



2019

中国 / 亚洲观众参观指南

Visitors' Guide for Chinese/Asian Buyers

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全书中英对照
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公司簡介

耀安裝備創立於80年代初，前身是東莞市安富塑料機械廠，位於中國的製造業名城—東莞，是一家具有強大獨立研發、製造和售後服務能力的塑膠機器製造廠商。耀安設備的優良品質及對產品科技創新的努力探索，而曾獲得了多項國家授予的榮譽稱號：如“民營高科技企業”，“廣東省名牌產品”“員工滿意企業”，“重合同守信用企業”等等。耀安還通過了“國際質量ISO9001”，“環境ISO14001”等管理體系認證和歐盟安全標準“CE”認證；並擁有多項技術專利，多項科技成果及技術指標皆居於業內領先水平。

在這三十多年間，耀安成功為全球各地的優秀製造業廠商提供了數萬臺性能優良的擠出設備和優良的產品服務，並且獲得了廣大客戶群體的認可。我們的產品涉及行業範圍廣泛：建築、農業、醫療、交通、電子、紡織、包裝、家具等；我們為每種大類別設備配備有專門的研發團隊，確保設備技術的專業性及精準性，滿足客戶各種特殊定制。

作為有實力的生產廠商，耀安擁有多個分工明確的技術團隊，投資超過數億的80000平方米現代化自置廠區，數十臺國外大型精密數控加工中心和先進的鋼材激光切割中心等設備。強大的技術力量及先進的加工設備，確保耀安的客戶能夠按時保質地接收設備。

耀安每一臺出廠的設備，皆先通過售前嚴謹的溝通洽談，清楚了解客戶的特定需求後，通過專業技術團隊的研發設計，每一個生產流程每個工序的嚴格把控，相關部門調試檢測合格後，得以高標準的品質交付客戶，以此保證耀安製造的標準：精準、穩定、高效！

COMPANY INTRODUCTION

YAOAN company, Established in early 1980's, previous name: DONGGUAN CITY ANFU PLASTIC MACHINE FACTORY; located in Chinese famous manufacturing city: Dongguan; is a plastic machine manufacturer with a strong capacity of independent R&D, manufacturing and after sale service.

Basing on the super quality and hard work in exploring technical innovations; she has several honors given from our government, such as: 'PRIVATE HIGH-TECH ENTERPRISES' 'GUANGDONG GUANGDONG PROVINCE FAMOUS BRAND', 'EMPLOYEE SATISFACTION ENTERPRISE', 'CONTRACT ABIDING AND TRUSTWORTHY ENTERPRISE' etc. She has adopted the certificates of "ISO9001", 'ISO14001' and 'CE' (European safety certificate); She owns several technical patents, several technical research achievements and technical standards. These are advanced in the field of plastic extrusion machines.

During the period of over 30 years, YAOAN has successfully offered over 10,000.00 sets of super quality extrusion equipments and satisfying after-sale service to our customers all around the world; the quality and service are acknowledged by most of clients.

Our products have a widely application in those fields: Construction, agriculture, medical care, transportation, electronics, textile, packaging, furniture etc. Since that the special R&D team for every big category of machines is established and it ensures the specialty and preciseness of the manufacturing in order to satisfy the various special customized requirements.

As a strong capable manufacturer, YAOAN possesses several specialized technical teams, an over 100 millions invested over 80000square meter factory area, over tens imported large scale CNC and advanced steel laser cutting centers etc. Powerful technical capacity and advance engineering equipments enable the delivery of machines in good quality and in time.

Every machine has undertaken the below process steps before its shipment in good quality: firstly, clear understanding client's special requirements after pre-sale cautious communications; then specialized team's the Researching and designing, then strict control on every production step and process; finally the related departments' successful testing and commissioning; This process ensures our machine standard: preciseness, stability, high productivity!



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Sheet extrusion machine



無紡布擠出設備
Non-woven fabric extrusion machine



管材型材擠出設備
Pipe, abnormal profile extrusion machine

Main Products:

- ◆ Automatic Screen Printing Machine
- ◆ Automatic Labeling Machine
- ◆ Semi-auto Screen Printing Machine
- ◆ UV Curing Machine
- ◆ Screen Mesh Stretching Machine

- ◆ Automatic Hot Stamping Machine
- ◆ Automatic Coating Machine
- ◆ Flame Treatment Machine
- ◆ Screen Mesh Exposure Machine
- ◆ ODM Machine



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Two-color Automatic Screen Printing Machine & Labeling system



YD-SPA12/1C

单色全自动丝印及UV固化生产线

Single-color Automatic Screen Printing Machine & UV Curing system



YD-SPA101/1C

单色全自动丝印及UV固化生产线

Single-color Automatic Screen Printing Machine & UV Curing system



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Address: Qipai Building, No.9 Industrial Avenue, Shipai Town, Dongguan City, Guangdong Provinces

电话Tel: +86 769 81032600 81032601 传真Fax: +86 769 81032602

E-mail: dgyd@dg-yaodong.com liulovely@163.com

www.dg-yaodong.com



2019

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Address: 6/F., 321 Java Road, North Point, Hong Kong

地址: 香港北角渣华道321号6楼

Tel 电话: +852 2811 8897 Fax 传真: +852 2516 5119

Email 电邮: cprj@adsale.com.hk

Website 网址: Adsale.com.hk | AdsaleCPRJ.com

Contact Persons 联系人: Janet Tong / Minnie Ho

Editorial Enquiry 编辑部查询: cprj.edit@adsale.com.hk

ADSALE OFFICES

HONG KONG
BEIJING
SHANGHAITel: 852 2516 3380 E-mail: cprj@adsale.com.hk
Tel: 86 10 5129 3366 E-mail: info@bj.adsale.com.hk
Tel: 86 21 3325 5688/3325 5615SHENZHEN
SINGAPOREE-mail: info@sh.adsale.com.hk / media@adsale.com.hk
Tel: 86 755 2354 7232 E-mail: cprj@adsale.com.hk
Tel: 65 3157 3101
E-mail: info@sg.adsale.com.hk / JeanHam@sg.adsale.com.hk

MEDIA REPRESENTATIVE

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JUST GLOBAL, INC.
SOUTH KOREATel: +49 2103 23292
Tel: +39 02 825 3326E-mail: ek@koehler-adservice.de
E-mail: seint@seint.comTel: +1 408 799 2839
Tel: +82 70 4440 9583E-mail: promotion@justglobal.net
E-mail: myhandler@naver.com

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目标受众：汽车及电子企业

KraussMaffei

Pioneering Plastics

8月27日

上午10:00-11:00

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批量化生产技术

Wittmann **Boschenfeld**

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What's Hot



Huntsman to sell chemical intermediates businesses for US\$2.1 billion

Huntsman Corporation recently announced it has entered into a definitive agreement to sell its chemical intermediates businesses, which includes PO/MTBE, and its surfactants businesses to Indorama Ventures in a transaction valued at US\$2.076 billion, comprising a cash purchase price of US\$2.0 billion.



View Detail



Over 650 professionals join CPRJ Plastics in Packaging Conference in Shanghai

With the theme "New design, materials and processing technologies", more than 650 experts and professionals attended the 7th Edition CPRJ Plastics in Packaging Conference & Showcase, which was inaugurated at Sheraton Grand Shanghai Pudong Hotel in Shanghai, China.



View Detail

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- Industrial equipment supplier Hillenbrand to acquire Milacron for US\$2 billion
- Who are the top Chinese plastics machinery manufacturers in 2019?
- US\$775 million! PolyOne to sell its Performance Products and Solutions Business
- IDTechEx forecasts US\$6.1 billion market for 3D printed medical devices
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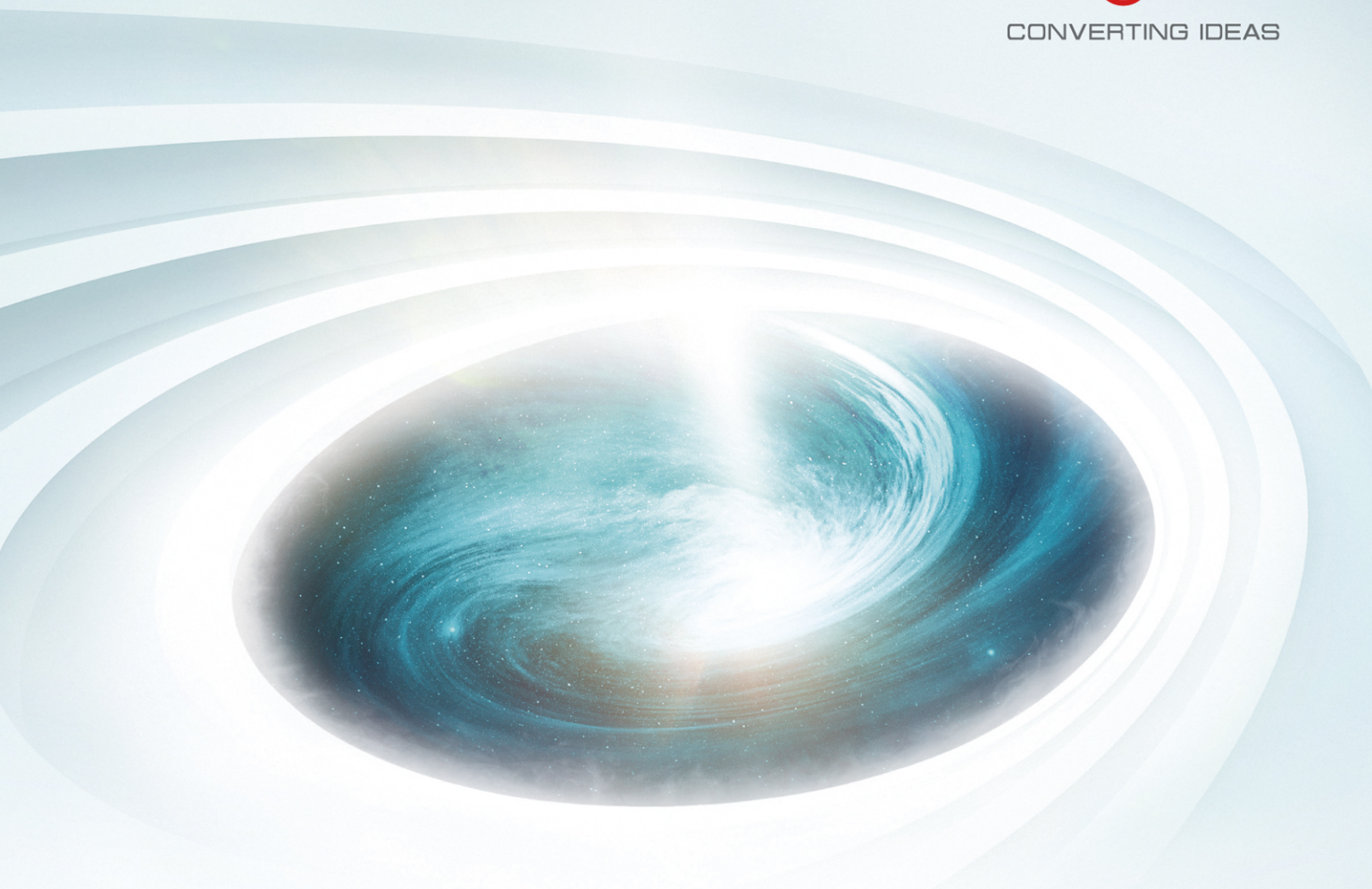
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- New Conair desiccant dryer simplifies large dryer line with single control
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- Covestro and the Holst Centre develop skin-friendly wearables
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Warm Welcome to Chinese Visitors and Trade Players Participating in K 2019

K 2019, the world's leading trade fair for plastics and rubber, will be back to Düsseldorf this October from 16-23. Over 3,000 exhibitors from more than 60 countries have registered to participate. K will occupy the entire Düsseldorf exhibition grounds with some 175,000sqm of net exhibition space, and more than 200,000 trade visitors from all over the world are expected to come to the event.

During K 2019, the manufacturers of plastics and rubber products as well as their industrial end users will be able to witness the pinnacle of developments in machine, process and materials technology at K 2019.

For example, the special exhibition "Plastics Shape the Future" also sees itself as a podium for solutions and answers to current social trends and discussions. Crucial topics will be discussed in detail, including packaging waste, marine litter and climate change on the one hand and resource conservation, energy efficiency and recycling on the other. "Plastics Shape the Future" not only will offer an international information and networking platform but will also provide greater involvement of policymakers and relevant social groups in the form of keynote speeches and speed talks.

The "Science Campus" of K 2019 stands for the dialogue between science and industry, with sustainability and recycling management also being examined intensively.

K 2019 will welcome over 300 Chinese exhibitors on 10,000sqm. We are glad to see all Chinese enterprises for their trust and continuous support over the years on K.

As an important window for cooperation and exchange between China and the German city Düsseldorf, Messe Düsseldorf China Ltd. is a subsidiary of Messe Düsseldorf GmbH and supports Chinese exhibitors and visitors to participate in K and other international events organized by Messe Düsseldorf. Wish K 2019 will be a great success! Look forward to meeting you at the upcoming global event K 2019!

Axel Bartkus
Managing Director
Messe Düsseldorf China Ltd.

热烈欢迎中国企业 and 行业人士参观K展2019

2019年10月16至23日，全球领先的塑料和橡胶贸易展览会K 2019将再次在德国杜塞尔多夫举行。届时，来自全球60多个国家的超过3,000家参展商将在17万5千平方米的展览场地上，再度向专业观众展出塑料和橡胶领域的产品和工艺，预计观众人数将高达20万。

K 2019期间，橡塑产品制造商及其行业终端用户将有机会参观机械、工艺及材料技术领域的尖端研发成果。

例如，“塑料塑造未来”特别展览是一个为社会趋势提供解决方案的平台，其深入探讨不同重要主题，包括包装废料、海洋垃圾、气候变化、资源保护、能源效益、回收再生等。透过主题演讲和讲座，“塑料塑造未来”不只提供一个国际化信息交流的平台，还带来政策制定者和相关社会团体的深入参与。

至于“科技校园”，则聚焦科研机构与产业的深入对话，可持续发展及回收管理等主题也将被详细讨论。

今年有超过300家中国企业参加K展，相应的展出面积高达1万平方米。我们非常高兴中国企业对杜塞尔多夫K展的信任并将其作为全球业务开拓的基础。

杜塞尔多夫展览（中国）有限公司是德国杜塞尔多夫展览集团公司下属的控股子公司，是中国和德国杜塞尔多夫市之间合作和交流的重要纽带，帮助中国参展商和观众参加K展以及其它由德国杜塞尔多夫主办的国际一流展览会。预祝K展2019圆满成功，再次热烈地欢迎中国来宾光临本届K展！

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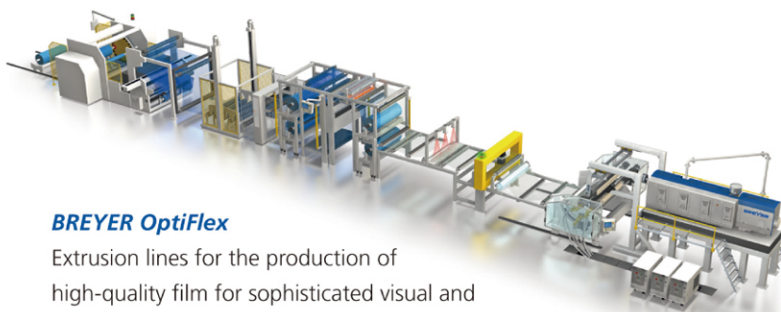
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K 2019 Contributes to the Chinese and Asian Plastics and Rubber Industry

Through our annual exhibition CHINAPLAS, one-stop plastics resources sharing platform www.AdsaleCPRJ.com, trade magazines CPRJ (China Plastic and Rubber Journal) and CPRJ International, as well as professional end-application focused conferences, the Adsale Group has been committed to facilitating trade activities and technology exchange in the plastics and rubber industry.

As a partner of Messe Düsseldorf, the organizer of K trade show, we are delighted to show our support and well wishes to the successful staging of the show.

The world is facing significant challenges ahead, in particular, the circular economy and digitization of manufacturing. The plastics and rubber industry is dedicated to developing technologies and solutions with fullest commitment. K 2019 will be a platform showcasing a full range of these developments.

Meanwhile, China continues to be one of the largest shareholders in global plastics machinery production and plastics processing. In order to achieve sustainable growth, Chinese plastics and rubber enterprises are striving to boost the domestic demand, explore emerging markets, and upgrade technological capabilities.

Asia, as a single market, is expected to be a growth engine for the plastics and rubber industry with increasing demands in end-applications such as automotive, packaging and medical. As such, by showcasing the latest technologies and innovations, K 2019 will contribute to the development of the Asian market.

The "K 2019 Visitor Guide for Chinese/Asian Buyers" is a handy tool for our Chinese and Asian readers, providing essential information about visiting K 2019. In addition to show information and travel tips, exhibits of leading suppliers are highlighted for the convenience of the visitors to identify their business partners.

We wish all visitors and exhibitors a most fruitful and rewarding experience at K 2019!

Stanley Chu
Chairman
Adsale Group

K 2019为中国和亚洲的塑料和橡胶工业做出贡献

透过举办中国国际塑料橡胶工业展览会——CHINAPLAS、推出一站式资源分享平台www.AdsaleCPRJ.com、出版贸易杂志《中国塑料橡胶》及《中国塑料橡胶国际版》，以及举行汇聚应用行业精英的专业会议，雅式集团致力于促进橡塑行业更多商贸活动和交流。

作为德国K展主办方Messe Düsseldorf的合作伙伴，我们很高兴在K 2019举行前夕，向展会的成功举办表达我们的支持和祝愿。

全球正面临着重大挑战，特别是循环经济和制造业的数字化。塑料和橡胶行业一直致力于研发能够应对这些挑战的技术和解决方案，而K 2019将成为展示各种相关发展的平台。

与此同时，中国仍然是全球塑料机械生产和塑料加工的最大国之一。为了实现可持续增长，中国塑料和橡胶企业正在积极发展国内需求，开拓新兴市场，并提升其技术能力。

亚洲作为单一市场，对汽车、包装和医疗等终端应用的需求也在不断增加，预计将成为未来塑料和橡胶行业的增长引擎。因此，通过展示最新技术和创新，K 2019将为亚洲市场的发展做出贡献。

《K 2019中国/亚洲观众参观指南》是我们特别为来自中国/亚洲的买家而推出的轻便参观指南，提供参观K 2019所需的信息。除展会信息和旅行提示外，还有在行业具领导地位的展商的亮点展品预览，以方便买家识别合适的供应商伙伴。

我们祝愿所有观众和参展商在K 2019获得最丰硕的回报！

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K 2019 to drive plastics innovations and circular economy

The triennial K trade fair will again under spotlight in Düsseldorf, Germany. With more than 3,100 exhibitors, K 2019 will present the latest products and technologies for the more innovative and sustainable plastics and rubber industry.

The industry will meet at the flagship show from October 16-23 at Düsseldorf Exhibition Center. K 2019 exhibitors will have their presence in all of the exhibition center's 18 halls with a total area of more than 176,000sqm.

According to the show organizer, Messe Düsseldorf, the largest group of exhibitors, as usual, comes from Europe, particularly from Germany, Italy, Austria, Switzerland, France and Turkey.

One of the rubber hot spots will once again be the Rubberstreet located in Hall 6.

Specials for inspiration

The special supporting program at K 2019 is a podium for solutions and answers to current social trends and discussions.

Plastics Shape the Future

The special seven-day event aims to show how polymer materials have shaped the appearance of modern settings, and introduce more visionary ideas that have the potential of becoming successful in the future.

Expert discussions, kick-off



K 2019 will welcome the global plastics and rubber industry in Düsseldorf from October 16 to 23.

speeches, entertaining presentations and exciting experiments will be offered. Crucial topics will be discussed in detail, including packaging waste, marine litter and climate change on the one hand and resource conservation, energy efficiency and recycling on the other.

Science Campus

The Science Campus in Hall 7 encourages the discourse between research and industry. It is a forum in which latest researches of universities, colleges and research institutions for the plastics and rubber industry will be presented.

Bioplastics Business Breakfasts

For visitors interested in the future role and potential of bioplastics, the

specialist publication "bioplastics Magazine" in cooperation with Messe Düsseldorf will host four individual mini-conferences from 8:00am on four show days (October 17-20) at the Congress Center on the fairgrounds.

The four topics will include: Bioplastics in Packaging; PLA, an innovative Bioplastic; Bioplastics in Durable Applications; and PHA, opportunities and challenges.

VDMA Circular Economy Forum

The central meeting point for the topic of the circular economy at the show. In the outdoor area in front of Hall 16, The Mechanical Engineering Industry Association (VDMA) will be providing information about trends and challenges based on data, facts and practical examples.

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70%的观众为目标行业制造商



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20 · 4 | Shanghai 上海



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6 | Eastern / Southern China 华东/华南



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6-7 · 8 | Eastern China 华东



Home Appliance 家电

9 | Eastern / Southern China 华东/华南



Medical 医疗

21-22 · 10 | Shanghai 上海



Demag Customized Conference 德马格定制论坛

22-23 · 10 | Ningbo 宁波



Automotive 汽车

11 | Shanghai 上海

Live streaming 回看论坛直播



- 46 presentations shared by Johnson & Johnson, China Synthetic Resin Supply and Sale Association Recycled PET Branch, SABIC, Nestle, etc.

46个演讲来自：强生、中国合成树脂供销协会再生PET分会、SABIC、雀巢等。



Recycling & Circular Economy
回收再生与循环经济

- 56 presentations shared by P&G, Amcor, Dow, Arburg, etc.

