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EXTRUSION

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FAKUMA
special issue



Reiloy

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The NEW generation of cutters for profiles



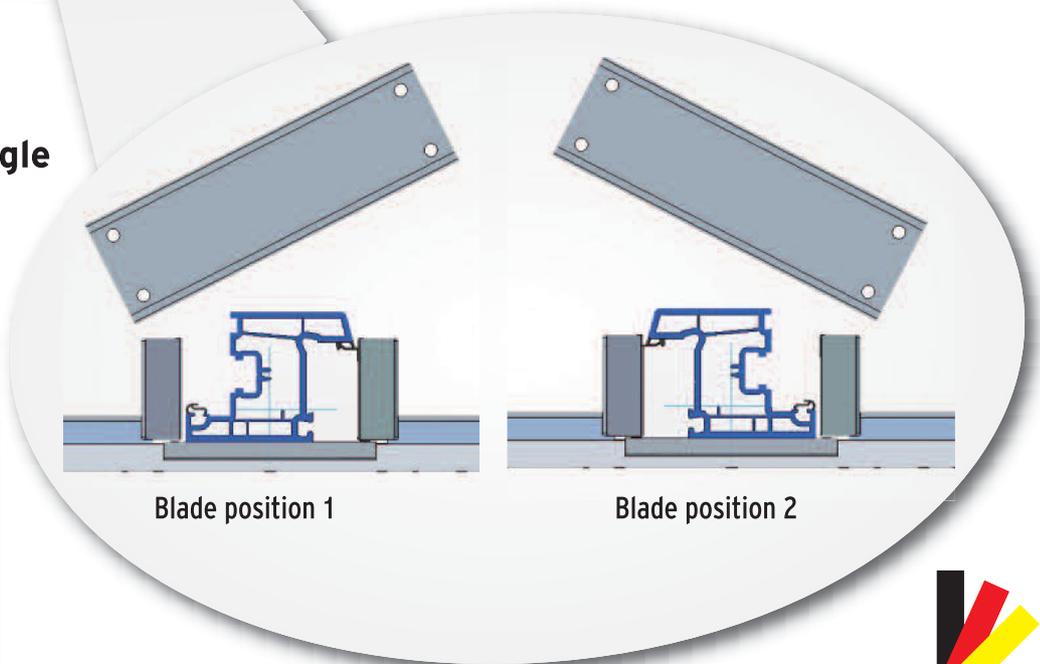
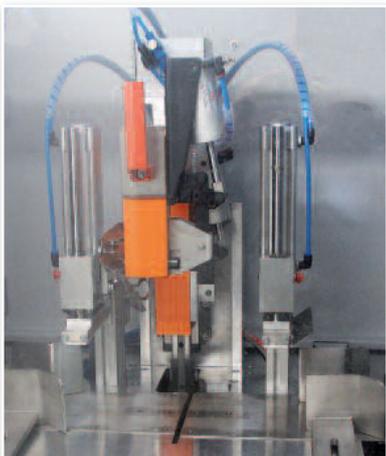
- Mirrored changing of the cutter angle during running production
- For optimised cutting of the respective profile
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- Sensational price thanks to increasing demand and manufacturing in large quantities

The cutter was manufactured for the first time in 1998 and in constant use throughout the world. They offer the absolute best cutting quality for glass strips, small profiles, main profiles and technical profiles.

Additional devices such as automatic film wrapping, measurement wheels for precise length determination or lettering with inkjet or laser printers can be attached.

PTW-200 changeable cutting angle

Cutting Unit



Blade position 1

Blade position 2



Made in
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EQUIPMENT FOR EXTRUSION



