hydrogen pressure vessels”, said Abdellah El Bouchfrati.

The technology developed by Kautex Maschinenbau for producing large-volume liners for hydrogen containers means that a cost-effective solution for transport and infrastructure requirements is now within reach. Experts have long considered sole reliance on battery technologies to provide a solution to tomorrow's mobility problems



Kautex KBS241 挤出吹塑机

Kautex KBS241 extrusion blow molding machine

will not achieve the long-term goal of mobility that is as carbon-neutral as possible.

While fuel cell technology in the passenger car sector does not yet appear to be economically viable, due to production costs and a lack of infrastructure, hydrogen-powered drive and production technologies are already being successfully implemented in other areas. This technology currently appears to be of particular interest for heavy goods transport, local public transport, shipbuilding, and the aircraft industry. In those sectors, the primary demand is for safe, lightweight and leak-proof tank systems. CPVs are not only significantly lighter than steel tanks, but also completely resistant to corrosion.

Hydrogen is also a first-class energy storage medium, especially if it has been produced using renewable energies. Here, too, tank systems that can withstand the associated pressure, and still store the extremely light gas safely, are needed.

Alongside high-tech machines for packaging and automotive products, the company also develops systems for producing thermoplastic pressure vessels. Kautex Maschinenbau's portfolio ranges from the development and production of prototypes and small series to the construction of complete production systems for manufacturing composite pressure vessels. Working together with its customers and materials manufacturers, Kautex continues to advance developments in CPV technology.



复合材料研究中心进行产品质量检查

Quality inspection in the Composite Center

The hydrogen liner that has just been unveiled is the latest fruit of this cooperation.

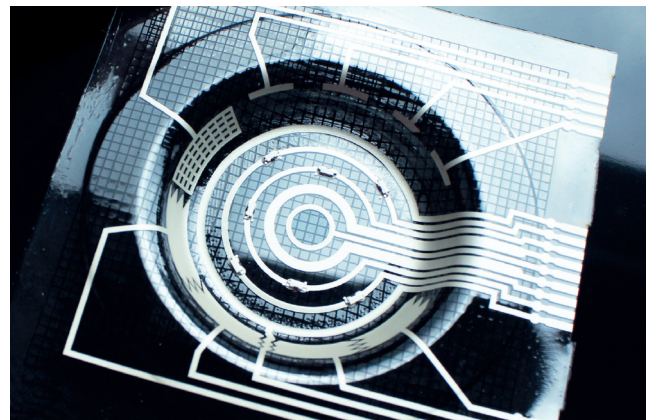
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www.kautex-group.com

3D电子元件热成型—来自研究所：开发了卷对卷制造工艺的电子组合元件

3D-Electronics, Thermoforming – From research: Roll to Roll Components developed

弗劳恩霍夫研究所加工技术包装 (IVV) 推出制造3D电子元件采用I卷对卷制造工艺。新的热成型工艺使这一技术得以实现，它能够通过温度曲线进行更高水平的成型。这项技术是由在德国德累斯顿弗劳恩霍夫IVV开发的。

The Fraunhofer Institute for Process Engineering and Packaging IVV presents the manufacture of 3D electronics using the roll-to-roll. A new thermoforming process makes this possible. It allows higher degrees of forming via temperature profiling. It was developed at Fraunhofer IVV Dresden, Germany.



弗劳恩霍夫 IVV 的热成型工艺可以使用卷到卷制造工艺原理制造 3D 电子元件 (©Fraunhofer IVV)

The thermoforming process of the Fraunhofer IVV allows the manufacture of 3D electronic components using the roll-to-roll principle (© Fraunhofer IVV)

这种热成型工艺适合于大批量制造产品，与创新的温度控制技术相结合，实现了对成型过程的精确调节。到目前为止，电子组合元件的生产包括构建和功能组件制造一直到组装和布线。就时间和金钱而言，这些都是昂贵的步骤。现在，IVV通过一个合作项目，已开发出一种新的成型技术，该技术首先使用已有的用于印刷和组装的技术，在平面状态下加工基板。仅在最后一个加工步骤中，才需要通过成型技术制成3D几何形状。例如，交互式（操作）面板可以通过优化的成本生产。

机器人技术、家用产品、医疗技术以及汽车和飞机制造行业中的应用将从这种新技术中获益。因为这种技术能够最好地满足这些行业对人体工程学、设计和功能的高要求。新工艺还提供了更大的设计自由度和灵活性。

按客户需求定制成型工艺

弗劳恩霍夫 IVV正在开发创新的加热和成型技术，以制作新颖的产品。位于德累斯顿的弗劳恩霍夫 IVV拥有一支专业的团队，为3D电子元件的开发提供支持，并在产品设计、材料选择和工艺配置等方面为各家公司提供帮助。自行开发的特性化方法可以确定加工工艺极限和相应的工业负载极限。此外，热成型试验台可在经过测试的基础上灵活地生产产品。对于这项工作，可以使用各种成型工艺和技术。使用实验和数值模拟，可以模拟和优化制造工艺和产品几何形状。热成型试验台使德累斯顿弗劳恩霍夫 IVV 能够采用多种材料为各家公司的印刷电子元件生产产品。

Thermoforming is suitable for large batches of products and is combined here with innovative technologies for temperature control in order to precisely regulate the forming process. Up until now the manufacture of electronic assemblies from structural and functional components has involved production,

assembly, and wiring. These are costly steps in terms of time and money. A collaborative project has now developed forming technology whereby a substrate is first processed in its planar state using established technologies for printing and assembly. Only in the last processing step is the 3D geometry generated by forming. Interactive (operating) panels can, for example, be produced at favorable cost. Applications in robotics, home products, medical technology, and the car and aircraft manufacturing industries will benefit from this. The high requirements on ergonomics, design, and functionality in these industries will hence be optimally met. The new process also offers greater design freedom and flexibility.