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K 2019推动塑料创新和循环经济发展

在德国杜塞尔多夫举行，全球首屈一指的K展是整个塑料和橡胶行业及市场的标杆。今年，逾3,100家展商将参展K 2019，展示他们的最新产品和服务，协助打造一个更高效、更创新、更加可持续发展的橡塑行业。

K 2019将于10月16至23日在杜塞尔多夫展览中心举行，占用18个展馆，展览面积超17.6万平方米。一如既往，不同展商按产品和服务主题分类，分布在不同展馆。

根据主办方杜塞尔多夫展览有限公司（Messe Düsseldorf）指出，机械设备制造商是K 2019的最大组成部分，展览面积超12万平方米，分布于馆1、馆3-4、馆8b及馆9-17。

同时，原材料、辅料、半制成品、技术部件及增强塑料的供应商，则位于馆5-6、馆7、馆7a、馆8a及馆8b。

至于展商来自的国家，则以欧洲为主，其中以来自德国、意大利、奥地利、瑞士、法国及土耳其的比较多。

过去数届K展，来自亚洲的展商数目及其展览面积均稳定地增加。

此外，位于馆6的“橡胶街”（Rubberstreet），将聚焦橡胶领域的创新发展及应用。为突出展会上与橡胶及弹性体相关的合作伙伴，主办方还再次制作一份《橡胶及热塑性弹性体指南》（Rubber & TPE Pocket Guide）。

同期特别活动激发灵感

K 2019同期还将举办多个特别活动，以提供讨论当前社会趋势和解决方案的机会。这些活动也是科学与行业对话的平台，同时也为吸引年轻人才提供积极支持。

塑料塑造未来（Plastics Shape the Future）

为期七天的“塑料塑造未来”同期活动，旨在展示高分子材料如何塑造现代环境，并且介绍已投入实际应用

的创新技术，以及可能在未来大获成功的点子。

活动举行期间，专家演讲、深入讨论、生动的演示和引人入胜的实验将轮番上演。其主题将聚焦不同的经济和生态领域，包括包装废料、海洋垃圾、气候变化、资源保护、能源效益、回收再生等，并且讨论相关潜在解决方案。

科技校园（Science Campus）

“科技校园”以论坛形式鼓励学术界与产业开展深入对话。该活动提供一个平台，让大学、院校、科研机构全面展示其与橡塑领域相关的科研活动及成果。

生物塑料业务早餐（Bioplastics Business Breakfasts）

对生物塑料的未来应用和发展潜力感兴趣的观众，专业刊物《生物塑料杂志》（bioplastics Magazine）与杜塞尔多夫展览有限公司合作，将于展会其中四天（10月17-20日），由上午8时开始在展会会议中心举办四场小型会议。

四个主题包括：生物塑料在包装的应用；PLA创新生物塑料；生物塑料在耐用品中的应用；PHA的机遇和挑战。观众将有机会听取专业级的报告，并从独特的交流机会中受益。

VDMA循环经济论坛（VDMA Circular Economy Forum）

在馆16馆前的室外区域，德国机械设备制造业联合会（VDMA）将根据数据、事实和案例，提供有关循环经济发展趋势和所存在挑战方面的信息，并安排提问机会。

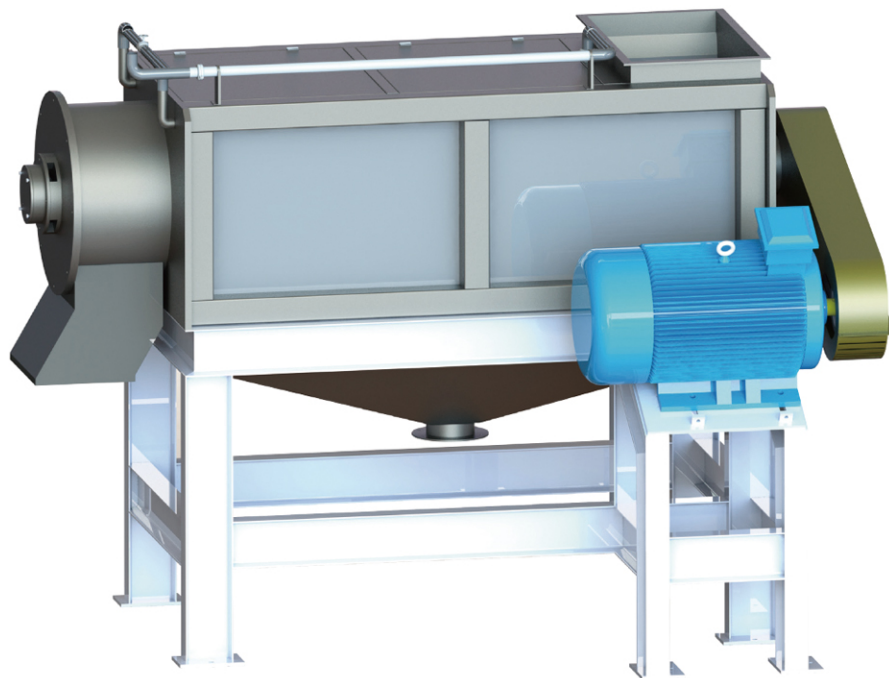


“塑料塑造未来”同期活动以专家演讲、深入讨论等形式，展示塑料如何影响现代环境。



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Plan of Fairground 展馆平面图



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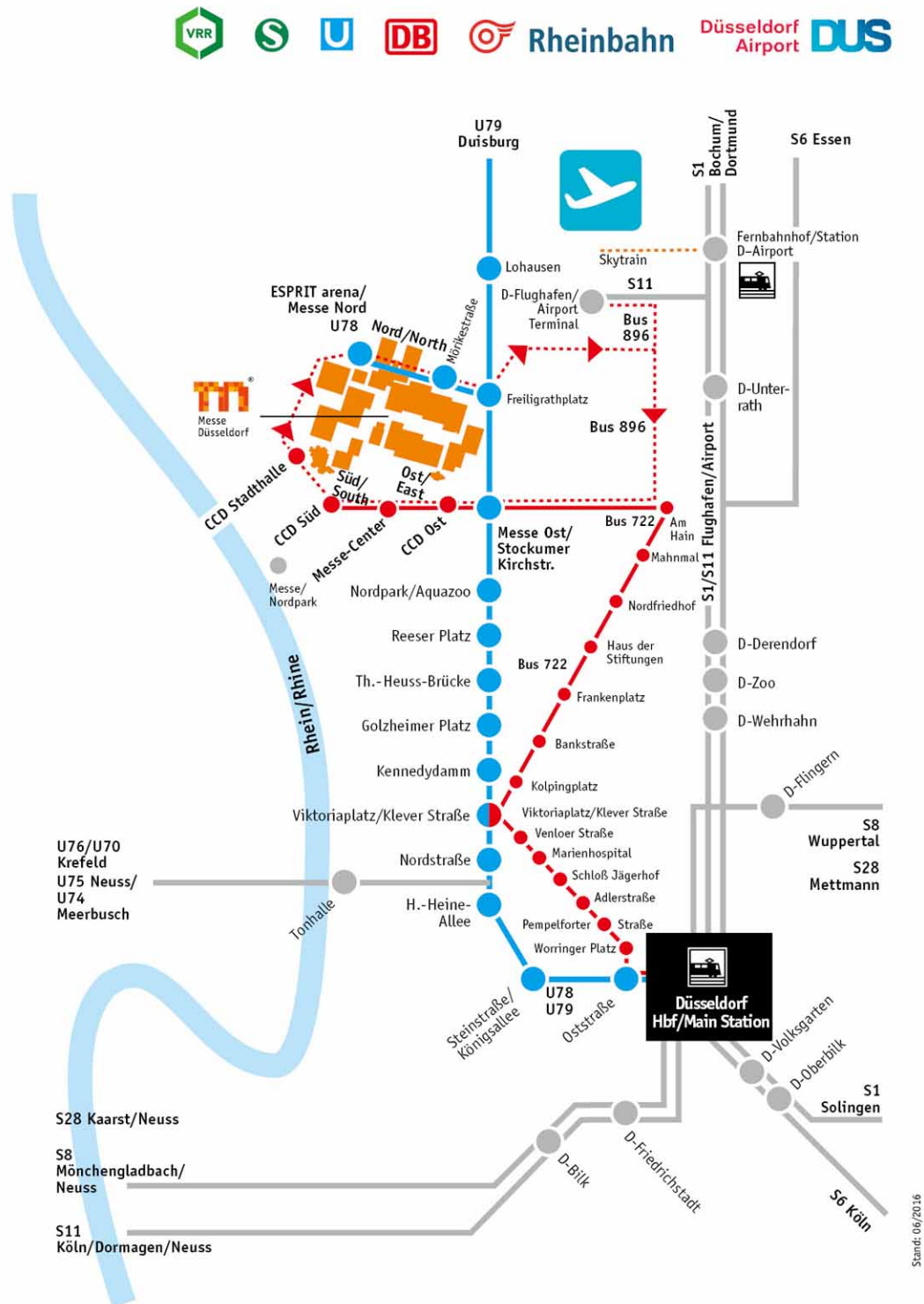


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Technology megatrends significant to the future

K 2019 will underpin its special status by showing a full depth of latest technologies to address the contemporary issues confronting the plastics and rubber industry. The show has defined several central themes which reflect the megatrends the industry is focusing.

Humankind is facing significant global challenges ranging from climate change to digitization. The plastics and rubber industry will contribute to solving the tasks ahead with the fullest commitment. Therefore, the central themes taking the center stage of K 2019 include:

- Plastics for sustainable development & circular economy
- Industry 4.0 & digitization of the value added chain
- System integration: Functionality through material, process and design, featuring lightweight engineering, mobility (e-mobility), new materials and 3D printing, etc.

Circular economy developing in full swing

Achieving circular economy is a global common mission now. The quest for widespread collection, efficient separation, recycling and reuse of plastics is still faced with major challenges. Nevertheless, plastics machinery manufacturers and chemical producers continue to offer advanced and innovative technical solutions.

At K 2019, recycling will be demonstrated in several live-performances, processing different

plastic input materials. In total more than 30 tons will be recycled during the show, including HDPE-bottles produced by Kautex Maschinenbau.

In a joint force demonstration, Braskem will provide Kautex with its innovative bioplastic "I'm green" polyethylene and post-consumer recycled (PCR) materials for the live production of three layer HDPE bottles with foamed middle layer.

Braskem's technology offers a better processability and less odour development. The raw material used for the demo bottles is derived from sugarcane, and the PCR material comes from already recycled material. For every kg of "I'm green" polyethylene used, more than 5 kg of CO₂ is saved.

The bottles will then be handed over to EREMA for fully recycling. With this initiative the three companies will demonstrate the closed plastic loop.

Meanwhile, in the outdoor exhibition area, post-consumer waste will be converted into miniature waste containers on an ENGEL victory injection molding machine.

As circular economy stands at the forefront of the plastics industry, packaging films and their production process have to be more sustainable. Thus, elite film stretching and blown

film lines manufacturers are working on producing films with the highest possible recycling capabilities.

One of the emerging technology trends to tackle the challenge is recyclable mono-material packaging films with superior performance.

Packaging films are often composed of a laminated composite of PET and PE. The addition of PET provides sufficient stiffness to the film for optimum secondary processing which cannot be achieved when using PE alone. However, this composite is not recyclable.

With its well-known EVO Ultra Stretch, Reifenhäuser Blown Film has developed new solution for processing PE. The film stretching system (MDO) is already being successfully used in plant for breathable backsheet films in the hygiene sector. The company will be presenting the solution at the show.



Post-consumer waste will be converted into miniature waste containers on an ENGEL machine at K 2019.

The positioning of the MDO in the haul-off unit is a key factor. The advantage lies in the fact that the plastic can be stretched using initial heat on the four- to six-fold extent. It facilitates higher process stability and lower shrink values due to longer cooling path. The result is a recyclable film with improved sealing properties, which can sustainably replace PET.



By further adapting the EVO Ultra Stretch, Reifenhäuser offers an ecologically and economically alternative for packaging production.

In recycling, new raw materials are obtained via a mechanical (typically leading to regranulates) or chemical (typically leading to monomer building blocks) pathway. Globally speaking, mechanical recycling is the most used method at present.

Chemical recycling is more complex and expensive. Nevertheless, more chemical recycling projects have become real-world things, ready to be alternative solutions for mechanical recycling.


SABIC's certified circular polymers are produced by using a pyrolysis oil feedstock from the recycling of mixed plastic waste. These products are to be supplied to leading brands for the development of high quality and safe consumer goods or packaging.

With the ChemCycling project,

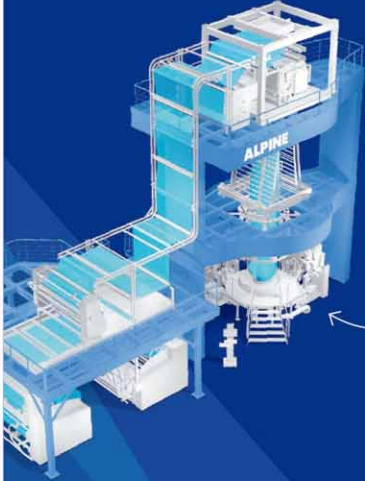
BASF also aims to process pyrolysis oil derived from plastic waste that currently cannot be recycled. During the pilot phase, BASF and its partners successfully created some prototypes. The company is developing the project to market readiness now.

Deeper digital integration unfolding more potential

Industry 4.0 has been the buzz word in the plastics processing sector, allowing plastics processors to harvest production data for more efficient production. Thanks to


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massive investments in R&D, machine manufacturers are able to achieve a deeper integration of digitalization in conventional production technology.

For example, the advancement of interface technology facilitates better communication between injection molding machines and higher-level MES (Manufacturing Execution System) systems or other downstream modules in one production unit.

In wake of these developments, digital control systems, Apps and services further help speed up and simplifying the production start-up, providing real-time and interactive support for operators, making production processes more efficient and flexible.

A significant number of latest solutions will be showcased at the fairgrounds. Sumitomo (SHI) Demag Plastics Machinery will release its myConnect web-based software solution, providing a central platform to access a wide range of fully connected support services.

For several years, the injection molding machine manufacturer has been developing its digital capabilities that enable molders to collect data to assist with internal production logistics, quality and efficiency. All of these R&D efforts have culminated in the modular system myConnect.

The innovative and secure myConnect service package comprises five modules: mySupport, myDocumentation, myPartsShop, myConnectApp, myLifeCycleLog. Additional modules are also currently in development.

The new KraussMaffei App, Social

Production, uses the advantages of social media for a completely new type of production monitoring.

The patent-pending process identifies process disturbances autonomously based on underlying data, without any user configuration, and provides tips on possible solutions for troubles. The system is compatible with all commercially available injection molding machines.



KraussMaffei commands digital tools, such as the DataXplorer, which shed light on production efficiency.

The industrial messenger function of Social Production is intended to replace messenger programs such as WhatsApp or WeChat, which are used mostly in a semi-official capacity. Social Production simplifies and accelerates communication in production and makes collaborating with colleagues more efficient.

Apart from injection molding machines, other machines and auxiliary equipment are also adopting digitalization to a greater extent. For film production, Brückner Servtec is continuously working on further developments of the Brückner ONE digital service.

As introduced, the new Brückner ONE service opens the future for intelligent film production, and features a Secured Remote Access

to the line for highest data security. It is equipped with enhanced modules for service requests, spare parts inquiries, communication and line documentation.

Lightweight engineering and e-mobility at center stage

Even after decades of intense scientific and industrial application, lightweight engineering is still considered a crucial factor in the reduction of energy and fuel used for mobility. Meanwhile, the electro mobility (e-mobility) revolution also offers a fleet of opportunities for lightweight high-performance materials.

Therefore, machine manufacturers, producers of plastics and reinforcement products, research institutes and plastics processors continue to pouring over the development of new methods for the stabilization and large-scale production of lightweight components for automotive applications.

Among many materials, polyamides are gaining popularity and in great demand for lightweight applications in vehicles. In view of this, Asahi Kasei is developing the PA Foam, a foam material based on polyamide.

PA Foam consisting of round-shaped beads features a strong rigidity, making it a promising alternative material for metal in structural applications, as well as for use for insulators, ducts, spacers, or other lightweight parts of the battery case of electrified vehicles.

PA Foam with a C- or macaroni-

shape provides noise insulation in addition to the typical polyamide properties.

With growing demand for e-mobility, electromagnetic interference (EMI) shielding and thermal management are increasingly important in delivering high-quality automotive electronic systems.

Conventional metal enclosures are used to house electronic control units



The e-mobility revolution opens opportunities for lightweight and high-performance materials. (Photo: WBCSD)

and battery management modules. However, these are heavy and drive fuel consumption.

DSM's portfolio of conductive plastics with shielding efficiencies of around 40-60dB of plastic thickness, for example, can lead to weight reductions of up to 50% while offering protection from EMI.

Polyplastics is also exploring new materials to replace metal in PCU housings. In particular, the company is currently targeting materials with EMI shielding properties for electric vehicles applications.

3D printing gets popular

Faster generative production methods, lower equipment costs and new printing materials has led to a

significant improvement and rising popularity of 3D printing (additive manufacturing). Gone are the days when this technology was only used for prototype production.

3D printing is getting more popular in industrial applications as it allows an individualisation and the production of small batches of plastic products without using molds. At a rapidly growing rate, the medical sector continues to recognize the added value of 3D printing which satisfies many specific requirements such as complexity, lead time and multi-materials.

Automotive is another sector that represents huge potential for the technology, from manufacturing

(Continues on P.66)



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主宰未来的塑料技术大趋势

K 2019将全面展示解决塑料和橡胶行业所面对问题的最新技术和解决方案。展会特别聚焦几个中心主题，反映了目前行业内的技术热点及大趋势。

从气候变化到数字化，全球正面对着重大的挑战。塑料和橡胶行业将尽力为解决这些问题而做出贡献。因此，K 2019的中心主题包括了：

- 面向可持续发展和循环经济的塑料
- 工业4.0和增值链的数字化
- 系统集成：通过材料、工艺和设计实现功能，包括轻量化、交通（电子移动方案）、新材料和3D打印等。

循环经济全速发展

实现循环经济是当前全球的共同使命，塑料机械制造商和化学品生产商为此而开发更多先进的创新技术解决方案。在展会上，多个展商将演示不同的回收过程，处理不同种类的废塑料，预计总共回收的废塑料将多达30多吨。

在其中一个演示中，Braskem将向考特斯（Kautex）提供其创新的“我是绿色”（I'm green）聚乙烯生物塑料和回收再生树脂，用于生产含有泡沫中间夹层的三层高密度聚乙烯

瓶。考特斯然后将瓶子交给埃瑞玛（EREMA）进行完全回收。通过这一举措，三家公司实现了塑料的闭环回收。

Braskem的技术提供具有较好加工特性、气味较少的材料，而考特斯在现场生产的塑料瓶，其原材料一部分来自甘蔗，另外一部分则是消费后回收的再生造粒。据悉，使用每公斤“我是绿色”聚乙烯，可减少5公斤二氧化碳。

在循环经济的大趋势下，包装薄膜及其生产工艺也必须更具可持续发展性。因此，知名薄膜拉伸和吹膜生产线制造商正致力于研发如何生产更高回收价值的薄膜。应对这一挑战的新兴技术趋势之一，就是具有优异性能的可回收单一材料包装薄膜。

包装薄膜通常由PET和PE层压复合材料组成。加入PET可使薄膜拥有足够的刚度，便于后序加工，单独使用PE则后序加工较困难。但是，这种复合材料无法回收。

莱芬豪舍（Reifenhäuser）将以其著名的EVO Ultra Stretch展示其加工PE的创新解决方案。该薄膜拉伸系统（MDO）已经在卫生行业的透气背衬薄膜工厂获得成功应用。

据介绍，MDO在牵引装置中的定位是一个关键因素，优点在于塑料可以利用初始热量拉伸到4至6倍的程度。由于冷却通道较长，所以工艺稳定性较高，收缩较小。所生产的薄膜可以回收，且密封性能较好，是替代PET的可持续方法。

在回收再生过程，可通过机械方法（通常制成再生料）或化学途径（通常制成单体单元）获得新原料。整体而言，机械回收是目前最常用的方法，因为化学回收过程较为复杂，成本也较高。然而，最近已越来越多有关化学回收的项目成为现实，准备成为机械回收的替代解决方案。

深度数字化展现巨大潜力

工业4.0是塑料加工行业的热点，塑料加工厂商利用相关技术可以收集生产数据，提高生产效率。由于大量投资在研发上，所以机器制造商成功在传统生产技术中更深层次地整合数字化技术。

例如，介面技术的进步促进了注塑机与更高级别的制造执行系统（MES）或生产单元中其他下游模组之间更好地连通。

K 2019便将展示大量最新数字化解决方案。其中，住友德马格（Sumitomo (SHI) Demag）将发布其基于网络的软件解决方案myConnect，提供一个可访问各种完全连接支持服务的中央平台。

高安全性的创新myConnect服务包设有五个模组：mySupport、myDocumentation、myPartsShop、myConnectApp、myLifeCycleLog，而更多模组也正在开发之中。

Social Production是克劳斯玛菲（KraussMaffei）最新开发的App，其利用了社交媒体的优势进行全新的生产监控。它的工业信息功能旨在取代微信等App，因为这些主要以半官方身份使用。

该项正在申请专利的工艺可基于底



考特斯的全电动KBB60吹塑机将在K 2019现场，以绿色材料生产三层高密度聚乙烯瓶。

层数据，自主识别工艺干扰因素，无需进行任何用户配置，并可提供故障的可能解决方案。该系统更与所有市售注塑机相容。

除注塑机外，其他机器和辅助设备同样地在更大程度上采用数字化技术。在薄膜生产线，Brückner Servtec 便不断进一步开发其Brückner ONE数字化服务。

据介绍，新型Brückner ONE服务开辟了智能薄膜制造的未来，配有生产线Secured Remote Access，可实现最高的数据安全性。其配备有用于服务请求、备件查询、通信和生产线档等的增强模组。

轻量化材料和电子移动方案方兴未艾

经过多年来在工业领域的大力应

用，轻量化被认为是降低车辆能源和燃油消耗的关键因素。

同时，电子移动革命也为轻量化高性能材料提供了大量机会。因此，机器制造商、塑料和增强产品生产商、研发机构和塑料加工商都继续开发能够大规模生产轻量化部件的新工艺。

在众多材料中，聚酰胺是越来越受重视的其中一种，而且车辆中轻量化产品对聚酰胺的需求很大。有鉴于此，旭化成（Asahi Kasei）正在开发产品PA Foam，其为一种基于聚酰胺的泡沫材料。

含有圆形泡孔的PA Foam具有很强的刚性，是结构部件中金属材料及电动车辆电池盒绝缘体、导管、垫片或其他轻质部件的替代材料。

至于含有C形或通心粉形泡孔的PA Foam，除了具有典型的聚酰胺特性外，还具有隔音功能，可用于汽车的

各个部分，特别是用于发动机舱内。

随着对电动交通需求的不断增长，电磁干扰（EMI）遮罩和热管理在高质量汽车电子系统中变得越来越重要。

目前金属外壳用于封装电子控制单元或电源和电池管理模组，对这些元件进行保护。

然而，这些传统金属外壳重量很大，对于纯燃油或混合动力汽车而言会增加燃油消耗和碳排放量，对于纯电动汽车则在牵引和驾驶体验方面存在不足。

针对这方面，帝斯曼（Royal DSM）的导电塑料系列可替代全金属外壳，塑料厚度的遮罩效能约为40-60dB，可防止EMI，并能减轻高达50%的重量。

此外，宝理塑料（Polyplastics）也在探索新材料，以取代PCU外壳中的
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Southeast Asia to bloom for years to come

Bracing for further headwinds in the months to come, mature economies are pointing their compasses towards Southeast Asian countries, and it is no exception for the plastics industry.