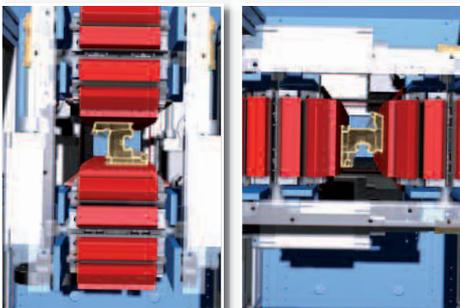
FOR PROFILE EXTRUSION LINES



Calibration table KTS 01,
rear



Caterpillar
Haul off



Haul off
rotating 90°



PRO 63
automatic stacker

FOR SHEET EXTRUSION LINES



Calender



Roller withdrawal AZ 8,
outlet side



Slitting RB 2 with four
sawing stations



Transverse separating
cutter QSS, inlet

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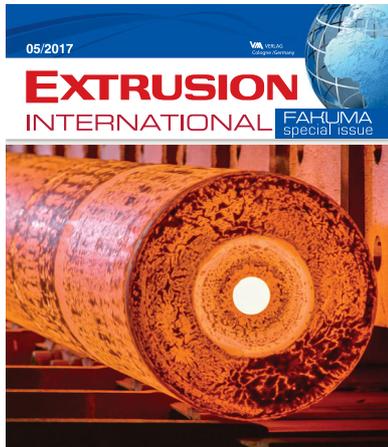
**STEIN Maschinenbau
GmbH&Co.KG**

Wartbachstr. 9
D-66999 Hinterweidenthal/Germany
Tel. +49/63 96/92 15-0
Fax +49/63 96/92 15-25
stein@stein-maschinenbau.de ·
www.stein-maschinenbau.de

Firms in this issue	6	film extrusion	
Imprint	7	Blown films perfectly suited for lamination	29
industry news	8	extrusion periphery	
Calendar	8	Quantum E	30
Reifenhäuser Digital Established	8	extrusion measurements	
Ultra-thin core insulation and minimized microphonic effects	11	"It's not a tube you're investing in – it's safety"	33
Asaclean PF – a strong addition to the purging compound portfolio by VELOX	11	PET recycling	
Krones and Erema are joining forces to progress PET recycling	12	rPET packaging trend	36
TROESTER innovations at the IRC/Rubber Expo	13	Chinaplas 2018	
"Our machines shape the world"	14	CHINAPLAS is ready for new breakthroughs	38
UL certification of PA expands international product standards	15	Fakuma 2017 – preview	
New Mach 500 waterjet cutting system	16	Full House for 25th Birthday!	40
Davis-Standard Completes Maillefer Acquisition	16	EREMA founds POWERFIL business unit	41
Double twin plants for polyolefins recycling	17	HERBOLD's main emphasis in recycling	42
BASF to acquire Solvay's global polyamide business	18	SIKORA: Innovative measuring, control, inspection	44
around the extrusion		Gneuss: new at the Fakuma	46
Precision in seven layers	20	FEDDEM: ICX® technology expanded to include LFT process	48
pipe and profile extrusion		Maag: new underwater pelletizing system	49
"Next Generation" equipment at Equiplast	24	ILLIG: Delivered 60 Percent More Sheet Processing Machines	50
Innovation in the plastic pipe industry: PVC-O fittings ecoFIT TOM®	26		

Coverstory

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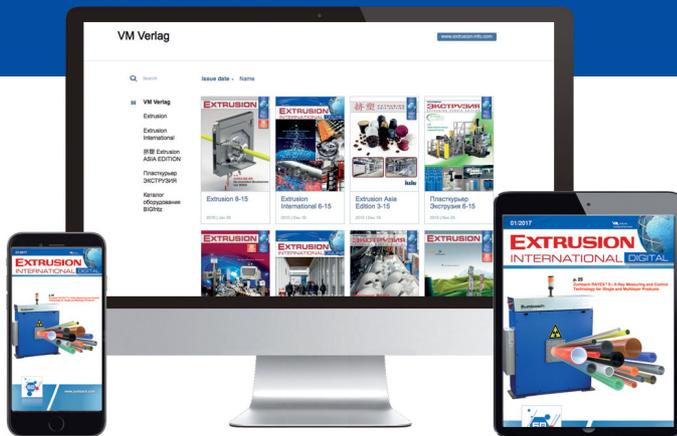
Reiloy Metall GmbH