Customization of forming processes

The Fraunhofer IVV is developing innovative heating and forming technologies to realize novel products. The Fraunhofer IVV Dresden has a specialist team supporting the development of 3D electronic components and offers assistance to companies with aspects such as product design, material selection, and process configuration. A self-developed characterization method enables process limits and relative industrial load limits to be determined. In addition, a thermoforming test rig enables the flexible manufacturing of products on a trial basis. For this work a range of forming processes and technologies are available. Using experimental and numerical simulation, manufacturing processes and product geometries can be simulated and optimized. The thermoforming test rig allows the Fraunhofer IVV Dresden to form a variety of materials with printed electronics for companies.

Fraunhofer Institute for Process Engineering and Packaging
IVV
Heidelberger Str. 20, 01189 Dresden, Germany
www.ivv.fraunhofer.de/en/dresden.html

薄膜挤出：全球首条7+米生产线： BOPA薄膜业的又一个里程碑

Film Extrusion: World's First 7+ m Line – Another Milestone for the Production of Biaxially Oriented PA Films

当中国BOPA薄膜的领先者、全球最大的薄膜生产商厦门长塑投资时，整个塑料行业都在关注 - 再次得到充分证实。刚刚从布鲁克纳机械有限公司订购了2条新的分次拉伸薄膜生产线，这是迄今为止同类产品中最快，最宽和最强大的：工作宽度为7+ 米，生产速度340米/分钟，每小时产量超过2.5 吨。

When the Chinese BOPA film pioneer and world's largest producer Xiamen Changsu makes an investment, the industry listens up – fully justified again. They just now ordered two new sequential film stretching lines from Brückner Maschinenbau which are the fastest, widest and most powerful of

their kind so far: a working width of 7+m, a production speed of 340 m/min and an output of more than 2.5 tons per hour have not been achieved yet.

厦门长塑采用布鲁克纳同步法生产线
成功生产双向拉伸尼龙薄膜

Successful BOPA film manufacturing at Xiamen Changsu with a simultaneous Brückner film production line



厦门长塑董事长王哲夫先生说：“我们决定投资时，我们有两个明确的目标：最低的生产成本和最高的薄膜质量。新生产线的速度比我们最大的设备快35%，产量多50%。基于我们在布鲁克纳技术上的长期使用经验，我们可以放心地确保满足客户期望提供具有特性的卓越优质薄膜。”

布鲁克纳远东董事总经理陈耀东先生对双方之间的再次合作感到高兴：“厦门长塑是BOPA业务中历史最悠久的客户之一 - 不仅在中国，而且在全球。自2003年以来，我们已成功完成了10个BOPA联合项目。多年来，我们的合作伙伴关系特别注重创新。而厦门长塑通常是第一个采纳创新方案，如BOPA双螺杆挤出机或6.6米宽的同步拉伸生产线等。”

布鲁克纳机械有限公司销售总监裴瑞乐补充说：“新生产线也标志着分次拉伸尼龙薄膜领域的最新发展阶段：从4.2米到5.1米到6.6米，我们现在达到了7米以上。厦门长塑与我们一起迈出了这一切的步伐，这是建立真正伙伴关系的有力标志！”该生产线将于2021年底左右投产。

BOPA薄膜具有多种优异的性能，例如抗穿刺，抗冲击，抗爆裂和抗撕裂等。BOPA薄膜完美地满足了严格的包装要求，出色的气体阻隔性能，对油，油脂，溶剂和碱的良好耐受性以及冷冻的适应性。因此，对高脂肪和油性食品，蒸馏产品，农产品或医疗产品的包装的需求日益增加。布鲁克纳机械有限公司提供久经验整的分步和同步BOPA技术，并具有在线收缩调节等特殊功能和卓越的生产效率。

lasting experience with the Brückner technology we can safely assume outstanding film qualities with the finishing characteristics our customers expect.”

Phillip Chen, Managing Director Brueckner Far East is happy about the renewed collaboration: „Xiamen Changsu is one of our longest-standing customers in the BOPA business – not only in China, but worldwide. Since 2003 we have completed 10 joint BOPA projects successfully. They were characterized by great innovative spirit on the part of Xiamen Changsu, who, for example, were the first to use a twin-screw extrusion at BOPA or decided in favour of simultaneous systems with a working width of 6.6 m.

Reinhard Priller, Sales Director Brückner Maschinenbau, adds: „The new lines also mark the latest development stage in the field of sequential PA film stretching: From 4.2 to 5.1 to 6.6 m we now reached a proud 7+ m. And Xiamen Changsu made all these steps along with us – a strong sign of true partnership!” The lines are to start production in the last quarter 2021, right in time to produce film for the year's end business.

BOPA films have a variety of exceptional properties such as puncture, impact, burst and tear resistance. Tough packaging demands, outstanding gas barrier properties, a good resistance to oils, greases, solvents and alkalis as well as freezer-suitability are perfectly covered by BOPA films. They are therefore increasingly in demand for the packaging of fatty and oily food, distilled goods, agricultural or medical products. Brückner Maschinenbau offers a proven sequential as well as simultaneous BOPA technology.

Wang Zhefu, Chairman of Xiamen Changsu says: „When we decided to make this investment, we had a clear goal in mind: lowest production costs with highest film quality at the same time. The new lines surpass our largest machines to date by 35% in speed and 50% in output. And based on our long-

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