As a single market, Southeast Asia is very attractive for key industries, including automotive, packaging, construction and medical devices. Southeast Asia's plastics market is expected to register a CAGR of 5.5% from 2018-2023, according to a report by Mordor Intelligence.

The region is embracing salient issues relating to fuel efficiency, through development of its electric vehicle (EV) industry; plastics waste reduction through a recycling infrastructure; and adoption of smart manufacturing via Industry 4.0 initiatives.

After analyzing the latest market growth, opportunities and challenges in the Southeast Asian plastics industry, Messe Düsseldorf recently published a report in which the outlooks of major application sectors and circular economy are discussed in detail.

Flaunting automotive manufacturing capabilities

To remain competitive, Southeast Asia needs to measure up with the global automotive demand, says the Messe Düsseldorf report. Despite a recent downturn in the year, it is a logical comment as the global automotive sector is undergoing

transformation to future mobility with increasing demand for new materials despite a recent downturn

The region produced over 4 million vehicles in 2018, and averaged a 7.6% growth in production and sales, from January to November of the year, according to the ASEAN Automotive Federation (AAF).

As the region's largest producer of vehicles (commercial and passenger vehicles), Thailand is a manufacturing haven for global automobile makers including Toyota, Ford, Honda, BMW, Mercedes and more, which have set up factories in the country.

Thailand produced 2.16 million units in 2018, up by 9% from the previous year. Meanwhile, the full year

vehicle sales in Thailand increased 19.2% year-on-year to 1 million units in 2018.

Second in rank in production is Indonesia, which produced over 1.24 million units, up 9.9% from 1.13 million units a year ago, according to the AAF data. As well, Indonesia remained the largest market for vehicles in 2018, having sold 1.06 million units in the 11 months to November, up 6.9% over the same period a year ago.

Plugging into electric vehicles

Southeast Asia, where vehicle, industrial and biomass burning are main reasons for degrading air quality, is progressing towards low carbon transport.

As of last year, 357 vehicles were petrol-electric plug-ins while 466 were pure electric, of the 614,937 vehicles registered in Singapore. Nevertheless,



The economic growth of Asian region will have a ripple effect on the global plastics industry.

the country is one of a few in the world with both an electric car-sharing scheme and an electric taxi fleet. It is also expected that 60 electric buses will ply public bus routes by 2020.

Elsewhere, Thailand, Malaysia, and Indonesia have formed respective EV roadmaps to build an integrated EV ecosystem to support private investments across the value chain.

Under its Electric Vehicle Promotion Plan, part of the Thailand Alternative Energy Development Plan 2012-2021, Thailand has progressed from having 60,000 hybrid passenger vehicles and 8,000 battery electric motorcycles in 2014 to 102,000 hybrid vehicles and 1,400 battery electric vehicles in 2018.

Indonesia has delved deeper into

the issue of adoption, pushing its goal for 20% of all locally manufactured vehicles to be electric by 2025. It is targeting 2.1 million units of two-wheeler EVs like e-motorcycles and 2,200 units of four-wheeler vehicles by 2025.

Under its National Green Technology Master Plan and the Electric Mobility Blueprint (EMB),



The number of electric vehicles has been on the rise in Southeast Asia.

Malaysia envisages by 2030, it will have 100,000 electric vehicles on the road, along with 2,000 electric buses and 125,000 charging stations.

Still, the region has to tackle the slow take-up rate of EVs due to unattractive incentives, higher prices of EVs, compared to petrol engine equivalents, and lack of availability of charging infrastructure, with the Frost & Sullivan findings indicating that governments have a critical role to play in promoting EV usage.

Top scorers in packaging

The Asian flexible packaging market is poised to reach a CAGR of 5.7% to US\$6.7 billion from 2016-2024, according to a Transparency Market Research sector forecast,

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driven by growth and increasing disposable incomes.

Thailand, touted as the “Kitchen of the World” for drawing importance on its food and agriculture sectors, has one of Asia’s most advanced food processing segments. The Thai packaging industry is expected to grow to 63.1 trillion units in 2020 from

51.3 trillion units in 2017, registering a CAGR of 4.2%, says Global Data.

Indonesia is, likewise, is predicted to lead in the flexible packaging market in the region, with food packaging accounting for 70% of plastics consumption, according to Transparency Market Research.

The high food and beverage

sales also back the growth of the Indonesian plastics market, forecast to witness a CAGR of 6.23% in a Mordor Intelligence report spanning 2018-2023.

In Indonesia, flexible packaging occupied a market share of 42% in 2016, and is forecast to reach 52 billion units in 2021, at a CAGR of

Powerhouses facing challenges and uncertainties

China striving to boost further development

China continues to be one of the most significant countries in all plastics industry segments.

The report of the China Plastics Processing Industry Association shows that, there were 15571 enterprises above designated size in the industry in 2018, with main business revenues of RMB 1806.18 billion, representing an increase of 5.04% year-on-year (YOY).



Many Chinese plastics machinery manufacturers grow their businesses by developing new markets.

Meanwhile, there were 447 enterprises above designated size in the plastics machinery industry from January to April 2019, of which 109 were loss-making enterprises, representing an increase of 14.74% YOY.

German plastics machinery anticipates 10% drop

In Europe, the plastics industry is facing challenges on several fronts. According to the forecast of VDMA Plastics and Rubber Machinery Association, there will be around 10% drop of turnover for the German plastics and rubber machinery industry in 2019.

Ulrich Reifenhäuser, Chairman of VDMA Plastics and Rubber Machinery Association, pointed out at a round table talk during the K Preview conference, that two application sectors are in particularly critical: automotive and packaging. For the automotive industry, the current market is uncertain; while in the packaging industry, a serious challenge for circular economy is posted.

Italian machinery sector expects a trend inversion

For the Italian plastics machinery industry, after a record-setting 2017, the year-end results for 2018 continued the positive trend, according to Amaplast (Italian plastics and rubber processing machinery and

moulds manufacturers' association).

At somewhat more modest level, production has continued to show growth; while exports, which have always been the engine for the sector, showed only a slight contraction.

Amaplast President Alessandro Grassi commented that 2018 may turn out to be a transition year. Beyond the normal realm of economic cycles, it leads to the expectation of an inversion of trend in 2019 after eight years of positive growth.

Positive outlook in the US

The MAPI Foundation (Manufacturers Alliance for Productivity and Innovation) forecasts that the US manufacturing as a whole will grow by an average of 2.8% per year between 2018 and 2021, and the spending on capital equipment will increase by an average of 6.8% annually during that period. This is good news for the US plastics industry.

However, the US chemical industry is in the crosshairs of escalating trade tensions between the US and China that have spawned tariffs on hundreds of products.

4.3% during 2016-2021. Nevertheless, rigid packaging snapped up a sizeable market share in 2016, accounting for nearly 25% of the market, and is expected to grow at a CAGR of 7.7% by 2021.

With over 1,500 plastics production companies, Malaysia's plastics market is driven by packaging. Citing data from Statista, Malaysia's food and beverage segment is predicted to earn US\$268 million in 2019, and is expected to grow annually at a CAGR of 18% to US\$520 million by 2023.

Putting recycling at the top of the agenda

The booming plastics and packaging sectors in Southeast Asia have resulted in a growing waste

problem. According to the Ocean Conservancy environmental advocacy group, and based on the findings of the Science journal, more than half of plastics that end up in the oceans come from five countries: China, Indonesia, the Philippines, Thailand, and Vietnam.

With China's ban on the import of most global recyclable plastics last



Circular economy is high on the agenda of many Southeast Asian countries.

year, to develop its own domestic recycling capacity, Southeast Asia has become a dumping ground for plastic waste from other countries. While Thailand, Vietnam and Malaysia have started to enforce import bans on plastic waste, further legislation is required to stem the tide.

As the second largest contributor to the plastic waste crisis in the oceans, trailing only behind China, Indonesia has a monumental task to tackle. It expects to reduce the amount of plastic it leaks into the oceans by 70% by 2025, through product packaging redesign, use of recyclable materials, and adequate waste management.

The country has a "sizeable"

(Continues on P.32)

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SEEDS

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东南亚市场未来数年前景可期

全球的成熟经济体系及不同行业，都正在放眼东南亚国家的急速发展，寻求具潜力的投资机会，以应对未来短期内或许出现的经济回落，而塑料行业也不例外。

作为一个独立市场经济体，东南亚对汽车、包装、建筑和医疗设备等关键领域极具吸引力。根据Mordor Intelligence的一份报告，2018年至2023年期间，东南亚塑料市场复合年增长率预计将达到5.5%。

杜塞尔多夫展览公司最近发布了一份报告，分析了东南亚塑料行业的最新市场增长、机遇和挑战，详细讨论了主要应用领域和循环经济的前景。

汽车行业持续向上

尽管近期汽车市场出现下滑趋势，但由于全球汽车行业正在向未来电动汽车转型，所以对新材料的需求仍在不断增加。

根据东盟汽车联合会（AAF）的数据，2018年该地区制造了超过400万辆汽车，从2018年1月至11月，平均产销量增长了7.6%。

有“亚洲底特律”之称的泰国是东南亚最大的汽车（商用和乘用车）生产国，2018年生产了216万辆，同比增长9%；全年汽车销量按年同比增长了19.2%至100万辆。

根据AAF数据，汽车产量于东南亚排名第二的印尼，2018年产量超过124万台，比上年的113万台增长了9.9%。

电动车发展强劲

汽车、工业和废物焚烧是导致东南亚空气质量下降的主要原因，也促使该区向低碳减排运输方向发展。

新加坡陆路交通管理局表示，该国是世界上少数拥有电动汽车共用计划和电动计程车的国家之一，预计到2020年将有60辆电动公车将规划到公共汽车路线中。

另外，泰国、马来西亚和印尼已经

制订了各自的电动汽车路线蓝图，致力于建立一个综合的电动汽车生态系统，以支持横跨整个价值链的私企投资。

根据泰国“电动汽车推广计划”，该国已发展到2018年拥有102,000辆混合动力汽车和1,400辆纯电动汽车的规模。

印尼在电动车辆应用方面已进行更深入的研究，旨在到2025年，将20%的本地制造汽车电动化，具体目标是到2025年生产210万辆两轮电动车如电动摩托车等和2,200辆电动汽车。

马来西亚投资发展局表示，根据国家绿色技术总体规划和电动交通蓝图，马来西亚期望到2030年，将拥有10万辆电动汽车，以及2,000辆电动公交车和125,000个充电站。

尽管如此，由于激励措施不够吸引、电动车比同类传统燃料汽车价格更昂贵，以及缺乏充电基础设施等因素，东南亚必须解决电动汽车的缓慢普及率。

包装市场蒸蒸日上

根据Transparency Market Research的预测，受经济及可支配收入增加的推动，亚洲软包装市场有望在2016-2024年间，以5.7%的年复合增长率，达到67亿美元的市场规模。

泰国素有“世界厨房”之称，向来重视发展其食品及农业领域发展。Global Data研究公司称，泰国包装业2017-2020年预计复合年增长率为4.2%。

在印尼，食品和饮料的高销售额支持了该塑料市场的增长。Mordor Intelligence市场报告（2018-2023年）指出，印尼的塑料市场的复合年增长



泰国是东南亚的汽车制造大国。

塑料强国面临不确定性和挑战

中国致力推动进一步发展

中国塑料加工工业协会的报告显示，2018年全国塑料制品行业15,571家规模以上企业完成主营业务收入18,061.75亿人民币，同比增长5.04%。

同时，2019年1-4月，中国塑料机械工业规模以上企业447家，其中亏损企业数目为109家，同比增加14.74%。中国塑料机械制造商正在努力提高国内需求，并开发新兴市场。

此外，目前中国正在降低制造业和其他主要行业的增值税税率，以减轻企业的税负，提高企业的盈利能力。

德国塑机营业额或降10%

在欧洲，塑料行业正面临不同方

面的挑战。根据德国VDMA塑料和橡胶机械协会的预测，2019年德国塑料和橡胶机械行业的营业额将下降约10%。

VDMA塑料和橡胶机械协会主席Ulrich Reifenhäuser指出，汽车和包装这两个应用领域尤其重要。对于汽车领域而言，目前的市场面临不确定性；包装领域则正面对循环经济的严峻挑战。

意大利协会预测增长趋势反转

意大利塑料橡胶机械设备和模具制造商协会（Amaplast）指出，对于意大利塑料机械行业而言，经过创纪录的2017年，2018年的年末业绩继续呈

现积极趋势，产量继续以更适中的水平呈现增长，而一直是该行业引擎的出口只表现出轻微收缩。

Amaplast主席Alessandro Grassi表示，2018年是一个过渡年，由于八年的正增长已超出正常的经济周期范围，所以预期增长趋势在2019年或将反转。

美国前景正面

根据生产力与创新制造商联盟基金会预计，2018年至2021年间，美国制造业对固定设备的支出将平均每年增长6.8%。

然而，美国化工行业正处于中美贸易局势的十字路口，而此局势已经催生了数百种产品关税。

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率将达到6.23%。

马来西亚塑料市场由包装应用领域驱动而增长。根据Statista的数据，马来西亚的食品和饮料行业预计2019年收入将达到2.68亿美元，并将以18%的年复合增长率持续增长。此外，制药行业也在推动包装业的增长。

迫在眉睫的废料问题

东南亚蓬勃发展的塑料和包装行业产生了日益严重的废料问题。根据海洋保护环境宣传小组以及《科学杂志》的调查，超过一半的塑料废弃物最终流入海洋，这些废弃物主要来自中国、印尼、菲律宾、泰国和越南五个国家。

与此同时，随着中国禁止进口全球大部分塑料固体废弃物，以发展国内回收产能，东南亚已成为其他国家塑料废物的倾倒地。

泰国、越南和马来西亚已经开始对废塑料实施进口禁令，但由于非法塑料回收工厂的兴起，在执法过程中，还需要进一步立法来遏制这一趋势。

(Continued from P.29)

recycling industry, with about 1.1 million tonnes/year of plastic waste recycled, yet the recycling rate remains low at 20%, says the newly formed Indonesia Plastics Recyclers.

With Thailand producing around 3 million tonnes/year of plastic waste, the country has established a 20-year strategy, which includes banning the use of thin single-use plastic bags by 2022, followed by single-use plastic cups and straws in 2025.

Neighbouring country Malaysia has charted a zero-waste plan that aims to abolish single-use plastics by 2030. In the Philippines, a ban on single-use plastics also came into effect in government offices, with



东南亚的包装市场持续增长，前景广阔。

印尼承诺投资10亿美元，其中包括向世界银行申请的1亿美元贷款，来治理废塑料问题。印尼将通过重新设计产品包装，使用回收材料和适当的废弃物管理，预计在2025年之前，将流入海洋的塑料废弃物减少70%。

根据泰国污染控制部门起草的计划，该国制定了一项20年战略，包括到2022年禁止使用一次性薄塑料袋，到2025年禁止使用一次性塑料杯和吸管。

马来西亚制定了“零浪费计划”，旨在2030年前废除一次性塑料。菲律宾对其政府办公室开始实行一次性塑料禁令，地方政府也在其他城市实施零塑料政策。

plastic utensils, bags and straws banned.

Going full circle

The five Asian countries of Indonesia, the Philippines, Vietnam, Thailand and Malaysia collectively produce 8.9 million tonnes/year of mismanaged plastic waste.

As Southeast Asia moves on a trajectory path, in its plastics industry growth, sustainability cannot be achieved without altering the current systems of plastics management and consumption, concludes the Messe Düsseldorf report.

Today, a more expansive approach is sought to incorporate design and enable technologies to maximize the

展望东南亚回收行业

印尼、菲律宾、越南、泰国和马来西亚这五个亚洲国家每年都会产生890万吨管理不善的塑料废物。

杜塞尔多夫展览公司的报告总结道，随着东南亚的塑料行业已走上快速发展轨道，如果不改变现有的塑料管理和消费体系，该行业将难以实现可持续发展。

通过推行塑料袋禁令和征税政策来处理垃圾堆积对环境的影响，可能不再如预期般那样有效。现在，更广泛的方法是寻求结合设计和能够实现材料“物尽所能”的技术和解决方案。

引入循环经济模式旨在通过材料的再利用以及主要应用领域（汽车、建筑、包装等）的材料回收来抑制浪费的经济模式。

非政府组织循环经济亚洲表示，如果政策制定者现在接受循环经济，预计2050年亚洲将实现完整的资源循环，即消除垃圾填埋，转移可回收资源进行再处理，生产100%的可回收塑料。

value of materials. Bringing into the fold is the circular economy model that aims to curb wastage through reuse of materials as well as recyclability of materials in major sectors.

Meanwhile, targets have been set in the newly formed sustainable framework led by Malaysia-based NGO, Circular Economy Asia, to consolidate efforts for Asia to tackle its waste leading to a circular economy.

CEA says that if policy makers embrace the circular economy now, it is expected to come full circle for Asia in 2050, through the elimination of landfilling with the diversion of recyclable resources for reprocessing and with the production of 100% of recyclable plastics.

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and more...

Experience Kiefel's new generation of KMD Speedformer live

 Hall 3 / E90

Kiefel's new Speedformer KMD 78.2 Speed will be performing live at K 2019. The new generation of Kiefel steel rule machines offers the usual quality with even greater productivity and energy efficiency.

In addition to common materials and products, the new system can also process novel film materials and produce even complex products whilst consuming a minimal amount of energy.

As introduced, the heating system is ready for use within a very short time and excels with a 20% higher heating capacity despite reduced energy consumption. In combination with the servo drives' energy recovery system this leads to considerable energy savings.

The new KMD generation also saves films. A newly developed film feed table safely and gently guides the film to the film transport system. The proven station drives stabilize and work symmetrically.

The further optimized forming air vacuum system enables customers to produce superior molded parts. The ergonomic tool change systems can

significantly shorten set-up times. The many improvements and details add up to significantly increase the up-time of the KMD 78.2 Speed.

Pictograms and graphics, some animated, support the adjustment of machine parameters. If necessary, they aid fault diagnosis and rectification as well. The new KMD generation only needs a few parameters to be input, the rest are automatically determined by installed algorithms.

KTR 5.2 Speed also on stage

Kiefel has also focused on the continued development of the tried-and-tested cup-forming machines for the KTR 5.2 Speed. Visitors are offered to experience the new generation.

Optimizations were done along the entire KTR 5.2 Speed cup-forming system, starting with film transport via the heating, forming station, forming air supply, tool cooling, tooling and tool



The new generation of KMD Speedformer thermoforming machine.

change through to the new stacking system with downstream automated carton packaging.

A planetary gearbox with a water-cooled servomotor improves drivetrain rigidity whilst reducing vibration throughout the system. In addition, the new motor-gearbox combination permits up to 50 cycles per minute and increases the punching force to 400 kN.

The enlargement of the usable molding surface results in an increase in the number of cavities in the tool. Optimized rapid tool change reduces downtime. Flow-optimized forming air lines fill the cavities consistently and reduce the filling time by 25% and the venting time by 30%.

SOREMA's pre-washing lines improve PET bottle recycling efficiency

 Hall 9 / D55

SOREMA (a Previero Division) will be presenting the new plastic post-consumer recycling technologies in Düsseldorf.

The third generation of SOREMA's advanced pre-washing



The pre-washing line of SOREMA.

lines with different throughput represents an innovative technical development of the company's R&D market oriented solutions.

The system allows to process both with hot and/or cold water the most contaminated bales of PET bottles, converted into high quality rPET flakes, reducing the operative costs with lower consumption of the energy, chemicals and water.