Spicher Str. 56, D-53844 Troisdorf, Germany
info@reiloy.com, www.reiloy.com



Index of Advertisers, companies and fairs referred in this issue

Adsale	38	KOMAX.....	43
Alkoma	23	KraussMaffei Berstorff.....	15
Amut Group.....	17	KraussMaffei Corporation.....	14
BASF.....	18	Krones	12
Battenfeld-cincinnati	19+24	Maag	35 +49
Chinaplas.....	38	Maillefer	16
Conextru.....	25	Messe Duesseldorf	Inside Back Cover
Davis-Standard	16	Molecor.....	26+27
EREMA Group.....	12+18+36+41	motan-colortronic.....	7+20
Erge	47	MTI.....	45
Extricom	31	Piovan	30
FAKUMA	40	Plastik-Maschinenbau	29
FEDDEM.....	46	Pmh	39
FIMIC	33	Promixon	37
Flow International	16	Reifenhäuser Blown Film	29
Gneuss	46	Reifenhäuser Digital	8
GRAFE	15	Reiloy Metall	Front Cover + 5
Graham Engineering	14	Sikora.....	17+33+44
Guill	49	SIPA	18
Herbold	42	Stein.....	Inside Front Cover + 3
HEW-KABEL	11	Troester	13
Illig	50	VELOX	12
Interplastica	Inside Back Cover	Weber	9+10
IPTF.....	Back Cover	Zumbach.....	13



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EDITORS

Dr. Yury Kravets (Editor-in-chief)
Tel. +49 2233 979 2976
y.kravets@vm-verlag.com

Bettina Jopp-Witt
Tel. +49 221 546 1539
redaktion@vm-verlag.com

Alla Kravets
Tel. +49 2233 949 8793
a.kravets@vm-verlag.com

ADVERTISING SALES

Martina Lerner
Tel.:+49 6226 971515
lerner-media@t-online.de

ADMINISTRATION

Alla Kravets
Tel. +49 2233 949 8793
a.kravets@vm-verlag.com

PRINTING

h-mailconcept e.K.
directmarketing
Venloer Str. 1271, Cologne, Germany

SALES REPRESENTATIVES

Quaini Pubblicita (Milano IT)
Tel. +39 02 39216180
grquaini@tin.it

Worldwide Services Co., Ltd.,
(TAIWAN)
Tel. +886-4-2325-1784
global@acw.com.tw

Tokyo PR Inc. (Japan)
Tel. +81 (3) 3273-2731
extrusion@tokyopr.co.jp

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China PEC'2017

The 17th China Plastics Exhibition & Conference

12.-15.10. 2017 Taizhou International Convention & Exhibition Center, China
www.china-pec.com

Equiplast 2017

The International Plastics and Rubber Event

1. - 5.10, Barcelona, Spain
www.messe-barcelona.de

FAKUMA 2017

International trade fair for plastics processing

17. - 21. 10, Friedrichshafen, Germany
www.fakuma-messe.de/en/fakuma/

Interplas 2017

The british plastics show

26. - 28.10.2017, Birmingham, UK
www.interplasuk.com

PLASTIMAGEN Mexico 2017

Plastics Exhibition & Conference

7.-10.11, Centro Citibanamex, Mexico City
www.plastimagen.com.mx/

COMPLAST - SOUTH AFRICA

Complete Plastics Exhibition

16. - 18.11, Johannesburg, Republic of South Africa
www.complastexpo.in/southafrica/

PLAST EURASIA ISTANBUL 2017

27. International İstanbul Plastics Industry Fair

6.-9.12, Istanbul, Turkey
www.plasteurasia.com/en/

INTERPLASTICA 2018

International Trade Fair for Plastics and Rubber

23.-26.01, Moscow, Russia
www.interplastica.de/

Reifenhäuser Digital Established



■ Reifenhäuser has founded its new business unit Reifenhäuser Digital with effect from July 1, 2017, thereby paving the way to the focused digitalization of its extrusion lines and services. The new unit will act as an internal incubator for all other business units within the Reifenhäuser Group. It will be managed by Dr. Benedikt Brenken, Head of Business Development and Thomas Fett, Head of Technical Development.

Bernd Reifenhäuser, CEO of the Reifenhäuser Group, commented: "Digitalization offers us the greatest potential for innovation that we have seen in plastics extrusion for a long time. So founding our own business unit with its own resources and the possibility of establishing new ways of working was a logical next step for us. Digital transformation isn't something that can be accomplished in passing. Within Reifenhäuser Digital, we are currently focusing hard on generating real customer benefits from new opportunities such as smart data, machine learning and anomaly detection, and on bringing digital products to the market in a swift and targeted manner. Our goal is to develop intelligent production both for and with our customers."