Thanks to the combined action of a centrifuge with a ballistic separator, the system decontaminates the surface and removes the labels of the bottles with minimum loss of material. Moreover, the process does not allow the water to enter the bottles.

The possibility to run clean bottles without labels and free from water dripping improves the efficiency of the whole recycling operation, allowing the sorting and grinding of cleaned material after the pre-wash phase.

Other very important advantages of the new SOREMA pre-washing technologies are minimization of wearing parts, easy maintenance operations and low maintenance costs, as well as considerably reduced space requirement.

A total of seven companies representing EREMA under one roof

 Hall 9 / C05

For the first time, a total of seven companies and business units: EREMA, POWERFIL, KEYCYCLE, PURE LOOP, 3S, UMAC and PLASMACH, will be representing the EREMA Group under the motto "Seeds for your performance".

The VACUNITE bottle-to-bottle technology will be headlining the show. It is a combination of the proven VACUREMA process with newly patented, vacuum-assisted solid state polycondensation (SSP) by Polymetrix for the production of food-grade rPET pellets.

In the in-house and industrial sectors, the new INTAREMA ZeroWastePro system is a compact solution that is precisely tailored to the requirements of recycling production waste. The optimized design of the machine makes integration into the existing process chain even easier and enables significantly shorter delivery times for customers.

PURE LOOP, an EREMA subsidiary in the shredder-extruder technology segment, will be displaying the new ISEC evo series as a supplement to its existing product range. This will enable output of more than 1,500 kg/h to be achieved for the first time.

And in post-consumer applications, the focus is on an increasingly diverse range of applications for high-quality recycled materials using contaminated plastic waste that can be processed

using innovative EREMA recycling technology.

EREMA will also be demonstrating its pioneering role in relation to industry 4.0 applications. BluPort, a newly developed customer portal, brings together decision-relevant information and service offers for customers in a clear and user-friendly way.



The new technology VACUNITE is a joint development of EREMA and Polymetrix.

SIKORA to showcase numerous premieres

 Hall 10 / H21

SIKORA will present a broad portfolio of innovative systems for quality control and process optimization for hose and tube, sheets as well as plastics industries.

CENTERWAVE 6000 for measurement of hose and tubes

With the world premiere of the CENTERWAVE 6000/1600, SIKORA will present a measuring system of a new

dimension. The system was developed especially for quality control of plastic tubes and pipes during extrusion.

Due to its design, the system offers a precise measurement of tubes with a diameter from 630 to 1,600 mm. The CENTERWAVE 6000 is based on innovative millimeter wave technology and measures continuously and completely over 360 degrees of the circumference, wall thickness, diameter, ovality, inner profile and the sagging.

Nominal dimensions are quickly reached, start-up scrap is avoided, the highest quality guaranteed and processes are optimally controlled. Furthermore, the system does not require any coupling media. It measures precisely and independently to external influences, and does not require calibration.

Optical lab testing system PURITY CONCEPT V

With the K premiere of the PURITY CONCEPT V, SIKORA will present an

optical laboratory testing system for plastic material. The system is an automated light table where plastic pellets, placed onto a sample tray, are being moved through the inspection area.

Within seconds, the material is inspected by a color camera. A projector optically marks all contaminated pellets directly on the sample tray. By evaluating the images, contamination, like black specks, from a size of 50 µm on the surface of transparent, diffuse and colored material are automatically detected, visualized and statistically evaluated. Another feature of the system is the automatic detection of color deviations of the pellets.

Customers have already been invited before the start of the show to send in pellet samples free of charge, which will be inspected and analyzed with the PURITY CONCEPT V directly at the booth. Alternatively, visitors can bring a small number of pellets directly to the booth for inspection and evaluation.



The PURITY CONCEPT V will be presented at K 2019.

Maguire introduces ULTRA dryer with huge energy saving

 Hall 10 / A26

ULTRA Low Energy Dryer is based on technology introduced by Maguire in 2013 under the name VBD. The manufacturer will formally introduce the brand at the show.

As introduced, the dryer uses energy to dry resin at a drastically lower rate than a comparable new desiccant dryer.

For example, in a typical material drying example for a process running at 220lb (100kg) per hour, for 6,000 operation hours per year, an average desiccant dryer might run at 60 watts per pound of material, versus the ULTRA that would run at 19 watts per pound.

As explained, each system uses the same amount of energy to bring the material up to temperature from ambient temperature – around 15 watts. This is the energy used to HEAT. However, the energy used to DRY is dramatically different.

The desiccant dryer would use a further 45 watts to DRY the material so it can be processed, whereas to the same level the

ULTRA would only use 4 watts – a 10 times difference in energy usage.

When translating to a direct saving and return on investment, the result is dramatic. If an average kW price is US\$0.12, then the energy bill for the desiccant dryer per annum is US\$7,128, versus US\$633.60 drying the same material with an ULTRA Low Energy Dryer. Over the course of an average lifespan of a dryer, that equates to US\$64,944.

ULTRA Low Energy Dryers are available for throughputs of 150, 300, 600, and 1,000 lb/hr (68, 136, 272, and 454 kg/hr).



ULTRA 600 Low Energy Dryer.

A total of 20 Arburg machines on stage

 Hall 13 / A13-1 – A13-2

Arburg's presence at K 2019 will focus on the topics of digitalisation and circular economy, providing answers to important and pressing questions for the plastics processing industry.

A total of 20 Arburg exhibits will cover a wide range of processes. Eight Allrounders and one freeformer will be demonstrating new machine technology as well as innovative applications at the company booth. Another 11 machines can be seen on partner booths.

A more digital showcase than ever

The company booth will offer more

digital Arburg world than ever before. At 10 interactive stations along the "Road to Digitalisation," visitors are able to learn more about "smart machines," "smart production" and "smart services".

The "arburgXworld" customer portal has been available to customers in Germany, and it will be available internationally in 18 languages as of the show.

On an Allrounder 570 A with a clamping force of 2,000 kN and Gestica control system, Arburg will demonstrate a particularly smart application. The new "Filling Assistant" is integrated into the control system, meaning that the Allrounder knows the molded part it is to produce – in this case a pair of Uvex goggles made of PA12.

At the Gestica control system, the degree of part filling, relative to the current screw position, is animated in real time as 3D graphic. The machine operator can compare the results of the simulation created offline with the filling performance of the last cycle interactively on the

Gestica monitor.

Circular economy in practice

Arburg will be presenting two applications on circular economy at the show. Around 30% recycled material is used in the production of cups with recycled PP provided by Erema. In a cycle time of around four seconds, eight cups are produced on a hybrid Allrounder 1020 H. This new size machine in the company's portfolio will be presented as a packaging version.

In the second circular economy application, a PCR material (post-consumer recyclate) derived from household waste is used to produce a technical product on an electrical two-component Allrounder 630 A in a Prof foam foaming process, the second material is TPE.

As introduced, numerous activities have been bundled in the new "arburgGREENworld" programme, which rests on four pillars. The first three pillars – "Green Machine," "Green Production" and "Green Services" relate to offers for customers, while the fourth pillar "Green Environment" includes Arburg's internal processes.



Arburg provides digital solutions with arburgXworld.

Coperion's two redesigned twin screw extruders take center stage

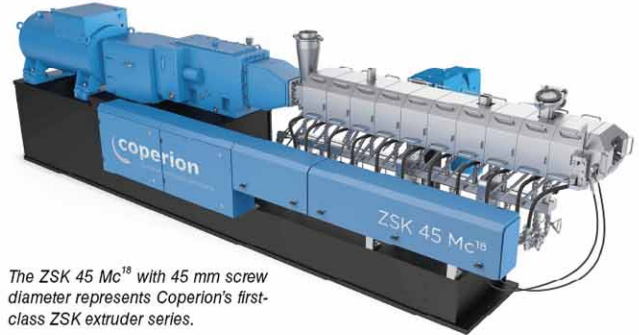
 Hall 14 / B19

In keeping with the motto "Making more out of your plastics," Coperion and Coperion K-Tron will demonstrate how plastics can be manufactured sustainably.

Front and center are two significantly re-designed high-end ZSK Mc¹⁸ type twin screw extruders. These two extruders are of 45 and 70 mm screw diameter and a specific torque of 18 Nm/cm³. Optimized mechanical and electrical features provide better operating comfort and even greater efficiency.

Both twin screw extruders are equipped with ZS-B easy type side feeders as well as ZS-EG easy type side devolatilization. Both the ZS-B as well as the ZS-EG significantly reduce the time needed for maintenance tasks, thanks to the easy design that enables quick removal from and re-installation to the process section for cleaning or screw changes with just a few hand movements.

The ZSK 70 Mc¹⁸ will be on display with a K3-ML-D5-V200 type vibratory feeder and an accompanying ZS-B easy with a K-ML-SFS-BSP-100 Bulk Solids Pump (BSP) feeder. The smaller ZSK 45 Mc¹⁸ will be equipped with a gravimetric K2-ML-D5-T35 twin screw feeder and an accompanying ZS-B easy with a K-ML-SFS-KT20 twin screw feeder for high accuracy feeding at low feeding rates.



The ZSK 45 Mc¹⁸ with 45 mm screw diameter represents Coperion's first-class ZSK extruder series.

European premiere of vibratory feeder

Coperion K-Tron's new vibratory feeder will celebrate its European premiere at K 2019. The K3-ML-D5-V200 vibratory feeder will be displayed in action as part of a recirculating system.

Vibratory feeders are ideal for feeding recycled material or flakes as well as for the addition of glass fiber in compounding processes. They are practically maintenance-free, since there is no wear on the mechanical parts.

Furthermore, the energy-efficient FLUIDLIFT ecoblue pneumatic conveying process for plastic pellets will be shown.

Plastics and Rubber Machinery



Circular Economy See it – feel it – join it

VDMA Pavilion at K 2019



ENGEL to debut two new iQ systems

 Hall 15 / B42 – C58

Circular economy will be one of ENGEL's focuses of presence. The injection molding machine manufacturer will showcase its contribution in processing recycled material, improving process stability, and the trend towards design for recycling.

Two new assistance systems to make world premiere

ENGEL is bringing smart factories to life with its inject 4.0 range. At K 2019, iQ



The iQ process observer continually analyses several hundred process parameters.

process observer and iQ melt control, will make their world premiere in Düsseldorf.

The iQ process observer continually analyses several hundred process parameters across all four phases of the injection molding process – plasticizing, injection, cooling and demolding.

The software automatically detects drifts by continually checking the results against the previous cycles, as well as comparing certain process parameters with a set reference condition.

Meanwhile, iQ melt control facilitates an even gentler plasticizing process, by determines the optimum plasticizing time for the application at hand. Instead of plasticizing at the maximum possible speed, the system makes full use of the component's in-mold cooling time for plasticizing.

The machine operator only needs to enter the screw type and the material to be processed. Next, along with the optimum plasticizing time, they receive recommendations for optimizing the temperature and back pressure.

Increasing recycled materials in sandwich-molded components

One further approach to using recycled materials more widely is sandwich components with a core of recycled material embedded in virgin material. The proportion of recycled material is essentially determined by the geometry of the molded part and the flow pattern in the cavity.

The transport boxes that ENGEL will be producing at its booth using the ENGEL skinmelt process pose a particular challenge in this respect.

Design for recycling means that the subsequent recycling process is taken into account as early as in the development of a new product. In the ENGEL organomelt process, fibre-reinforced prepregs with a thermoplastic matrix are overmolded. The entire composite component consists only of thermoplastic and glass fibres, and has the potential to be recycled.

At its booth, ENGEL will be showcasing the production-ready process with a demanding automotive application.

Sumitomo (SHI) Demag's star line-up to shine

 Hall 15 / D22

Sumitomo (SHI) Demag Plastics Machinery GmbH will unveil its fastest, most energy efficient, sustainable, data driven integrated machine line-up, which consists of five machines.

In addition, the company will launch a new eMultiPlug innovation and provide an interactive area where visitors can test out the latest smart diagnostic and support services using myConnect.

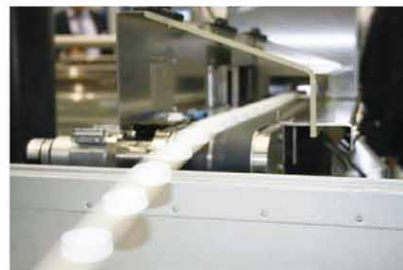
Consuming up to 20% less energy than its predecessors, Sumitomo (SHI) Demag will bring a large and a smaller version of energy-enhanced EI-Exis SP machines to the show.

Central to the machine's fast cycle time is the hydraulic accumulator, which achieves injection speeds of up to 1000 mm/s. This enables molders to produce even thinner packaging items.

Sumitomo (SHI) Demag will demonstrate a trailblazing, as-yet unseen, touchfoil interactive decoration for a vehicle console on a brand new IntElect 500 to be unveiled at the show.

Ranging now up to 500 tonnes, the new IntElect series combines precision, energy efficiency and much larger mold

space. As a result of the big tie bar spacing, increase in mold height and opening stroke, the new IntElect models accommodate larger molds, providing a less energy intensive machine for automotive applications.



In a live demonstration, water bottle caps will be produced on an EI-Exis SP.

The technical LSR know-how of the company and the process of molding light guides for a matrix light will be demonstrated on a special IntElect 130.

As introduced, the latest IntElect systems achieve extremely precise shot control with the low-viscosity material. Units feature a specially designed screw, ranging from 14 mm to 45 mm, a modified plasticising unit, a shut off nozzle specifically designed for LSR, and a spring loaded non-return valve to

achieve the highest processing consistency.

The IntElect S 180-tonne is another new machine to be unveiled. Aimed squarely at mass manufacturers of medical plastic components, the machine has been specially built for extremely narrow tolerance applications requiring fast cycle times between 3 and 10 seconds.

KraussMaffei to demo closed loop production under one big roof

 Hall 15 / C24 – C27

KraussMaffei is now consolidating all business divisions and its previous brands KraussMaffei, KraussMaffei Berstorff and Netstal within a single, unified brand: KraussMaffei. A new corporate design will be rolled out during K 2019.

KraussMaffei is deliberately committed to making a contribution to the development of a circular economy with new products and services. KraussMaffei will be linking its EXT (Extrusion), IMM (Injection Molding Machinery) and DSS (Digital & Service Solutions) business units at the show.

The newly presented GX 1100 injection molding machine with a clamping force of 11,000 kN will produce buckets made of



KraussMaffei is extending its successful GX series upwards by adding the clamping force size of 11,000 kN.

polypropylene, which will then be shredded externally and fed back into the material circuit as regrind.

Buckets of polypropylene with capacity of 20 liters each will be injected in two cavities and decorated by in-mold-

labeling (IML). The shot weight will be about 1,500 grams with a cycle time of just 14 seconds.

Under the EdelweissCompounding brand, a new high-performance ZE 28 BluePower twin-screw extruder will produce technically enhanced recomponds from it.

For this purpose, pigments and a 20% proportion of talc will be added to the polypropylene flakes. After underwater pelletizing and drying, the recomponds will again available at high quality and with property patterns adapted to the following injection molding application.

A material feeder will convey the polypropylene to the all-electric PX 320 injection molding machine, and then the polypropylene will be formed in the cavity into a panel for an A-pillar. The component surface will form an over-molded layer of fabric.

The launch of new B2B online platform - Polymore

Another highlight of the company is Polymore, a new B2B online marketplace for the purchase and sale of compounds, masterbatches, recycled material and post-industrial waste in Europe. The platform will be getting online right at the K show.

As explained, Polymore is a platform that welcomes everyone in the industry, not just KraussMaffei's customers.

WITTMANN BATTENFELD to present itself for the first time

 Hall 15 / C06

With an additional 120sqm of exhibition space at its disposal, WITTMANN BATTENFELD will exhibit its products and applications for the first time.

The main theme of WITTMANN BATTENFELD's presentation will be showcasing intelligent machines with adaptive algorithms, which adjust themselves to the ambient conditions.

This will be demonstrated with an all-electric EcoPower 55/350 equipped with the software packages HiQ-Flow, HiQ-Melt and HiQ-Metering. A W918 robot from WITTMANN and all auxiliary appliances connected with the machine, as well as the TEMPL+ MES system, are integrated in the machine's UNILOG B8 control system via WITTMANN 4.0.

WITTMANN BATTENFELD will show its latest further development of the vertical machine in PowerSeries design in the multi-component version.

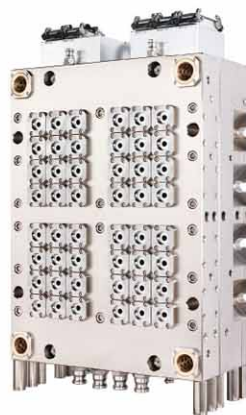
On a VPower 120/130H/210V, a plug

made of PA and TPE for the automotive industry will be manufactured with a 2+2-cavity mold.

In this application, a Scara robot and a WX142 linear robot from WITTMANN are used, which insert the wrap pins, transfer the preforms, then remove and deposit the finished parts.

Another new product at this year's K show will be a high-speed EcoPower Xpress 160/1100+ in a medical version.

On this machine with



Mold for blood tubes manufactured on an EcoPower Xpress 160 medical version.

1,600 kN clamping force, PET blood tubes will be produced with a 48-cavity mold.

To meet the stringent requirements for PET plasticizing, this machine has been equipped with a modified high-performance screw.

The tubes will be removed from the mold and deposited in transport boxes by the new WITTMANN high-speed robot.

With an example from the automotive industry, WITTMANN BATTENFELD will demonstrate its competence in CELLMOULD structured foam technology, which enables the production of extremely light-weight parts.

A second application for the automotive industry will be presented on a machine from the SmartPower series in XL configuration.

With a SmartPower 240 XL, a module for a car headliner with a functional surface will be produced with a single-cavity mold.

现场体验凯孚尔新一代KMD Speedformer

 展馆3 / E90

凯孚尔 (Kiefel) 新型Speedformer KMD 78.2 Speed将在展会上进行现场演示。除了常见材料和产品外, 该新一代系统还可以加工新型薄膜材料, 生产更复杂的产品, 同时能耗较低。

据介绍, 机器的加热系统在很短的时间内就可以达到使用状态, 尽管降低了能耗, 但加热能力却提高了20%。与伺服驱动装置的能量回收系统相结合, 可节省大量能源。

新一代KMD还能节省薄膜。新开发的薄膜送料台可安全、轻柔地将薄膜引导至输送系统, 经过实际验证的工位元驱动装置可稳定、对称地工作。

进一步优化了的成型空气真空系统, 让使用者能够生产品质优异的模塑产品。符合人体工程特性的模具更换系统则可以明显缩短设置时间。许多改进和细节相结合, 大幅提高了KMD 78.2 Speed的正常执行时间。

通过一些图形和动画可说明调整机器参数, 如有必要, 它们也可说明进

行故障诊断和纠正。新一代KMD只需要输入几个参数, 其余参数由安装的演算法自动确定。

改良版KTR 5.2 Speed隆重登场

凯孚尔也不断开改良过长期验证的KTR 5.2 Speed杯成型机, 观众将有机会在展会上体验经过改良的机型。

从薄膜输送开始, 再到加热、成型工位、成型空气供应、模具冷却、模具和工装更换, 直到配有下游自动纸箱包装设备的新型堆垛系统, 凯孚尔对整个KTR 5.2 Speed杯成型系统进行了优化。

配有水冷伺服 新一代KMD Speedformer热成型机。

电机的行星齿轮箱提高了动力传动系统的刚性, 同时减少了整个系统的振动。此外, 新的马达-变速箱组合可达到每分钟最多50个周期, 并将冲切力增加到400 kN。

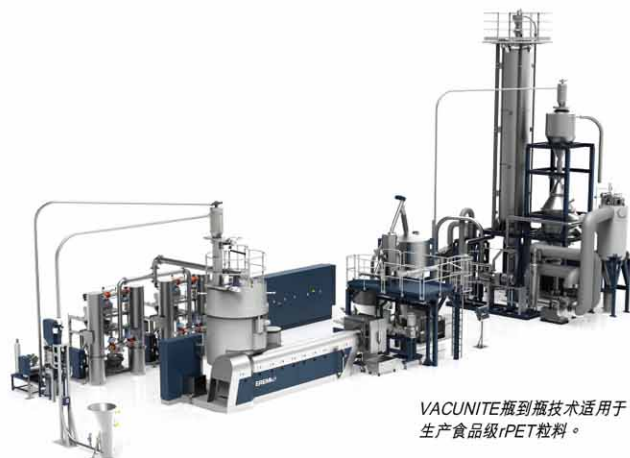
扩大了可用的成型表面, 从而增加了模具中的模腔数量。优化了的快速模具更换装置, 则减少了停机时间。优化了成型空气管路, 可以稳定地填充模腔, 填充时间缩短25%, 排气时间缩短30%。



埃瑞玛集团七家子公司同台亮相

 展馆9 / C05

作为塑料回收领域领先企业的埃瑞玛集团 (EREMA), 旗下七家子公司及业务单元EREMA、POWERFIL、KEYCYCLE、PURE LOOP、3S、UMAC与PLASMAC, 都会在K展上亮相。



VACUNITE瓶到瓶技术适用于生产食品级rPET粒料。

埃瑞玛预期, 将在展会上亮相的VACUNITE瓶到瓶技术会大放异彩。该技术是以成熟的VACUREMA技术, 与来自Polymetrix的专利新技术——由真空支持的固相缩聚 (SSP) 的结合, 用于生产食品级rPET粒料。

在工业废料回收领域, INTAREMA ZeroWastePro带来了崭新的高效解决方案, 优化的设备使现有生产过程衔接更加简便, 显著缩短了交付时间。

在撕裂-挤出的技术连接中, PURE LOOP推出ISEC EVO系列, 作为现有产品组合的补充, 其产量超过1,500公斤/小时。

埃瑞玛还将证明其在工业4.0应用方面的先锋作用。BluPort是一个新开发的客户门户网站, 为客户提供清晰、使用者友好的决策相关资讯和服务。

此外, EREMA Circonomic Center毫无疑问是展馆外的独特亮点。Circonomic是Circular和Economy结合而成的一个词, 代表了集团想要实现的目标, 即在塑料价值链中融入再生解决方案, 让行业、环境和社会能够获取经济和环境效益。

SOREMA预清洗生产线可提高PET瓶回收效率

展馆9 / D55

SOREMA (Previero的分公司) 将在杜塞尔多夫展示最新的消费后塑料回收技术。

具有不同处理量的第三代SOREMA先进预清洗生产线，是公司以市场为导向的解决方案的创新技术成果。

该系统可以使用热水和/或冷水处理重度污染的PET瓶，将其加工成高品质的rPET碎片，降低运行成本，同时减少能源、化学品和水的消耗量。

由于机器采用离心与冲击分离器的综合作用，所以可以净化瓶的表面，并去除标签，包括收缩标签，同时最大限度地减少材料损失。此外，该过程中不允许水进入瓶中。

由于在处理过程中瓶子清洁且没有标签，也没有水滴，所以提高了所有回收操作的效率，可以在预清洗阶段之后对清洗过的材料进行分类、粉碎。

新型SOREMA预清洗技术的其他重要优势，在于最大限度地减少了易损件，运行过程也易于维护，维护成本低，并大幅减小了所需的空間。

美锴推出ULTRA低能耗干燥机

展馆10 / A26

美锴产品 (Maguire Products) 的真空树脂干燥机有了一个新的品牌名称，以反映其节省大量能源的优点。

这款干燥机现在称为ULTRA，其基理为美锴在2013年推出的VBD的技术。在干燥树脂时的能耗远低于同等级别的新款吸附式干燥机，每年可节省数千美元的能源成本。

据介绍，虽然真空干燥机和吸附式干燥机在将聚合物加热到所需温度时需要的能量大致相同，但在下一阶段对已加热的树脂进行实际干燥时，ULTRA使用的能量要少得多。

如生产每年运行6,000小时，每小时的输送量为220磅 (100 千克)，一台普通的吸附式干燥机所需的功率可能是每磅60瓦，而ULTRA所需的功率则为每磅19 瓦。

每个系统将材料从环境温度升至干燥温度所需的用电功率相同，大约是15瓦，这些是用于加热的能量。然而，用于干燥的能量则存在巨大的差异。吸附式干燥机需要再使用45瓦的电力才能将材料干燥至可以加工的水准，而ULTRA达到同等水准只需要4瓦，两者在能耗方面有10倍之差。

ULTRA低能耗干燥机不同型号的产量分别为每小时150、300、600和1,000磅 (68、136、272和454千克)。

>extruders >feeders >components >pneumatic conveying >complete systems

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MAKING MORE OUT OF YOUR PLASTICS

SIKORA一系列新型检测设备助力高效品质控制

展馆10 / H21

在K 2019期间，SIKORA将为软管和管材、板材以及塑料行业推出一系列用于品质控制和工艺优化的创新设备。

观众更可以携带他们的塑料颗粒，在检测系统PURITY CONCEPT V进行现场测试和分析。

CENTERWAVE 6000/1600的全球首发，意味着SIKORA推出了一个全新尺寸的测量系统，专门用于挤出过程中塑料软管和管材的品质控制。

基于创新的毫米波技术，该系统可以连续、完整、360度地测量管道周长、壁厚、直径、椭圆度、内型和下垂度，测量直径为630至1,600 mm。

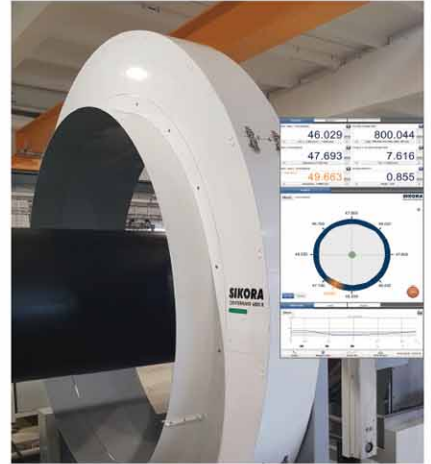
据介绍，CENTERWAVE 6000可快速实现标称尺寸，不需要任何耦合介质，精确且独立地测量，而且不受外部影响，例如温度或塑料材料等，也不需要校准。

此外，该系统自动确定精确的折射率，它确定强度及辐射穿过材料的速度，对测量精度起了决定作用，无须手动输入生产条件的更改资料。系统可集成在生产线上，在启动后直接提供可靠且可重复的测量值。

SIKORA还推出一种用于塑料材料测试的光学实验室测

试系统PURITY CONCEPT V。该系统是一个自动光桌，塑料颗粒放置在样品托盘上，通过检查区域移动，数秒钟内，材料就由一部彩色相机完成检查。投影仪在样品盘上直接用光学的方法标记了所有受污染的颗粒。

通过评估图像，便可对50 μm大小的透明、漫射和着色材料表面上的污染物，例如黑色斑点等进行自动检测、检视和资料分析，并且可随时确定污染分布和进行后续检查。



CENTERWAVE 6000透过毫米波技术测量大管道。

20台阿博格机器惊喜亮相

展馆13 / A13-1-A13-2

阿博格（Arburg）将在德国杜塞尔多夫围绕数字化及循环经济的主题，为K展观众带来惊喜。该公司在自己的展位上展示8台Allrounder和1台freeformer，并在其他合作夥伴的展台上展示其他11台机器。

进入阿博格数字化世界

一个前所未有的数字化阿博格世界将呈现在观众眼前，在总共十个“Road to Digitalisation”交互工作站上，观众将了解到有关该公司在“智能设备”、“智能生产”和“智能服



阿博格在K展将以数字化及循环经济为主题参展。

务”的更多资讯。

六个可靠的辅助套装软件、中央生产管理系统 ALS、交钥匙控制模组 ATCM和远端服务ARS也齐齐亮相。此外，所有展出的注塑机都配置了“基础连接”，比如配有IIoT介面，可以连接至更高等级的ARS系统。

智能Allrounder识别待生产部件

阿博格将在一台配备Gestica 控制器的200吨电动机Allrounder 570 A上，展示一款特别“智能”的应用。机器内置全新的“填充辅助”软件，可识别需要生产的注塑件，即一副PA12材质的Uvex护目镜。

“填充辅助”类比模型线下生成，几何形状将直接读入控制器。在Gestica控制系统中，产品填充的比例和当前螺杆位置等，可即时输入为3D图形。

这台电动机Allrounder 570 A集成在一套交钥匙系统中，在约30秒的

循环时间内，对复杂的护目镜进行注塑。这套方案系统还配备阿博格交钥匙控制单元（ATCM）SCADA系统，可实现百分之百的部件可追溯性。

实践中的循环经济

针对循环经济课题，阿博格在展会上展示两个应用。阿博格与提供再生PP材料的埃瑞玛（EREMA）携手合作，采用一台混合动力Allrounder 1020 H，在约4秒的循环时间内生产8个杯子。

在另一个循环经济应用中，双组分电动机Allrounder 630 A采用Profoam发泡工艺，生产PCR（消费后再生材料）和TPE材料的产品，即一项设备的门把手，其两半分别安装在模具中，软胶部分采用分型面包胶注塑。

针对客户和内部人员的大量活动均整合在全新的“arburgGREENworld”项目中，项目由四大支柱构成，其中三个对客户服务，而第四个则属于阿博格内部流程。

科倍隆展出两台经大幅改良的双螺杆挤出机

展馆14 / B19

科倍隆 (Coperion) 和科倍隆楷创 (Coperion K-Tron) 将在展台上展出一系列全新及持续研发的塑料加工技术方案, 而重点会放在回收、升级再造及可生物降解塑料的加工上。

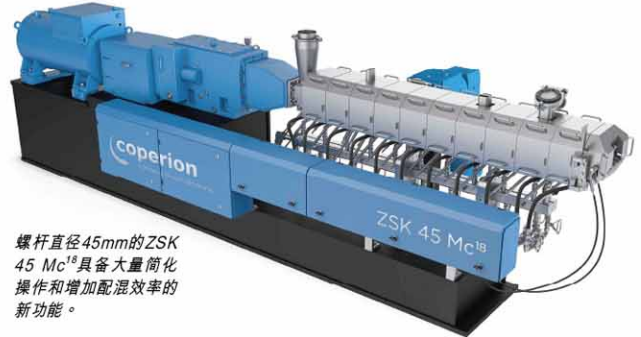
高端ZSK Mc¹⁸双螺杆挤出机

据科倍隆介绍, 展台的重点展品是两台高端ZSK Mc¹⁸双螺杆挤出机, 螺杆直径分别是45mm和70mm, 比扭矩为18 Nm/cm³。

两台双螺杆挤出机都配有ZS-B easy侧喂料机和ZS-EG easy侧脱挥装置。ZS-B和ZS-EG能够明显降低所需的维护时间, 快捷的设计使得将设备从加工段移出或接入进行清洁和替换螺杆时, 只需几个动作就可完成。

ZSK 70 Mc¹⁸上将装有一台K3-ML-D5-V200振动式喂料机, 在它配套的ZS-B easy上也有一台K-ML-SFS-BSP-100固体容积泵 (BSP) 喂料

机。小一点的ZSK 45 Mc¹⁸装有一台K2-ML-D5-T35重力式双螺杆喂料机, 它配套的ZS-B easy上装有一台K-ML-SFS-KT20双螺杆喂料机, 用于低喂料量时的高精度喂料。



螺杆直径45mm的ZSK 45 Mc¹⁸具备大量简化操作和增加配混效率的新功能。

科倍隆楷创振动式喂料机欧洲首秀

科倍隆楷创全新K3-ML-D5-V200振动式喂料机将作为开机运行展示系统的一部分, 献出它的欧洲首秀。

这台振动式喂料机将连同一台自动填充的P系列真空接收机和一台紧凑型真空泵, 作为再循环系统的一部分运行展出。振动式喂料机是再生材料或片状料以及在配混加工过程中增加玻纤的理想喂料设备。由于机械部分无

磨损, 设备在实际操作中无需维护。

同时展出的科倍隆楷创SWB-300皮带秤, 结构简单, 极其可靠的重力式喂料机可提供高喂料精度和有效的工艺监控。这种集成式的重力式喂料机可以处理不同特性的大流量散料, 除此以外, 十分适合回收料加工。

此外, 将展出的还有一台操作更加方便的高性能SP拉条切料机, 以及节能高效的FLUIDLIFT ecoblue气力输送系统。

住友德马格五台机器组成明星阵容

展馆15 / D22

在K 2019上, 住友德马格 (Sumitomo (SHI) Demag) 将推出五台其最快、最节能、最具可持续发展性, 以及由数据驱动集成的机器。

公司还将推出新型eMultiPlug创新技术, 并提供互动区域, 让参观人员试用myConnect智能诊断和支援服务。



在K 2019上推出的新型IntElect 500。

面向包装领域的两台高效能EI-Exis SP

住友德马格将展出高效能EI-Exis SP机器的较大和较小款式, 与之前的机器相比, 能耗降低了20%。

机器的快速循环周期的核心是液压蓄能器, 其注射速度可达1000 mm/s, 因此模塑产品制造商可以生产更薄的包装产品。该系列机器也是市场上注塑速度最快的机器之一。

由新型IntElect 500生产的汽车触控式控制台

在展会上推出的一款全新IntElect 500机器, 将演示用于车辆控制台的开创性、尚未见过的触控式互动装饰。

新型IntElect系列最大吨位达500吨, 拥有高精度、高能效和更大的模具空间。由于拉杆间距大, 并增加了模具高度和开启行程, 所以IntElect新型号可以容纳更大的模具, 为汽车行业提供能耗更低的机器。

LSR成型的未来

住友德马格的工业LSR专有技术将体现在一台特殊的IntElect 130机器上, 其会演示生产模塑矩阵灯光导光件的工艺。

据介绍, 最新IntElect的系统在采用低粘度材料时可实现极其精确的注射量控制。该机器采用特殊设计的螺杆 (14 mm到45 mm)、经改进的塑化单元、专为LSR设计的关断喷嘴, 以及弹簧加压止回阀, 可实现极高的工艺一致性。

推出面向医用洁净室的IntElect S

IntElect S 180-tonne是住友德马格将推出的另一款新机型。该机器专门针对医疗塑料部件生产、公差要求极高、以及需要3到10秒快速循环周期的应用领域而设计。

其模具空间布局可确保机器不会有污染物、颗粒和润滑剂, 符合GMP要求, 是医用洁净室环境的理想机器。

克劳斯玛菲整合三大品牌 携手演示闭环生产

展馆15 / C24 - C27

克劳斯玛菲集团 (KraussMaffei) 正在整合旗下业务部门及品牌, KraussMaffei、KraussMaffei Berstorff和Netstal将统一以克劳斯玛菲名义运营。整合之后, 公司将会有新的企业标记, 并于K 2019期间向观众推广。

闭环生产：水桶化身为汽车A柱

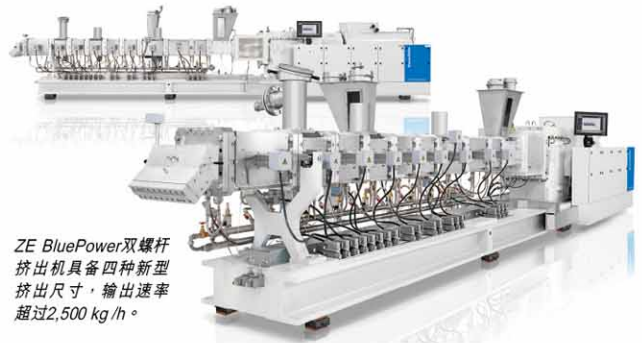
作为塑料回收、再循环和再混配的先锋, 克劳斯玛菲将于展会上把其EXT (挤出机)、IMM (注塑机) 和DSS (数字服务解决方案) 的业务部门联合起来, 演示把聚丙烯水桶化身为汽车A柱, 展示结合挤出和注塑机械的闭环材料和生产线生产。

一款锁模力为11,000 kN的全新GX 1100注塑机将于展会期间亮相, 现场利用聚丙烯生产水桶。然后水桶外部将被切碎, 并作为再生材料进入材料循环系统。

接着, 一款新型ZE 28 BluePower双螺杆挤出机通过对材料进行升级回收, 使它成为新的可用材料。

为此, 需要将颜料和20%比例的滑石加入到聚丙烯片材中。在水下进行造粒和干燥后, 再次混配出高品质、性能标准、适用于接下来注塑成型材料。

接着喂料器将升级改性后的聚丙烯输送到全电动PX 320注塑机中, 然后聚丙烯在空腔中注塑成型为A柱面板, 该部



件表面形成包覆成型的织物层。

全新Polymore线上交易平台即将上线

克劳斯玛菲在展会的另一个亮点是Polymore。这是一个全新的B2B线上交易平台, 专注于欧洲的化合物、色母粒、再生材料和工业废料买卖交易, 并将在展会期间正式上线。

据介绍, Polymore是一个面向塑料行业内所有企业的平台, 而不仅服务克劳斯玛菲的用户。该平台展示了公司如何超越机械的界限, 将产业链中的混炼厂和塑料加工厂连接在一起, 为循环经济作出贡献。

威猛巴顿菲尔展出多款新机型

展馆15 / C06

威猛巴顿菲尔 (WITTMANN BATTENFELD) 将在K 2019展出多款新机型及演示相关应用。其中一项展示重点是其采用自我调整演算法的智能机器, 这些演算法可根据环境条件自行调整。

一台全电动EcoPower 55/350将配备有HiQ-Flow、HiQ-Melt和HiQ-Metering套装软件, 与W918机械手、所有辅助设备和TEMI+MES系统连接, 并且通过WITTMANN 4.0集成在



在一台MacroPower 1100上的CELLMOULD 模组。

机器的UNILOG B8控制系统中。

立式VPower

威猛巴顿菲尔将展示其采用PowerSeries多组分版本设计的立式机器的最新开发成果, 一台VPower 120/130H/210V将采用2+2腔模具, 制造用于汽车工业的PA和TPE插头。

该应用场合还采用了Scara机械手和WX142线性机械手, 由其插入包覆的插针, 传送预成型件, 然后取出并堆放成品部件。

新型EcoPower Xpress

将在今年K展上展出的另一款新机型, 是针对医疗应用的高速EcoPower Xpress 160/1100+。机器的锁模力为1600 kN, 将使用48腔模具生产PET血液管。为了满足塑化PET的严格要

求, 该机器配备了经改进的高性能螺杆。

此外, 注射单元上方安装了一个特殊的干燥料斗, 其中粒料通过由频率控制的DRYMAX 300干燥机进行干燥。最后, 新型WITTMANN高速机械手将管子从模具中取出, 并放置在输送箱中。

面向汽车行业的轻量技术

威猛巴顿菲尔还将以汽车行业的产品为案例, 展示其在CELLMOULD结构泡沫技术方面的实力, 利用该技术可生产极轻的部件。

此外, 公司将在采用XL配置的SmartPower机器系列的一台机器上, 展示面向汽车行业的第二个应用。即在一台SmartPower 240 XL上, 用单腔模具生产带有功能性表面的汽车顶篷模组。

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uCloud

恩格尔首发全新数字化辅助软件

循环经济作为K 2019的聚焦话题之一，也是恩格尔（ENGEL）的参展主线。在展会上，恩格尔将彰显其在回收材料加工、工艺稳定改善，以及回收再生设计方面的贡献。

首发两个数字化辅助软件

此外，恩格尔将首发的两个辅助系统：iQ process observer生产监察辅助系统、iQ melt control熔体控制辅助系统。

恩格尔的iQ process observer可用来优化注射成型过程中的多个步骤，例如注射和冷却步骤。该系统在注塑成型工艺的四大阶段（塑化、注塑、冷却和脱模）能够连续分析数百个工艺参数。

该软件是通过连续检查之前几个周期的资料，以及比较实际工艺参数与设定的参考条件，来实现自动监测偏差。

至于iQ melt control的目标是让塑

化过程更温和，其并非以最快的速度塑化，而是充分利用元件的模内冷却时间来进行塑化。

提高夹层模塑部件中回收材料的比例

能够更广泛地使用再生材料的另一种方法是利用夹层结构部件，夹层结构具备嵌入原始材料中的回收材料芯材。使用夹层结构的目的是为一方面为这种双组分制造设计更多的产品，另一方面，是增加夹层结构中再生材料的比例。

可用于芯材中的再生材料比例主要取决于模塑部件的几何形状和模腔中的流动模式。在这方面，恩格尔使用ENGEL skinmelt工艺在其展台上生产以回收再生聚丙烯为

展馆15 / B42-C58

材料、部件几何形状十分复杂的运输箱。

回收再生设计意味着在产品开发阶段就尽早考虑后续回收过程，并在产品设计中考虑循环经济的要求，例如仅由热塑性塑料和玻璃纤维组成的复合材料部件，在使用完之后有回收潜力。恩格尔在展位上，便会展示其生产高标准汽车应用的生产流程。



恩格尔的iQ process observer可持续分析注塑过程整个阶段的数百个工艺参数。

（上接第二十五页）

金属。该公司目前特别重点开发用于电动汽车的具有EMI遮罩特性的材料。

3D打印市场热度升高

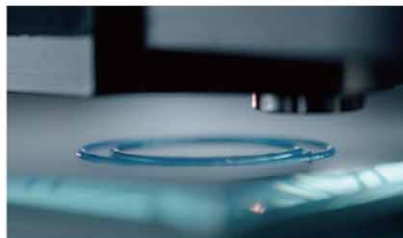
3D打印在工业应用上越来越受欢迎，因为其可以实现个性化和小批量生产，不需要使用模具。其中，由于可以满足许多特定要求，如复杂性、交付周期和多种材料，3D打印在医疗领域的应用快速增长。

汽车是另一个3D打印拥有巨大潜力的领域，从对个性化需求和品味的低产量车辆到备件生产都是如此。对于备件生产来说，3D打印有助于减少库存，而库存通常占汽车OEM流动资产的7%。

由于存在巨大的商机，许多知名公司已开始加强其在3D打印市场中的地

位。在K 2019上，许多领先材料供应商都把新型3D打印材料作为展出重点之一。

亨斯迈（Huntsman）便将展出其开发的一系列新型3D打印材料。公司的IROPRIENT平台包含三种不同类型的氨基甲酸乙酯材料（树脂、粉末和细丝），可使用各种增材制造方法进行3D打印，包括立体光固化成型（SLA）、高速烧结（HSS）和熔丝制造（FFF）。



瓦克的ACEO打印机是采用有机硅进行3D打印的系统解决方案。

这些材料针对全球鞋类和运动行业进行了优化，具有极高的耐磨性、伸长率和撕裂强度。亨斯迈在其他领域也看到了其IROPRIENT平台的应用潜力，包括汽车行部件和用于物联网（IoT）的产品。

瓦克（WACKER）的ACEO团队开发了一种采用有机硅进行3D打印的系统解决方案，该系统在上届K展上首次亮相。在今届展会，该化学集团将展示其最新产品：ACEO Imagine Series K2。

该款新型打印机拥有多个喷头，最多可同时打印4种不同类型的有机硅，用不同颜色或不同硬度的材料打印3D部件。自动控制功能是产品的另一亮点，能够测量打印的有机硅层，将其与目标值进行比较，一旦发现偏差便会自动纠正，打印出精准度极高的3D打印件。

BASF to showcase first prototypes of ChemCycling project

Hall 5 / C21 – D21, C41

With the ChemCycling project, BASF is aiming to process pyrolysis oil derived from plastic waste that currently cannot be recycled, such as mixed or contaminated plastics.