Reifenhäuser Digital is working closely with internal and external customers and suppliers, as well as outside experts, to design and develop digital solutions.

*Dr. Benedikt Brenken,
Head of Business Development*

*Thomas Fett,
Head of Technical Development*





PEXa – the pipe for fluids with high temperatures

A high-quality pipe with exceptional properties: The peroxide cross linking of HDPE makes the PEXa pipe one of the best of its kind. There is a good reason why these pipes are used in areas with particularly high requirements. This includes the heating and sanitary sector, geothermal plants, district heating and industrial applications.

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- // Practically oriented, proven system components

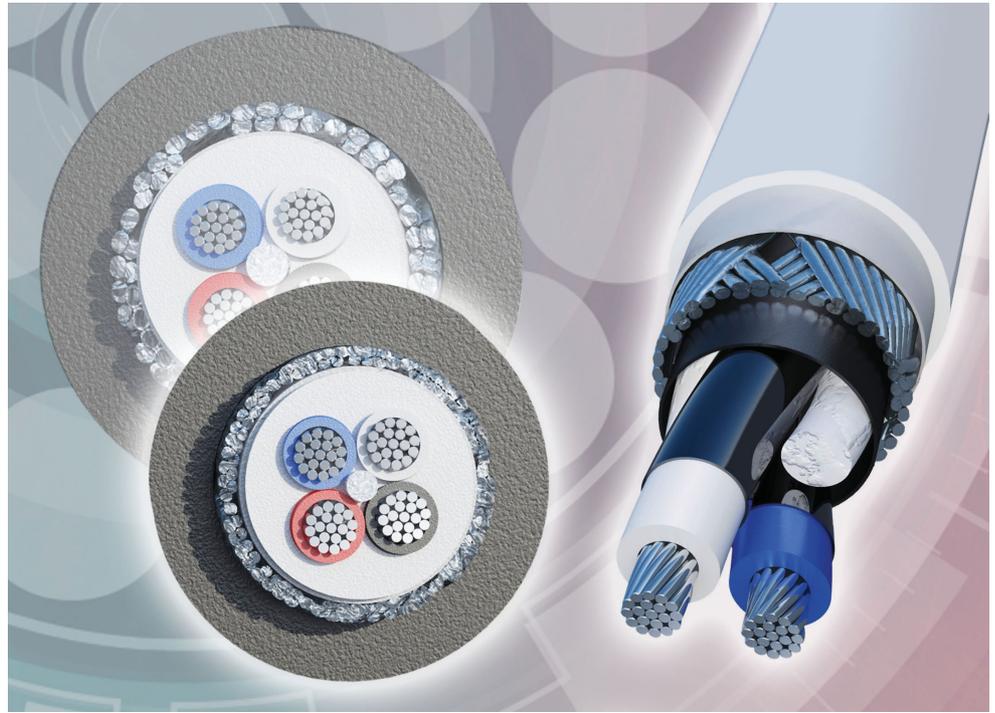
Ultra-thin core insulation and minimized microphonic effects

■ Among the variety of new products to be exhibited by specialty cable manufacturer HEW-KABEL of Wipperfürth, Germany, at the SPS IPC Drives (November 28-30 in Nuremberg) are a modified PTFE (polytetrafluoroethylene) for ultra-thin yet highly resistant insulations and the HEW-SILENT technology, also based on PTFE, for minimizing microphonic effects when transmitting low signals.

The new modified PTFE from HEW-KABEL combines for the first time outstanding performance properties with reliable processability even in the case of extremely small dimensions. Its mechanical strength and electrical insulating strength exceed those of conventional PTFE with the same wide service temperature range (+260 °C to -190 °C), the same high temperature and chemical resistance, and unchanged good high-frequency properties (permittivity and dielectric loss factor). This means that the new specialty PTFE is suitable for the production of insulations that can be made very much thinner than was previously possible, but without making any compromises on application properties.

The potential is shown by a pilot application in the form of a multi-core cable for the harsh oil production environment. By switching to the new modified PTFE, HEW-KABEL was able to reduce the thickness of the insulations from their original 0.16 mm to 0.10 mm, which thus permitted the specified 10% reduction in the cable diameter. Furthermore, the new cable offers almost double the flexural fatigue strength than the previous design – without any change in cross-section, dielectric strength, chemical resistance or tensile strength.