If the company is successful in developing the project to market readiness, ChemCycling will be an innovative complement to existing processes for recycling and recovery to solve the plastic waste problem.

At K 2019, BASF will be showcasing the first prototypes that were created with its partners during the pilot phase of the project. The exhibits will include: plastic front-end carrier (Jaguar Land Rover), insulation packaging (Storopack), film packaging (Südpack) and circuit breaker (Schneider Electric).

New products to be launched

For new products, BASF will launch and present its new Ultradur B6551 LNI for extrusion and thermoformable PBT Ultradur B6560 M2 FC TF.

Both new grades combine all the

well-known characteristics of the Ultradur family like high melting point, low water uptake, high dimensional stability and good barrier properties. Though, up to now the melt strength of PBT was not sufficient to make it a preferred product for extrusion.

By connecting and branching polymer chains via tailor-made additives, the experts of BASF gained very high melt strength. This makes the Ultradur B6551 LNI the material of choice for pipes, profiles and mandrels, and the Ultradur B6560 M2 FC TF for extrusion of films and thermoforming of packaging or technical parts.

BASF will also present innovation highlights from its broad range of Colors & Effects pigments for plastic applications. The new product launches include two new Lumina Royal effect pigments, Microlen Piano Black, and a black and red addition to the Sicopal product line, which are especially recommended for recycling



Ultradur B6551 LNI is suitable for extrusion and for applications like pipes, profiles and mandrels.

materials and demanding applications.

Featuring these latest innovations as well as other key pigment chemistries, BASF's Colors and Effects brand will reveal a Color Collection inspired by Pantone.

Comprised of three palettes with seven colors each, the collection will highlight current consumer trends and address how pigments can meet the plastic industry's versatile colorant requirements.

Milliken enhancing plastics with Color, Care, Clarity and Performance

Hall 6 / A27

Milliken Chemical will demonstrate how its advanced plastics additives and colorants are "Enhancing plastics with Color, Care, Clarity and Performance. Together," tackling sustainability issues.

At the show, the company will be introducing its latest grade, Hyperform HPN 715, which will offer new opportunities for PP to replace more-expensive engineering resins.

Hyperform HPN 715 delivers an optimized balance of various key factors, while also providing higher heat-deflection temperatures compared to other advanced nucleators. This allows PP to be used in microwaveable containers, under-hood vehicle components and in household appliance parts.

Milliken's DeltaMax Performance Modifiers for PP, meanwhile, help contribute to a circular economy by enhancing the impact strength and flow properties of rPP resins, blends and polypropylene impact copolymers (ICPs). Milliken plans to introduce the latest addition to its DeltaMax family at the show.



Packaging from NX UltraClear PP resin produced exclusively with Millad NX 8000 clarifier can display a UL ECV label on their products.

The DeltaMax melt-flow modifier can raise melt flow by as much as five times while maintaining impact and stiffness properties. This allows converters to increase operating efficiencies and create more innovative part designs with easier flow through molds.

Additionally, the firm's ClearShield UV Absorber gives the ultimate protection from damaging UV light to PET packaged materials such as food, beverages and consumer products.

Milliken's industry-leading Millad NX 8000 clarifier for PP resin not only transforms polypropylene into a lightweight, crystal-clear alternative to glass, but also boosts its sustainability by enabling converters to process the material at a lower temperature.

The KeyPlast colorants for plastics will be displayed as well. They enhance the visual appearance of virgin polymers, and can be used by liquid and solid masterbatch producers, resin producers and compounders, and are suitable for use with a wide range of polymer and resins systems.

New KRAIBURG TPE compounds for packaging and auto applications

 Hall 6 / C58-04, E22

The show appearance of KRAIBURG TPE will focus, among other things, on new TPE compounds that pass migration tests even when in contact with foods that contain fat.

Visitors can also see the TPE manufacturer's new developments in the fields of emission and odor relating to interior applications and in the field of thermoplastic elastomer hybrids. KRAIBURG TPE's show highlights:

- Two custom-engineered compound series with significantly improved migration control as compared to common TPEs. They are particularly suited for closure systems, valves and seals for packaging with direct contact to foods that

contain fat.

- Ultra-low-emission TPE compounds with a secure, optimized odor and emission behavior for interior automotive applications.

- TPE compounds with enhanced UV resistance and adhesion to plastics for exterior automotive applications including ASA, EPDM and PMMA.

- New custom-engineered thermoplastic hybrids (TEHs) that provide superior chemical and thermal resistance, filling the gap between classic elastomers and thermoplastic elastomers.

The expanded product portfolio, with improved emission and odor values as well as migration results, meets



KRAIBURG TPE to showcase low-odor, low-emission and low-migration TPEs.

strict requirements worldwide and thus minimizes risk and accelerate the launch of new applications. The expansion of solutions for packaging has been targeted to cover also high-end applications.

SABIC promotes certified circular polymers

 Hall 6 / D42

One of SABIC's many highlights at the show will be the certified circular polymers produced by using a pyrolysis oil feedstock from the recycling of mixed plastic waste.

The certified circular polymers produced at SABIC's Geleen production site in The Netherlands are to be supplied to leading brand customers, including Unilever, Tupperware Brands, Vinventions and Walki Group.

They are used in the development of pioneering, high quality and safe consumer goods or packaging for food, beverage and personal care products.

As a disruptive innovation, the introduction of SABIC's certified circular polymers aims to transform the value chain, where SABIC, its upstream suppliers and downstream customers work in tandem to upcycle mixed plastic waste back to the original polymer for high quality applications.

In other words, SABIC's certified circular polymer process enables the creation of brand new polymers, offering a real alternative to mechanical methods and closing the recycling loop.

The polymers are certified through the International Sustainability and Carbon Certification plus scheme that certifies renewable content and standards from source to end product.

SABIC intends to build a semi-commercial plant specifically to refine and upgrade pyrolysis oil feedstock, with the plant anticipated to enter commercial production in 2021.

Solvay to unveil new PEEK polymer

 Hall 6 / C61

Solvay will reveal developments in thermoplastic composites, a lightweighting material that enhances the Group's sustainable mobility objectives and enables resource-efficient solutions for aerospace, automotive, and oil & gas industries.

In addition, the company will also present a new high temperature polyetheretherketone (PEEK) polymer which is said as an industry first.

Solvay recently created a platform fully dedicated to thermoplastic composites, blending its unique in-house expertise via the vertical integration of its composite materials and its unmatched portfolio of high-performance polymers.

These materials, beyond lightweighting, feature exceptional heat and shock resistance, strength and toughness, chemical inertness, and enable design flexibility.

Also under the spotlight are unique applications of high-performance materials, such as the world's first all-polymer recyclable e-bike made using the company's long-fiber thermoplastics (LFT) material.

At the company booth, presentations on sustainable mobility and resource efficiency will be given on a variety of topics including batteries, additive manufacturing, hyper-connectivity, transportation, water filtration, construction, and consumer goods.

DSM innovates for Brighter Living



Under the theme of "Bright Science. Brighter Living", Royal DSM will demonstrate how its latest purpose-led innovations tackle the world's major challenges at K 2019.

EMI shielding plastics for EV

With growing demand for electric mobility, electromagnetic interference (EMI) shielding and thermal management are increasingly important in delivering high-quality automotive electronic systems.

Conventional metal enclosures are used to house electronic control units and battery management modules. However, these are heavy and drive fuel consumption.

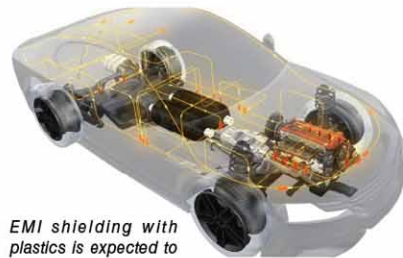
DSM's portfolio of conductive plastics enables the replacement of full-metal enclosures, with shielding efficiencies of around 40-60dB of plastic thickness,

which protect from EMI, and can lead to weight reductions of up to 50%.

E-TPEE in athletic footwear

In recent years, the athletic sportswear industry has increasingly integrated high-performance materials to deliver higher durability, stability and functional performance without compromising on weight.

DSM's expanded Arnitel co-polyester (E-TPEE) can be used in mid-soles of



EMI shielding with plastics is expected to be a trend for EV.

athletic footwear to deliver a range of performance advantages. It has a very high rebound rate of 75-80%, compared to 65-70% other materials such as E-TPU at same densities.

In addition, thanks to its high consistency in modulus across temperatures from -25°C to +50°C, Arnitel shows consistent performance across diverse climates.

Akulon RePurposed resin

DSM and Starboard came together when the surfboard company selected DSM's Akulon RePurposed, where the resin used is fully recycled from discarded nylon-based fishing nets and is known for its sustainability profile as much as its performance.

The product can be applied in many other applications and is specifically targeted at the sports and leisure market.

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Borealis' new Borcycle technology produces compounds made of rPO

Hall 6 / A43

Borealis and its wholly-owned subsidiary, mtm plastics, will showcase the latest recyclate innovations, including the new plastics recycling technology Borcycle.

As a scalable and modular technology, Borcycle transforms polyolefin-based waste streams into recyclate material

such as pellets. Compounds made using the technology deliver high performance, add value and offer versatility.

Borcycle technology will be used to produce high-quality compounds made of recycled polyolefins (rPO), such as the newly-launched Borcycle MF1981SY, which is 10% talc-filled with over 80%

recycled content.

Borcycle MF1981SY will be available in Europe, and is the first of several upcoming launches of rPO solutions made under the umbrella of the Borcycle technology. It offers a balance between stiffness and impact, and is especially suited for use in visible black parts, for example in small appliances.

Like its relatives in the mtm plastics family of recyclate materials, Borcycle MF1981SY is a sustainable offering. Recyclates from mtm save approximately 30% of CO2 emissions compared to virgin materials.

Borealis is applying its Visioneering Philosophy to the development and implementation of polyolefins-based solutions that enable plastics reuse, recycling, and recovery.

These wide-ranging activities are gathered under the symbolic roof of EverMinds, the Borealis platform dedicated for a more circular mind-set in the industry.



Recyclates from mtm save approximately 30% of CO2 emissions compared to virgin materials.

Covestro pushes the boundaries for a sustainable and digital world

Hall 6 / A75-1 – A75-3

As to provide answers to the great challenges of the world, products and technologies for a wide array of applications, including automotive, E&E, construction, etc., will be on display at Covestro's booth. The examples below give an impression of developments that the company will present.

The highlight of Covestro's show exhibit for automotive application is a comprehensive interior concept for future mobility. In line with the latest trend, it intends to turn car interiors into multi-functional, mobile living and working spaces.

Covestro developed the concept together with key industrial and academic partners. It involves functionality, comfort and design in equal measure, as well as efficiency. Key design features are surfaces with a decorative look and feel, integrated ambient lighting, the latest infotainment systems and cutting-edge seating concepts.

To build the infrastructure for 5G, Covestro is working together with Deutsche Telekom and the Umeå Institute of Design to develop innovative material solutions for base stations, antennas and other system components.

Covestro is also working on a multi-layered film solution in

conjunction with a new manufacturing process for the backs of smartphone bodies. Unlike conventional metal elements, these polycarbonate films are permeable to high-frequency radiation.

Together with partners such as RWTH Aachen University and various textile manufacturers, Covestro succeeded in producing elastic textile fibers from thermoplastic polyurethane with CO2, and as a result partially replaced crude oil as the raw material.

The starting point is an intermediate product called cardyon, which is already used for the soft foam found in mattresses and the base layers of sports fields. The partners are currently working on developing production to industrial scale.



The car of the future is fully networked and is seamlessly integrated into everyday life.

A multitude of novel silicone innovations from WACKER



On an area of 300 square meters, WACKER will be showcasing its silicone innovations under the motto "Thinking Beyond", ranging from thermally conductive silicones for battery cooling in electric vehicles, flame-retardant silicone rubber for rolling stock and self-adhesive silicones with low-friction surfaces to electroactive silicone laminates for actuators and sensors.

Solid silicone for new fire-safety standard

WACKER's existing product portfolio includes solid and liquid silicone rubber solutions already certified for a large portion of the applications mentioned in EN 45545-2 – especially those subject to the standard's R22 and R23 requirement sets.

Now, to allow manufacturers to produce large-format bellows and profiles in compliance with the new fire-safety codes, the Munich-based chemical group has added a new grade of flame-retardant

solid silicone rubber to the product portfolio.

ELASTOSIL R 771 meets today's fire-safety codes and enables the manufacture of rolling-stock components in accordance with the R1 requirement set.

Self-Adhesive liquid silicones with less friction

WACKER has expanded its portfolio of self-adhesive liquid silicone rubber (LSR) with two further product lines:



Profile made from flame-retardant solid silicone rubber.

ELASTOSIL LR 3671 for applications in food technology and ELASTOSIL LR 3675 for automotive applications.

These products have combined two technologies that are firmly established in the silicone compounding industry, with a proven track record in numerous applications: silicones with self-adhesive properties and grades featuring intrinsically low-friction surfaces.

Silicone laminates for sensors

NEXIPAL is a novel silicone laminate with electroactive properties. It consists of several ultrathin precision silicone films that are coated with electrically conductive material prior to lamination. The result is an actuator that creates movement, as soon as electrical voltage is applied.

The laminates can furthermore be used to measure mechanical deformation electrically. Thus, NEXIPAL can also serve as a sensor. The product is wear-free, compact and energy saving, and ideal for use in innovative applications.

Polyplastics to highlight new POM grades



Leading engineering thermoplastics global supplier Polyplastics and its subsidiary TOPAS Advanced Polymers will jointly showcase their leading-edge material technologies.

Under its exhibition theme of "Your Ideas. Our Material. Success Together," Polyplastics will highlight the latest developments in DURACON polyoxymethylene (POM).

For automotive applications, Polyplastics will discuss the recent launch of DURACON POM grades for the production of injection molded automotive fuel system components.



Product samples made of Polyplastics materials.

A new high-flow/high-rigidity POM grade has a melt flow rate (MFR) around 14. This material suits a wide range of molding conditions (cylinder conditions, injection pressure) and is used in Europe. Other key highlights in POM include a new grade which combines high strength with good creep and sliding properties.

Polyplastics will also focus on the latest development in DURAFIDE PPS, DURANEX PBT, and LAPEROS LCP.

For electric vehicle applications, the company has developed new DURANEX PBT and DURAFIDE PPS materials which are targeted for engine peripheral parts such power control units (PCUs), delivering high insulating properties, lower water absorption, and meet harsh operating conditions (-40°C to 150°C, up to 95% relative humidity).

Polyplastics continues to see strong growth for its TOPAS cyclic olefin copolymers (COC) which continue to find strong appeal in the healthcare industry and diagnostics. The company continues to work closely with OEMs and processors on new solutions to create next-generation products.

The unique attributes of TOPAS COC - purity, drug compatibility, transparency, biocompatibility, and dimensional stability – are finding their way into high-performance end uses.

Asahi Kasei's new PA Foam to open new doors in auto applications

Hall 8a / J15

Asahi Kasei is currently developing the PA Foam, a foam material based on polyamide, which offers unique possibilities for vehicle lightweight and noise reducing applications. Samples will be displayed at the K 2019.

The PA Foam features the typical heat, chemical and oil resistant properties of polyamide, mixed with an outstanding rigidity or noise reducing quality depending on the shape of the beads.

PA Foam consisting of round-shaped beads features a strong rigidity, making it a promising alternative material for aluminum and metal in structural applications, as well as for use for insulators, ducts, spacers, or other lightweight parts of the battery case of electrified vehicles.

PA Foam with a C- or macaroni-shape provides noise insulation in addition to the typical polyamide properties. Possible applications can be found everywhere around the car, especially in the engine compartment. Used for engine covers, it does not



The PA Foam features an outstanding rigidity or noise reducing quality depending on the shape of the beads.

only contribute to lightweight, but also significantly reduces the radiating engine noise.

As the PA Foam can also reduce noise coming from the outside, possible applications can be found in the roof and bonnet as well as in the seat and floor structure.

Foam beads made of polyamide can be processed in a steam molding process on standard polystyrene molding equipment. Furthermore, a significant reduction of resin for the production process can be achieved, contributing to an overall cost reduction.

At present, Asahi Kasei offers a broad range of polyamide types for lightweight and UV-resistant applications with the LEONA polyamide family. The SG series was introduced last year as the newest member of the family.

The Japanese technology group headquartered in Tokyo is one of the few fully integrated polyamide manufacturers worldwide, and is able to produce polyamide 6.6 completely from monomer to compound.

Clariant sheds light on sustainability collaborations

Hall 8a / J11

Through "Symphony of Collaboration", Clariant proactively fosters partnerships for a more sustainable plastics industry. At K show, the specialty chemical company will emphasize its collaborative sustainability projects and the products behind them.

This includes the launch of a major new company-wide initiative specifically focused in plastics recycling. It aims to change the current take-make-dispose consumer attitude, moving towards a circular economy for post-consumer and

post-industrial plastics.

As introduced, one important partnership has delivered some breakthrough results. Together with the Finnish oil refining company, Neste, which is passionate about giving fat residues and discarded cooking oils a second life, Clariant has been exploring opportunities to use renewable hydrocarbons, derived from this waste.

Meanwhile, with a partner for Near Infrared (NIR) scanners, Clariant developed new colorants for the black coloration of plastics that can be identified by NIR sorting devices. This new range of black colorants can be used for various polymers (e.g. Polyolefins, PET, PA) and applications such as packaging and E&E. This offers brand owners and masterbatch producers new opportunities.

To boost use and re-use of PET

In line with making recycling a viable option, Clariant supports the effective monomaterial consumer solutions. A key

priority is ensuring the attractiveness of virgin PET for packaging.

Clariant will launch its new masterbatch for PET destined for the food and beverage market at the show. The patented oxygen scavenger is based on a new molecule that goes beyond existing solutions for PET in protecting content shelf life and taste.

It is proving a real success in initial customer trials, offering the potential to address a number of challenges for packaging producers in one solution.

Taking EcoTain to next level

In a further drive for collaboration, Clariant is also taking its EcoTain label, currently awarded to a portfolio of more than 200 products that show outstanding sustainability advantages, to next level.

At the show, Clariant will issue an open invitation to companies to come together and collaborate specifically on one particularly challenging aspect of recycling.



Clariant will launch new patented oxygen scavenger for PET destined for the food and beverage market.

巴斯夫携化学回收专案最新成果亮相

展馆5 / C21-D21, C41

目前, 巴斯夫 (BASF) 正在推进化学回收 (ChemCycling) 专案, 并首次在生产中使用从塑胶废料中提取的裂解油作为原料。在K展会上, 巴斯夫及其合作夥伴将展示该专案试点阶段所取得的最新成果。

观众将会看到巴斯夫及合作夥伴采用再生塑胶所制造的最新原型样本, 包括汽车塑胶前端托架 (捷豹路虎)、保护性包装 (Storopack)、薄膜包装 (S ü dpack) 及断路器 (施耐

德电气)。

巴斯夫指出, 各行业的试点专案表明, 采用化学回收原料与新料生产的产品, 具有同等的高品质和高性能。巴斯夫正在研究为公司的一体化生产基地提供长期商业用量的裂解油的各种选择。如果成功, 化学回收将是现有塑胶废物回收的创新补充。

即将推出的新产品

至于新产品, 巴斯夫将推出并展示用于挤出工艺的新型Ultradur B6551 LNI和可以热成型的产品PBT Ultradur B6560 M2 FC TF。

这两个新牌号结合了Ultradur系列的特性, 如高熔点、低吸水率、高尺寸稳定性和良好的阻隔性能。但是, 到目前为止, 由于PBT的熔体强度较低, 仍然不适合挤出工艺。

利用定制添加剂连接和支化聚合物链, 巴斯夫的专家使材料达到了非常高的熔体强度, 使得Ultradur B6551 LNI成为管材、型材和芯棒的理想材料, 而Ultradur B6560 M2 FC TF则可用于挤出薄膜和包装或工业部件的热成型。

巴斯夫还将展示其种类繁多的颜料, 将推出的新产品包括两种新型Lumina Royal特殊效果颜料, 即Microlen Piano Black, 以及Sicopal产品系列中新增的黑色和红色颜料。这些颜料特别推荐用于回收材料和要求苛刻的应用场合。

由于巴斯夫拥有这些最新创新成果以及其他主要颜料化学品, 所以其品牌将展示受到Pantone启发的色彩系列。该系列由三个主色调组成, 每个主色调有七种颜色, 重点反映当前消费趋势。



Ultradur B6551 LNI是挤出工艺和管材、型材和芯棒等产品的理想材料。



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(Information provided by advertiser)

SABIC聚焦经认证的循环解决方案

 展馆6 / D42

沙特基础工业公司（SABIC）将在展会上重点展示为实现可持续发展创建的产业链协同合作。其中，采用回收混合塑料废物而成的裂解油原料生产的、经认证的循环聚合物将是亮点之一。

据悉，SABIC在荷兰工厂生产的经认证循环聚合物将供应给领先品牌，包括联合利华、特百惠等，用于开发先进的高品质安全消费品或食品、饮料和个人护理产品包装。

这款循环聚合物要求SABIC与其上下游供应商及客户协同合作，进行混合塑料废料的高品质回收，再制成聚合物原料，用于高品质应用场合，可与物理（机械）回收互相补充，并实现闭环回收。

这些聚合物通过International Sustainability and Carbon Certification plus (ISCC+) 认证，这些认证对从原料到最终产品的整个价值链中的可再生材料含量和标准进行认证。

SABIC计划建造一个专门用于改进和升级裂解油原料的半商业化工厂，预计将于2021年投入商业生产。

索尔维展示最新型PEEK聚合物

 展馆6 / C61

索尔维（Solvay）将于K 2019上发布其热塑性复合材料解决方案。这些轻量化材料可为航空航天、汽车和石油及天然气领域提供资源高效的解决方案。此外，公司还将推出一种最新高温聚醚醚酮（PEEK）聚合物。

据悉，索尔维最近创建了为热塑性复合材料服务的平台，将公司独特的内部专业知识与其复合材料和高性能聚合物产品进行垂直整合。这些材料不仅轻量化，同时具有优异的耐热性和抗冲击性、强度、韧性及化学惰性，并具有设计灵活性。

同时，索尔维会展示高性能材料的独特应用，如世界上首台采用该公司长纤维热塑性材料制成的全聚合物可回收电动自行车。

美利肯添加剂提升塑料色彩、通透度和性能

 展馆6 / A27

美利肯（Milliken）将在K 2019上展示如何通过其多种添加剂解决方案，提升塑料的色彩、通透度和性能，并助力可持续发展。

在展会上，美利肯将推出其最新等级的聚丙烯成核剂Hyperform HPN 715，让聚丙烯在苛刻应用中取代更昂贵的工程树脂提供新的机会。

与其他先进的成核剂相比，Hyperform HPN 715优化了各种关键因数，同时也提供了更高的热变形温度。这使得聚丙烯可以用于微波容器、发动机罩下的车辆部件和家用电器部件。

同时，美利肯计划推出其Deltamax家族的最新成员。Deltamax改性剂能



Keyplast着色剂可改善多种聚合物产品的视觉外观，提供稳定且可复制的颜色。

够提高再生聚丙烯树脂（rPP）、共混物和聚丙烯抗冲共聚物（ICP）的抗冲击强度和流动性能。

至于Deltamax熔体流动改进剂在保持树脂抗冲击和刚度特性的同时，可使熔体流动增加5倍。

这使得塑料加工商可以加速塑料熔浆在模具的流动

速度，提高生产效率，创造更具创新性的零件设计。

塑料用Keyplast着色剂是一种多用途产品，可供液体和固体色母粒生产商、树脂生产商和聚合物生产商使用。

该产品可应用于透明且与食品接触的PET材料，以及其他透明非晶态聚合物比如PS、PC、PMMA和PSU等，可改善视觉外观，提供稳定且可复制的颜色。

此外，美利肯自主研发的针对聚丙烯树脂的透明剂Millad NX 8000，不仅将聚丙烯转化成为可取代玻璃、如水晶般通透的轻质树脂，同时让塑料加工商可以较低的温度对聚丙烯进行加工，减少成型周期，节约注塑机能耗，从而提高成品的可持续性。

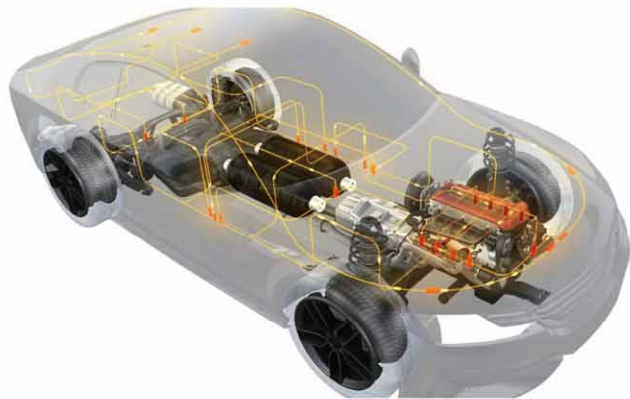
此外，使用含有NX UltraClearPP（一种用Millad NX 8000透明剂生产的聚丙烯）的品牌商可以在其注塑包装上贴上UL的ECV标签，以表明他们致力于循环经济。

帝斯曼携多款创新材料技术亮相

 展馆6 / B11

帝斯曼 (Royal DSM) 将于今年K展, 展示其开发的创新材料技术, 其应用领域广阔, 包括汽车、运动、增材制造等。

随着对电动交通需求的不断增长, 电磁干扰 (EMI) 遮罩和热管理在高品质汽车电子系统中变得越来越重要。



利用塑料来遮罩电磁干扰将是电动汽车的趋势之一。

金属外壳可用于封装电子控制单元或电源和电池管理模组, 对这些元件进行保护。

然而, 这些传统金属外壳重量很大, 对于纯燃油或混合动力汽车而言会增加燃油消耗和碳排放量, 而对于纯电动汽车而言则在牵引和驾驶体验方面存在不足。

帝斯曼的导电塑料产品系列可替代全金属外壳, 塑料厚度的遮罩效能约为40-60dB, 可防止EMI, 同时能减轻高达50%的重量。

帝斯曼Akulon RePurposed牌号使用的树脂完全从废弃的尼龙渔网获

取, 这些废弃的渔网从印度洋和阿拉伯海收集, 并在冲浪板中重新利用, 如用于鳍片、鳍盒、立式桨板泵和其他结构部件。这个牌号的产品可应用于许多其他应用场合, 尤其是针对运动领域。

近年来, 运动服装行业越来越多地采用高性能材料, 在不影响重量的情况下实现更好的耐用性、稳定性和功能性。帝斯曼Arnitel热塑性聚酯弹性体发泡材料 (E-TPEE) 可用于运动鞋中底, 并具备一些特征优势: 高达75-80%的回弹率, 而相同密度的其他材料如E-TPU, 其回弹率为65-70%; 在各种气候条件下性能稳定; 在-25℃ - +50℃ 的温度范围内绝对值高度稳定。

此外, 帝斯曼从事增材制造领域的材料研发已有超过25年的历史, 在展会上将为汽车主机厂展示增材制造应用潜力。

凯柏胶宝推新型TPE 满足包装和汽车领域需求

 展馆6 / C58-04, E22

凯柏胶宝 (KRAIBURG TPE) 将于两个展台上, 全面展示其TPE业务的主要发展趋势, 其中会侧重于已通过迁移测试的全新TPE化合物, 这种化合物甚至可以接触含有油脂的食品。

此外, 公司还将展示室内应用中与排放和气味相关的新进展, 让观众了解热塑性弹性体混合物领域的新动态。凯柏胶宝的展示亮点包括:

- 两款定制设计化合物系列。具有比普通TPE更优越的迁移控制性能, 这两个系列的化合物特别适用于封闭系统/阀门和密封件, 可直接接触含油脂的食品。
 - 具有低气味和排放性能的TPE化合物, 安全可靠, 适用于汽车内饰应用。
 - 具有更强大的抗紫外线性能和对塑料粘结性的TPE化合物, 适用于汽车外饰应用, 包括 ASA、EPDM 和 PMMA。
 - 定制的全新热塑性混合物 (TEH)。具有卓越的耐化学性和耐热性, 填补了传统弹性体和热塑性弹性体之间的空白。
- 这一产品组合具有可扩展性, 其排放和气味值以及迁移效



凯柏胶宝将展示低气味、低排放和低迁移的TPE。

果均得到了很大的改善, 可满足严格要求, 从而最大限度降低风险, 还可加快新应用的推出速度。

此外, 针对包装市场材料解决方案的发展过程中, 也已经考虑到其他高端应用。

北欧化工推出Borcycle新型塑料回收技术

展馆6 / A43

北欧化工 (Borealis) 及其全资子公司mtm plastics将于展会上展示全新的Borcycle塑料回收技术及回收产品。

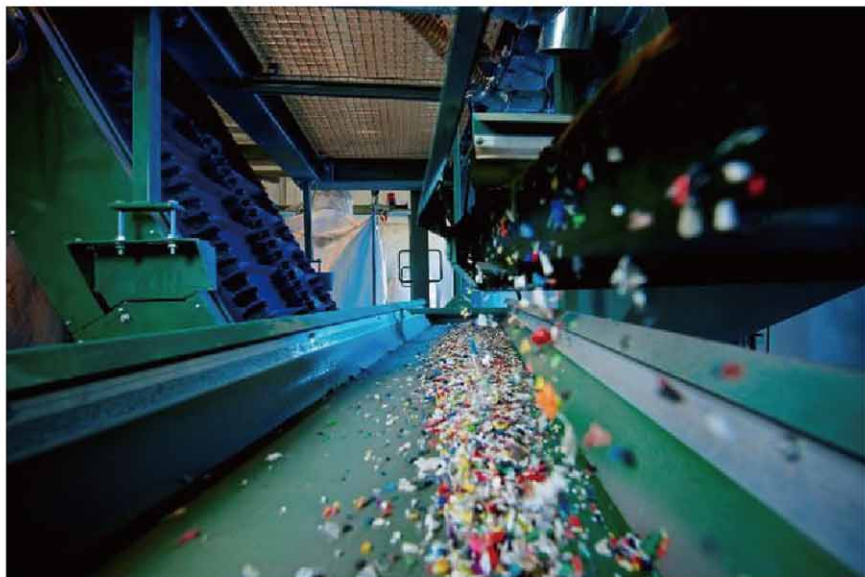
Borcycle技术可将聚烯烃废料转化为颗粒等回收材料，将用于生产由回收聚烯烃 (rPO) 制成的高品质化合物，例如新推出的Borcycle MF1981SY，一种含有超过80%再生成分、用于可视电器部件的rPO。

作为一种可扩展的模组化技术，该技术的开发旨在满足市场对高品质回收品不断增长的需求，并补充和完善现有的北欧化工初生聚烯烃产品组合。

使用Borcycle技术制造的化合物可带来高性能、增值性和多功能性。Borcycle MF1981SY便是一系列利用该技术的rPO解决方案中的首款产品，该产品将在欧洲推出。

该化合物是rPO产品系列的一个理想补充，因为它含有10%的滑石填充化合物，并含有80%以上的再生材料成分，在刚度和抗冲击力之间提供了理想的平衡。

该化合物特别适用于可视黑色部



相比初生塑料，mtm的回收利用可减排30%左右。

件，例如小型家电等。

正如在mtm回收材料塑料系列中的同类产品一样，Borcycle MF1981SY是一种真正可持续的产品。相比初生塑料，mtm的回收利用可减排30%左右。

北欧化工透过将其Visioneering

Philosophy应用于聚烯烃新型解决方案的开发和实践，以实现塑料再利用、再循环和回收，以及循环设计。

这一系列的行动都属于EverMinds的一部分，而EverMinds是北欧化工致力于促进行业循环发展的平台，通过利用其经验，与价值链伙伴合作。

科思创展示全方位创新型及功能性材料方案

展馆6 / A75-1-A75-3

科思创 (Covestro) 将展出一系列为应对各种全球性挑战开发的创新型及功能性材料方案，其应用领域广泛，涵盖汽车、电子、建筑等行业。

在展会中，科思创展台的一大亮点是展示一种针对未来交通出行的综合性内饰概念。这种设计使得汽车内部成为多功能移动居住和工作空间，符合最新行业趋势。

科思创与贯穿汽车价值链各环节的重要合作伙伴联合开发出此设计，兼顾功能性、舒适性、设计性和效率。重要的设计特征包括：具有装饰性外观和触感的表面、集成的车内氛围照明、最新资讯娱乐系统，以及前瞻性座椅设计。

对未来交通出行及所有生活和商业领域的数位化而言，一个重要的前提是5G新型传输技术。为了建造相应的基础设施，科思创正与Deutsche Telekom和Umeå Institute of

Design联合开发应用于基站、天线和其他系统元件的创新型材料解决方案。

科思创还正在开发一款多层薄膜解决方案，配合新型制造工艺，可应用于智能手机背壳。与传统金属元件不同，这款聚碳酸酯薄膜，可让高频辐射穿透。

在与亚琛工业大学和各纺织品制造商的共同协作下，科思创成功利用二氧化碳为原材料，生产出基于热塑性聚氨酯的弹性纺织纤维，部分替代了原油的使用。其制造的基础是一种名为cardyon的中间产品，并已被应用于床垫的软质泡沫和运动场面层的基层中。

目前，科思创和合作伙伴正在致力于进一步实现工业规模生产，并希望在纺织和服饰行业中引入以可持续性资源为基础的物料循环。

瓦克携多款硅橡胶创新方案亮相

展馆6 / A10

总部位于德国慕尼黑的瓦克化学集团（WACKER）将在300多平米的展台上，展示多款硅橡胶创新产品及解决方案。

展出重点包括：电动汽车制冷用导热型硅橡胶；面向轨道交通工具的阻燃型固体硅橡胶；表面摩擦系数低的自粘型硅橡胶，以及执行器和感测器用电活性层压硅橡胶等。

满足新消防安全标准的固体硅橡胶

长久以来，轨道交通工具必须满足消防安全标准，自2018年生效的欧盟EN 45545-2法规比之前适用的标准严格很多，并对所有轨道交通工具部件的生产商具有约束力。

瓦克现推出一种新型阻燃型固体硅橡胶，采用这种硅橡胶产品，生产商能生产出满足新消防安全法规要求的大面积波纹管或型材。

ELASTOSIL R 771符合欧盟最新消

防安全标准，用它生产的车辆部件可满足R1的要求。

此外，越来越多的公共建筑也必须遵守欧盟消防安全法规，ELASTOSIL系列的产品在此亦有广泛用途。不同于含卤素的合成材料，硅橡胶着火时冒烟少，不会释放有害健康的氯化氢。

因此，ELASTOSIL R 771尤其适用于防火帘、绝缘材料和门窗密封件等需要具备抵御火灾能力的建筑部件。

低摩擦的自粘型液体硅橡胶

瓦克为自粘型液体硅橡胶产品组合增添两个产品系列：ELASTOSIL LR 3671和ELASTOSIL LR 3675，分别面向食品及汽车技术应用。

这些新型的液体硅橡胶产品能够附着于金属和一些特殊的热塑性塑料，交联而成的弹性体表面干燥平滑，可用于注射成型工艺，使软硬复合元件的大规模生产具有成本效益。



以阻燃型固体硅橡胶生产而成的型材。

感测器及执行器用层压硅橡胶

NEXIPAL是一种新型具有电活性的层压硅橡胶。该产品由多层涂有导电材料的超薄硅橡胶精密薄膜层压而成，可在施加电压的情况下用作运动执行器。

此外，NEXIPAL层压硅橡胶还可用作测量机械形变的感测器。该产品耐磨性强，体积小，能耗低，是创新型应用的理想材料。

宝理塑料重点展示最新POM牌号

展馆7a / B02

热塑性工程塑料领先供应商宝理塑料（Polyplastics）及其子公司TOPAS Advanced Polymers将共同展示其先进材料技术和产品。

宝理塑料将重点展示夺钢（DURACON）POM的最新成果。针对汽车应用领域，公司将聚焦最近推出的夺钢POM牌号，该牌号用于生产注塑汽车燃料系统部件。

一种新型高流动性/高刚性POM牌号的熔体流动速率



采用宝理塑料的材料而制成的产品。

（MFR）约为14。该材料适用于各种成型条件（机筒条件，注射压力），并已经在欧洲使用。

其他有关POM的其他主要亮点，则包括一种具备高强度、良好蠕变性能和滑动性能的新牌号。

同时，宝理塑料还将重点展示DURAFIDE PPS、DURANEX PBT和LAPEROS LCP的最新开发成果。

针对电动汽车应用领域，公司开发了新型DURANEX PBT和DURAFIDE PPS材料。这些材料适用于发动机周边部件，如动力控制单元（PCU），具有高绝缘性能、低吸水性，并可满足恶劣工作条件下的要求（-40℃至150℃，相对湿度高达95%）。

宝理塑料指出，TOPAS环烯烃共聚物（COC）的需求一直在强劲增长。该材料具有独特的性能，包括高纯度、药物相容性、高透明度、生物相容性和尺寸稳定性，在医疗保健行业和诊断领域仍有强大的吸引力。

公司将继续与OEM和加工厂商密切合作，共同开发新的解决方案，研发下一代产品。

旭化成展出用于减重、降噪的新型聚酰胺泡沫

展馆8a / J15

旭化成 (Asahi Kasei) 是全球为数不多的完全一体化的聚酰胺制造商之一，能够完全从单体到配混料生产聚酰胺 6.6。以这些专业技术为基础，公司目前正在开发PA泡沫，这是一种基于聚酰胺的泡沫材料。样品将在K 2019上展出。

PA泡沫拥有聚酰胺的典型耐热、耐化学品和耐油性能，视乎泡孔的形状，还拥有极高的刚性或降噪特性。

据介绍，泡孔呈圆形的PA泡沫具有很高的刚性，因而是结构部件中铝和金属，以及用于绝缘体、导管、垫片或电动汽车电池盒等其他轻量部件的材料替代材料。

至于拥有C形或通心粉形状泡孔的PA泡沫，除了具有聚酰胺的典型特性外，还具有隔音功能，可用于汽车的任何地



视乎泡孔的形状，PA泡沫拥有极高的刚性或降噪特性。

方，特别是用于发动机机舱内部。用于发动机罩时，不仅有助于减轻重量，而且还可明显降低发动机的辐射噪音。

由于PA泡沫还可以减少来自外部的噪音，因此还可用于车顶和发动机罩，以及座椅和地板结构中。

由于共用汽车不断普及，而且预期会推出自动驾驶技术，所以汽车内部作为放松的舒适空间变得越来越重要。泡沫的这些降噪特性，也有助于增强汽车内部的舒适性。

PA泡沫可以在标准聚苯乙烯模塑设备上以蒸汽模塑工艺加工。此外，还可以明显减少生产过程中的树脂用量，有助

于降低总体成本。

目前，该总部位于东京的日本技术集团公司以LEONA聚酰胺系列提供多种类型的聚酰胺，用于轻量化产品和耐UV产品，而其中的SG型号是去年推出的最新成员。

科莱恩奏响协作交响曲 打造可持续发展产业链

展馆8a / J11

科莱恩 (Clariant) 通过“协作交响曲” (Symphony of Collaboration) 主题来促进合作伙伴关系，推动在减少塑料用量、塑料再利用和塑料回收方面的设计与创新。在K 2019上，该特种化学品公司将阐明其可持续发展性协作专案及背后的

产品，以支援开发市场上可采用的解决方案。

其中包括推出一项专门针对塑料回收的重大倡议，其旨在改变目前的材料—产品—废弃的消费态度，使废塑料和工业塑料废料转向循环经济。

据科莱恩介绍，目前公司一个重要合作项目取得了突破性成果。芬兰炼油公司Neste专注于回收利用脂肪残余物和废弃食用油，科莱恩与该公司合作，探索来源于这些废料的可再生烃类的回收利用方法。

此外，科莱恩与一家近红外 (NIR) 扫描器公司合作，开发了用于塑料的新型黑色着色剂，可通过NIR分选设备进行识别。这些新型黑色着

色剂系列可用于各种聚合物（如聚烯烃、PET、PA）和包装与电子电气等应用领域。

促进PET的应用和再利用

为了使回收成为可行的供选方案，科莱恩还支持有效的单一材料消费解决方案，而这方面需优先考虑的一个关键问题就是确保PET材料对包装的吸引力。

在展会上，科莱恩将推出面向食品和饮料市场用PET的新型专利除氧剂。这款专利除氧剂基于一种新分子，有别于现有用于PET的解决方案，可延长包装产品的保质期，并保持口味。目前这款新型除氧剂在客户试验中取得了巨大成功，可解决包装生产商面临的诸多挑战。



科莱恩将推出面向食品和饮料市场用PET的新型专利除氧剂。



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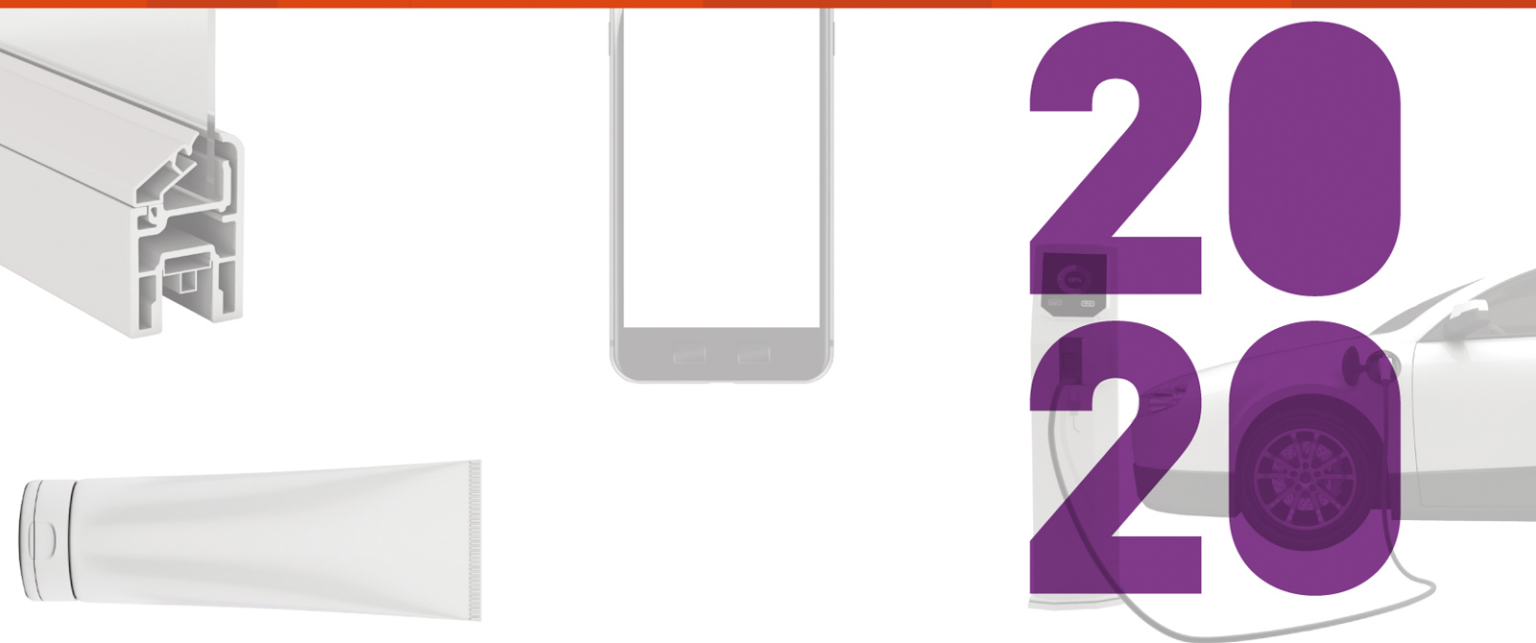
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Travel tips 旅游提示

Weather 天气

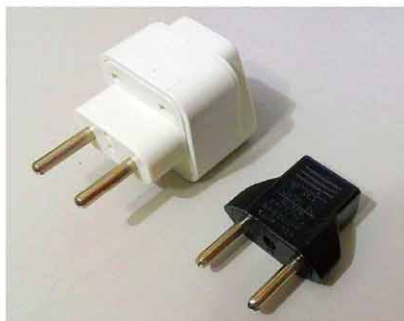
Temperature during October is about 14°C in daytime and 7°C at night. Visitors are advised to bring an umbrella in case of a touch of rain.