The HEW-SILENT technology developed by HEW-KABEL makes a considerable contribution to avoiding microphonic effects in signal cables and thus to an optimized signal integrity, for example in medical and measurement technology. Such effects can occur with cables under mechanical load when a conductor or screen rub against a non-conductor. The resultant electrical charges can, despite their small size, be so troublesome that they overlay the equally small useful signals. The HEW-SILENT technology minimizes the occurrence of such electrical charges and is suitable for



both coaxial cables and for paired and multi-core cable constructions.

The basis of this technology are conductive tapes based on PTFE with a particularly homogeneous surface resistance in the low Ohm range. To manufacture them, the company has developed a special production line that enables the stringent quality requirements to be continuously met. Apart from that, the in-house production allows a large amount of versatility with regard to the design and dimensions for a variety of different products, with which, because of the very good plasticity, even complex geometries like the surface of a cable shield can be replicated. Thanks to the in-house development of special technologies, HEW-KABEL can also apply very thin conductive layers with a high level of uniformity. The effectiveness of the HEW-SILENT technology is shown, for example, in its use for a twisted-pair wire in which the microphonic effect was lowered from a critical 1.4 pC – with the same wire design – to an outstanding 0.2 pC (approximate figures). As a result, accompanying measures became superfluous.

Asaclean PF – a strong addition to the purging compound portfolio by VELOX

■ VELOX GmbH is presenting a new grade to complement the Asaclean purging compounds family and close another gap in the market for high temperature applications.

The Japanese manufacturer Asahi Kasei Corp. has developed a new high-temperature type with Asaclean PF, which, unlike Asaclean PX2, does not contain any glass fibres.

Asaclean PF has been developed for a temperature range of 280°C to 420°C and is ideal for the cleaning of super-engineering resins, such as PPS, PEI, PEEK, LCP and similar.

Like all Asaclean types, Asaclean PF cleans mechanically and is safe to use for the operators and the machine. It can also be used for hot runners – if the gates are larger than 0.5 mm – as well as for sealing (at a maximum of 370°C).

“Asaclean PF will perfectly complement our purge compound portfolio. The feedback of our customers confirms the efficiency of the cleaning as well as the excellent thermal



Application example: Asaclean PF used to clean PEI (black). Injection moulding machine: 50 ton, Barrel temperature: 380°C. Quantity of Asaclean PF used: 500 g

stability. We are delighted to be able to close another gap in the market. The previous type PX2 with 50 percent glass fibre remains an effective tool against black spots and carbonisation”, says Enno Stapel, Product Manager for purging compounds at VELOX.

► www.velox.com

Krones and Erema are joining forces to progress PET recycling

■ Krones AG, Neutraubling, Germany, and Erema Engineering Recycling Maschinen und Anlagen GmbH, Ansfelden, Austria, have agreed to collaborate in the field of PET plastic recycling. The aim of this alliance is to incorporate the technical expertise of both companies into the planning and design of PET recycling lines and indeed complete factories, so as to be able to offer clients from both the beverage and PET recycling industries an optimal line or an entire factory. The accumulated corporate experience and the product portfolios of Erema and Krones complement each other to optimum effect: Erema, as the world’s market leader in the manufac-



ture of plastic recycling systems, contributes the expertise required for PET processing, and Krones is the world’s leading manufacturer and turnkey vendor of filling and packaging technology. Krones’ product portfolio, however, comprises not only machines and lines for filling and packaging beverages and liquid foods, but also machines for producing PET bottles, plus modules and lines for the recycling process. The collaborative arrangement will also focus significantly on planning entire factories, which Krones is already offering to beverage bottlers and PET recyclers from the feasibility study stage all the way through to the finished factory.

Krones’ comprehensive product range, particularly the MetaPure W hot-wash technology developed specifically for PET and validated by performance in the field, combined with Erema’s Vacurema technology developed for PET, will enable the two companies in future to offer responsively customised job sections - for washing and/or decontamination technology all the way through to complete factories for PET plastics recycling, and handle them as a turnkey vendor.