杜塞尔多夫10月份天气颇清凉，日间气温大约为14°C，晚间下降至约7°C。此外，当天偶尔仍会下雨，宜带备短伞。

Voltage 电压

220V and plugs are European type with two round pins. An adapter is needed for foreign travellers.

德国电压为220伏特，电插头为两脚幼圆插，旅客宜带备变换插头。



European two round pins.
欧洲两脚幼圆插。

Making phone calls 拨电话

To make an inter-state phone call from Germany, press "0" first, and then press the area code and finally the phone number. The area code of Düsseldorf is 211.

All mobile phone numbers in Germany come with 11 digits. It is necessary to press "0" and then the area code first if you are calling a mobile phone number.

For example in Düsseldorf, press

0-211-12345678999.

要在德国打跨区电话，需先拨0号，再拨地区号码，最后拨电话号码。杜塞尔多夫的区号是211。

德国所有手提电话都是11位元数位。要拨打手提同样需先拨0号，再拨地区号码，最后是电话号码。举例在杜塞尔多夫，需打0-211-12345678999。

Opening hours of shops 商店营业时间

Most shops in Germany open from 9:00am/10:00am to 6:00pm, with service hour limited to 1:00pm on Saturday. Except for stores in major train stations, business are closed on Sunday and public holidays.

大部分商店星期一至五的营业时间为上午9:00或10:00至下午6:00，星期六则营业至下午1:00，星期日及公众假期休息。至于火车站内的商店，星期日多照常营业。



Most shops are closed on Sunday and public holidays.

大部分商铺在星期日及公众假期休息。

Tipping 小费

Service and VAT are included in the menu price in restaurants, bars, etc. all over Germany. It is typical to "round up" the amount to some more-or-less round figure. A rule of thumb is to add 5-10% for tips, generally ending with a full Euro amount.

在德国，帐单已包括服务费和消费

税，但一般仍然会四舍五入至整数，惯例上可以多付账目的5-10%作小费。

Useful telephone no. 有用电话

24/7 Municipal Lost & Found 24小时失物支持

Telephone 电话：116 116

Ambulance 救护车

Telephone 电话：112

Police 警察

Telephone 电话：110

Universitätsklinikum Düsseldorf (Düsseldorf University Hospital) 杜塞尔多夫大学附属医院

Telephone 电话：+49 211 810 0

Address 地址：Moorenstrasse 5 40225 Düsseldorf, NRW

Useful websites 有用网址

The German National Tourist Board 德国国家旅游局

www.germany.travel/en/index.html

Düsseldorf Tourism Board 杜塞尔多夫旅游局

www.duesseldorf-tourismus.de/en/home/

Düsseldorf Airport 杜塞尔多夫机场

www.dus.com/en

Düsseldorf Central Station (Hauptbahnhof) 杜塞尔多夫火车总站

www.bahnhof.de/bahnhof-de/Duesseldorf_Hbf.html

Bahn 德国铁路

www.bahn.com

Transportation 交通

Düsseldorf is the capital city of the German state of North Rhine-Westphalia and center of the Rhine-Ruhr metropolitan region. International visitors can travel by air directly to the Düsseldorf Airport.

杜塞尔多夫是北莱茵威斯特伐尔州的首府，海外参观人士可乘飞机直达杜塞尔多夫机场。

Düsseldorf Airport 杜塞尔多夫机场

Düsseldorf Airport is the third largest airport in Germany. It is approximately 7 km north of downtown Düsseldorf and 3 km away from the Düsseldorf Exhibition Center.

It only takes a few minutes to get to the exhibition center, either by bus (No. 896) or by taxi.



Düsseldorf Airport.
杜塞尔多夫机场。

杜塞尔多夫机场是德国第三大机场，有约70家航空公司的航班。机场位于市中心以北约七公里，距离杜塞尔多夫展览馆更只有三公里之遥。从机场乘坐巴士（896号）或的士到展馆只需十分钟。

Travel between downtown and airport 从机场往返市中心

Visitors can travel to and from downtown by the city and suburban train S-Bahn S11. The S11 has its

own underground station below the Terminal, the Bahnhof Düsseldorf Flughafen Terminal and is especially signposted by "S11". It takes passengers to the city's Central Station (Hauptbahnhof).

从杜塞尔多夫机场往返市中心，可乘搭火车S-Bahn S11线。S11线在机场客运大楼设有车站，名为Bahnhof Düsseldorf Flughafen Terminal，并以S11标示，列车可到达位于机场南部的市中心总站（Hauptbahnhof）。

Travel to Fairgrounds 前往展馆

Both the U-Bahn U78 and U79 subway tram lines and the bus No. 722 go to the fairgrounds. The U78 line stops at the East and North Entrances, with the U79 also stopping at the East Entrance.

Visitors who wish to go to the North Entrance or Esprit Arena will need to switch to the U78 from here.

At the Messe Ost stop, visitors can switch to the No. 722 bus, which stops directly in front of the administration buildings as well as at the South Entrance.

There is additional shuttle bus service during the show. The No. 896 makes regular trips to the airport.



U-Bahn U78 and U79 arrive the fairground entrance directly.
地下列车U-Bahn U78线及U79线直达展馆。

地下列车U-Bahn U78线及U79线直达展馆，U78线途经东北两个出入口，而U79线只到东面出入口，参观人士欲到北出入口或Esprit Arena必须在此换乘U78线。

此外，722号巴士亦前往会场。乘搭地下列车的观众如欲到南出入口和行政大楼，也可于Messe Ost站换乘722号巴士。在展会举行期间，特别设立的896号巴士线会往返机场及展馆。

Free ride for ticket owners

持票人免费乘搭公共交通工具

With admission tickets and eTickets, visitors can travel to and from the Düsseldorf Exhibition Center free of charge on Rheinbahn, Rhine-Ruhr Regional Transport Network routes (VRR, 2nd class, trains without additional fees in fare zone D) as well as Rhine-Sieg Regional Transport Network routes (VRS, 2nd class).



K Show Admission and eTickets are valid as tickets on local public transport. 持有K展入场证或电子入场券均可免费乘搭公共交通工具。

持有入场证或电子入场券，观众可以免费乘搭公共交通工具，往杜塞尔多夫展览馆，包括：Rheinbahn、Rhine-Ruhr Regional Transport Network的路线（VRR，二等，D价格门票范围），以及Rhine-Sieg Regional Transport Network的路线（VRS，二等）。

Attractions 旅游景点

Located along the River Rhine, Düsseldorf is an international business center. Düsseldorf means “fascination of variety”. True to the name, it is famous for its nightlife, carnival, events, shopping and, of course, exhibitions. Most destinations can be reached by bus, tramway and subway.

杜塞尔多夫位于莱茵河畔，是欧洲有名的商业中心。它的德文名称解作“多元魅力”，恰如其名，无论是夜生活、嘉年华、购物和展览方面均有声有色。在杜市基为方面，乘坐巴士、电车和地铁可抵达大部分景点。

Altstadt 旧城区

Almost completely destroyed during World War 2, Altstadt (the Old Town) was rebuilt according to historic plans on its foundation walls, making it look like a real historic town.

Today the old town is a popular shopping mall and at night and weekends turns into the so-called “longest bar of the world”.

An uncountable number of bars, coffee shops and snug brewing houses are situated here. The old town is the home of “Altbier”, a top-fermented, dark beer that tastes best at the historical brewing houses.

旧城区在二次世界大战几被夷平，其后模拟过往面貌复建，现时已成流行及前卫时装店林立。旧城区在晚上和周末变



身号称“全球最长酒吧”。的而且确，在旧城区一平方公里有数之不尽的间酒吧、咖啡店和酿酒屋，最有名的饮品是“Altbier”，一款沿于当地的陈年黑啤酒。

Burgplatz 城堡广场

Burgplatz (Castle-Square) is situated at the old town limits next to River Rhine. Once upon a time here was the castle of the Earls of Berg, the later duke of Jülich-Kleve-Berg. Later the castle was reconstructed to a baroque palace, which burned down in 1872. In 1888 the ruins were removed completely, only a tower was left.

Burgplatz is also the starting point of the 2,000m long Rhine embankment promenade Rheinufersporenade.

城堡广场位于旧城区之端、莱茵河之旁，是观赏日落的好地方。很久以前，这里是Earls of Berg的城堡，后来改建为巴洛克式皇宫，惟在1872焚毁，只剩下座看守塔。

城堡广场也是杜塞尔多夫长达2公里的河畔大道的起点。



Rheinufersporenade 河畔大道

Rheinufersporenade links the traditional Altstadt to the modern MedienHafen and is lined by coffee shops and bars. The promenade on the bank of River Rhine is one of the

most beautiful ones in Germany, and it is situated on the right bank where the sun shines onto this side all day long.

It was created by constructing a tunnel in 1993 and banning cars underground, so that the riverside became a pedestrian area.

Most gangways for boat trips on River Rhine are situated near to Burgplatz. Many coffee shops offer outdoor seats for better taste of the beautiful scene.



河畔大道连接旧城区和现代化的媒体港，被誉为德国最美丽的散步道之一，不少咖啡店和酒吧沿河开店。1993年，市政府兴建隧道让汽车行驶，建成河畔大道供行人使用。

在莱茵河旁漫游，休闲静候日落，甚为写意。此外，这里亦是不少游客上落船只漫游莱茵河的地方。

Königsallee 国王大道

Called “Kö” by the locals, Königsallee is the main street of Düsseldorf and consists of two streets divided by a canal. This shopping district is internationally recognized for its plethora high level fashion stores. It is sometimes referred to as the “Champs-Élysées of Germany”.

Along the main boulevard there are many smaller boutiques. The most common German department store chains (Galeria, Karstadt, Peek and

Cloppenburg, etc.) are all situated on the crossing Liesegangstrasse/Schadowstrasse.

The west side of the Kö has developed into a top address for luxury hotels: the highly traditional Breidenbacher Hof, the Steigenberger Parkhotel and the Intercontinental are to be found.

国王大道，又称Kö，是市内著名的购物大道，由一条运河分隔成两边，汇聚不少国际品牌、时装店、珠宝首饰店和百货公司（Galeria, Karstadt, Peek and Cloppenburg等），被形容是德国的香榭丽舍大道。

国王大道以西，则成为豪华酒店的集中地，如传统的Breidenbacher Hof、the Steigenberger Parkhotel和洲际酒店。



MedienHafen 媒体港

At the southern end of the River Rhine promenade is the newest landmark of Düsseldorf, the MedienHafen (Media Harbor). The former harbor was transformed in a quarter with restaurants, bars, coffee shops, discotheques and hotels.

Its flair is based on the mixture of old and new. Protected buildings like depots, quay walls and industrial surroundings stand side by side with modern architecture. There are buildings constructed by Frank O. Gehry, Claude Vasconi or David Chipperfield.



过去，这里是莱茵河贸易港口；现在，著名建筑师设计的独特建筑物纷纷竖立于此。新旧融和是媒体港吸引之处，旧码头的墙壁、梯阶、路轨、上落货线路等，在重建时皆保留下来，诉说过去的历史。

另外，不少餐厅、酒吧、咖啡室、舞厅和酒店均坐落于此。

Rheinturm 莱茵塔

Rheinturm, meaning the Rhine Tower, is a 240.5m high concrete telecommunications tower right on the River Rhine, near the Media Harbor. As the tallest construction in Düsseldorf, it houses a revolving restaurant and an observation deck at a height of 170m.

The observation deck is open to public. As a special attraction, a light sculpture on its shaft works as a clock, said to be the largest digital clock in the world.

莱茵塔高240.5米，是杜塞尔多夫最高的建筑物。作为一座广播的信号发射塔，它同时为游客提供俯瞰杜市的机会，在170米高设有旋转餐厅和观光层。

莱茵塔紧邻莱茵河，面向杜塞尔多夫老城的一面展示了「灯光文化」，有据说是世界上最大的电子钟。

Palace and Park Benrath 本拉特宫

One of the most beautiful garden palaces of the 18th century is situated

in Düsseldorf's southern district of Benrath. Planned and built between 1756 and 1773 by Nicolas de Pigage, the Palace and Park Benrath was constructed as a maison de plaisance for Elector Carl Theodor.

The palace is an overall work of art dating from the late baroque period that combines art, landscaping and nature. It is also home to three museums: the Museum Corps de Logis (located in the palace's main building), the Museum für Gartenkunst (Museum for Landscape Art) and the Naturkundemuseum (Natural Science Museum).

This is where visitors may immerse themselves in the 18th century, follow the footsteps of important landscape artists and take a stroll through local flora and fauna.



本拉特宫是18世纪最美丽的花园宫殿之一，位于杜塞尔多夫南部的Benrath区。由Nicolas de Pigage于1756年至1773年间进行规划和建造。在这里，游客可以跟随重要景观艺术家的脚步，沉浸在18世纪。

该宫殿是一件艺术品，可以追溯到巴洛克时期晚期，结合了艺术、景观和自然。这里还有三个博物馆：Museum of Corps de Logis（位于宫殿的主楼），Museum für Gartenkunst（景观艺术博物馆）和Naturkundemuseum（自然科学博物馆）。

Restaurants recommendations 推荐餐厅

The variety of restaurants and bistros in Düsseldorf is one of a kind. Trying Asian food is a must in the city with Japanese restaurants and sushi bars high on the list. Chinese, Vietnamese, etc. can also be found in abundance.

杜塞尔多夫的餐厅种类多不胜数，不少日本人聚居于杜市，故寿司等日本菜甚为盛行，其他亚洲菜如中国菜、越南菜等亦相当普遍。

Asian Food 亚洲菜

Böser Chinese Medienhafen

Chinese, authentic, fresh produce, hand-made noodles
中国菜、传统、即叫即制、手打面

Address地址: Zollhof 13, 40221 Düsseldorf

Phone电话: +49 211 30337887

Website网址: www.boeser-chinese.de/



Böser Chinese Medienhafen.

Suzie Q

Vietnamese, vegetarian
越南菜、素食

Address地址: Flurstrasse 19, 40235 Düsseldorf, NRW

Phone电话: +49 211 966 668 03

Website网址: <http://www.suzieq.de/>

ZEN Restaurant

Vietnamese
越南菜

Address地址: Ackerstrasse 128, 40233 Düsseldorf

Phone电话: +49 211 23040066

Website网址: <https://zen-gastro.de/>

KiKaKu

Japanese, sushi
日本菜、寿司

Address地址: Klosterstrasse 38, 40211 Düsseldorf

Phone电话: +49 211 357 853

Website网址: <http://www.kikaku.de/>

Nagaya

Japanese, sushi
日本菜、寿司

Address地址: Klosterstrasse 42, 40211 Düsseldorf

Phone电话: +49 211 863 9636

Website网址: www.nagaya.de/

Western style 西餐

Agave

Italian
意大利菜

Address地址: Neusser Str. 47, 40219 Düsseldorf

Phone电话: +49 211 308 455

Website网址: <http://www.agave-restaurant.de/>

Himmel & Ähd

Rhenish
莱茵地道菜

Address地址: Nordstrasse 53, 40477 Düsseldorf

Phone电话: +49 211 498 1361

Website网址: <http://www.himmel-aeht.de/>

Restaurant Benders Marie

German, mussels
德国菜、青口

Address地址: Andreasstrasse 13, 40213 Düsseldorf

Phone电话: +49 211 876 382 83



Restaurant Benders Marie.

Useful smartphone Apps 有用智能电话程序

Guide and maps

Düsseldorf Offline City Map



It offers an interactive map that lets you browse the city. Additionally, it comes with a search index for locating streets,

but also other points of interest such as museums, restaurants, cafés, hotels, sights and many more. No internet is needed.

提供互动地图，并有搜寻功能，除了街道之外，亦可找到博物馆、餐厅、咖啡店、酒店及景点等，而且毋须接上互联网。

Download 下载地址：

<https://play.google.com/store/apps/details?id=de.topobyte.apps.offline.stadtplan.duesseldorf&hl>

Translation

iTranslate



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allows you to use iTranslate abroad without having to pay expensive roaming charges.

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Download 下载地址：

<https://itunes.apple.com/us/app/i-translate-free-translator/id288113403>
<https://play.google.com/store/apps/details?id=at.nk.tools.iTranslate>

Sansibar by Breuninger

Seafood, steak
海鲜、扒类

Address 地址：Königsallee 2, 40212 Düsseldorf

Phone 电话：+49 211566 414 650

Website 网址：<http://www.sansibarbybreuninger.de/>

Transport

BetterTaxi - Taxi App für Deutschland



You can book spontaneous hailing rides and long term pre-bookings through this app. Pick-ups at airports, train stations,

large events or pre-bookings for a taxi van for up to 7 persons are offered as "Premium class" and "Business Class" service at guaranteed fixed prices. For city trips in Düsseldorf the regular taxi booking has fastest availability. Prices are solely determined by the taximeter.

通过这个程式可以预约的士，如有需要甚至可以指名需要7人车，提供机场、火车站、展馆等接送。在杜塞尔多夫，预约一般的士会最为快捷。此外，公司亦提供优质和商务级接送服务，价钱另议。

Download 下载地址：

<https://itunes.apple.com/de/app/bettertaxi-taxi-app/id558163880>

Taxi-Düsseldorf



Said to be the largest taxi central in Düsseldorf and the surrounding area with a fleet of more than 1,200 vehicles.

据称是杜塞尔多夫最大的团队，超过1,200辆的士为你服务。

Download 下载地址：

<https://itunes.apple.com/de/app/taxi-duesseldorf/id793157599>
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Brauerei Zum Schiffchen

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Address 地址：Hafenstrasse 5, 40213 Düsseldorf

Phone 电话：+49 211 132 422

Website 网址：<http://www.brauerei-zum-schiffchen.de/>

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Restaurant Brauerei Zum Schiffchen.

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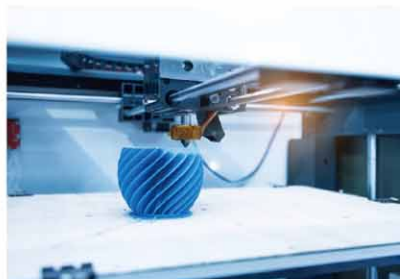
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vehicles in comparatively low volumes for individual requirements and tastes, to production of spare parts. For the area of spare parts production, 3D printing can help reduce inventory, typically 7% of an automotive OEM's liquid assets.

In light of the huge business opportunities, many notorious companies have started to boost their presence in the market. At the booths of many leading materials suppliers, new 3D printing materials will be part of the focuses.

Huntsman will be presenting a new range of 3D printing materials that it has developed. The company's IROPRINT platform contains three different kinds of urethane-based materials (resins, powders and filaments), which can be 3D printed using a variety of additive



Huntsman sees huge potential for its IROPRINT 3D printing platform.

manufacturing methods including stereolithography (SLA), high speed sintering (HSS) and fused filament fabrication (FFF).

These materials have been optimized for the global footwear and sports industry, offering advanced abrasion resistance, elongation and tear strength. Further down the line, Huntsman sees opportunities for its IROPRINT platform in other sectors, from components for the automotive industry to objects for Internet of

Things (IoT) applications.

The ACEO team from WACKER developed a system solution for 3D printing with silicones, which had its world premiere at last K show. This year, the chemical group will present its latest innovation: the ACEO Imagine Series K2.

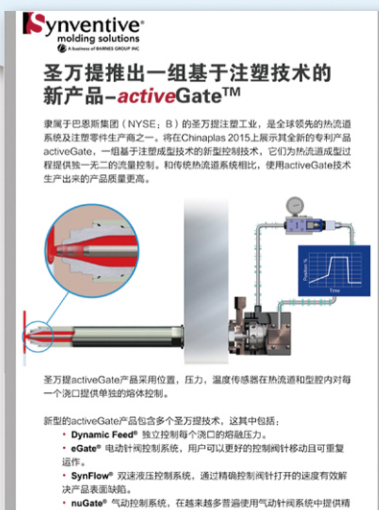
With its multiple printing nozzles, the new printer can print up to four different silicone materials simultaneously, allowing entirely novel designs to be realized. 3D objects can now be printed in different colors and with different degrees of hardness.

Another highlight will be ACEO's new auto-control technology. It measures the silicone layer applied with each printing operation and compares it with the target value specified in the CAD model. In this way, the new printer produces extremely precise 3D prints.

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