This means that Krones’ clients will soon be able to close the entire PET cycle, from manufacture of the PET plastic products all the way through to their recovery, and thus make a sustainable contribution towards the “circular economy”, with concomitantly reduced resource consumption and environmental impact.

► www.krones.com

TROESTER innovations at the IRC/Rubber Expo

■ Hanover, Germany-based Troester GmbH & Co. KG has made a name for itself as a global leader in machine and line engineering for the manufacture of tires and technical rubber goods. For 125 years now, the wealth of ideas put forward by its employees and its permanent succession of innovations has allowed Troester to secure a leading position in the global market.

At the IRC/Rubber Expo in Cleveland, Ohio/USA, interested visitors will be able to find out more about the company's cross extrusion head equipped with hydraulic tool adjustment for manufacturing premium-quality hoses. This new head system proves to be particularly advantageous when combined with downstream X-ray measuring technology, which permanently reduces wall thickness tolerances throughout the entire production process.



TROESTER Cross Extrusion Head Qu 120/65-90°

Another highlight to be showcased is the ROTOMEX gear extruder. Its numerous machine sizes guarantee versatile and extremely economical applications in almost all rubber processing areas, both in the lab, mixing room and on the extrusion line.

www.troester.de

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"Our machines shape the world": KraussMaffei Corporation's Open House in Kentucky

■ KraussMaffei Corporation, the affiliate of the KraussMaffei Group in the United States of America, opens its doors on October 4 and 5, 2017. Under the slogan "Our machines shape the world", customers and all those interested will experience a wide variety of live demonstrations, technological innovations and groundbreaking applications from the KraussMaffei, KraussMaffei Berstorff and Netstal brands. For the first time, the well-established event takes place in the new TechCenter at the headquarters in Florence, Kentucky, which has recently quadrupled

The ZE 28 BluePower twin-screw extruder is a machine for all research and development tasks thanks to its versatile modular design



in size. Numerous technical presentations and booths featuring more than 70 partners round off the program.

Expertise in extrusion technology

"To the world of extruders, we demonstrate our expertise in pipe extrusion and compounding, technologies highly in demand on the American continent", says Matthias Sieverding, President of the Extrusion Technology Segment of KraussMaffei. Customers and interested parties get to experience several twin-screw extruders in continuous operation, such as the ZE 65 BluePower, with higher torque density and larger available volume for highly filled polypropylene, and the ZE 28 BluePower laboratory extruder, with a significantly expanded process and processing window for color masterbatch. For the recycling of plastic waste, we are exhibiting a ZE 40 UTXi, which produces premium-quality compounds from remnants of fibers and foils—all in just a single step. Additionally, a complete pipe system will produce PVC drainpipes with a dimension of 6" (168 mm) at SDR class 41. The core piece is the KMD 114-32/R twin-screw extruder with the KM-RK 23-250 pipe head, designed for an output of 2,200 lbs/hr (1,000 kg/h). Another highlight of the series is waterless wall thickness measurement.

► www.kraussmaffei.com

Graham Engineering Corporation has appointed Brad Lovelace as Process Engineer

■ In this role, Mr. Lovelace will be a member of the Process Technology team responsible for technical and customer support including product development, product and system testing.

"Brad brings a demonstrated track record of medical extrusion operations and management, including product development, technical support, and extrusion laboratory management," said Steve Maxson, business development director for extrusion. "His hands-on experience and proficiency at extruding catheters, balloons, shafts, bump tubing, and multi-layer tubing will directly benefit our customers."

Brad Lovelace previously held the role of extrusion engineering technician at Merit Medical Systems and lead extrusion operator and supervisor at Medtronic, Inc.



► www.grahamengineering.com

UL certification of PA expands international product standards

■ The GRAFE Group has expanded its range of products meeting international quality standards with yet another UL certification. The plastics specialist from Blankenhain has announced that the UL Mark will now be applied to polyamide, joining the already certified materials PP, TPU and PC. The UL Mark certifies high and long-lasting quality of the company's products and clears the way for new sales channels and project activities in North America and Canada.

Back in 2010, GRAFE certified its PP Modale product group – Masterbatch for PP injection molding applications. In 2014 TPU-Tekolen was granted approval in accordance with UL94 HB „all colors“ and shortly thereafter PC-Tekolen followed. With the most recent UL certification of polyamides, GRAFE

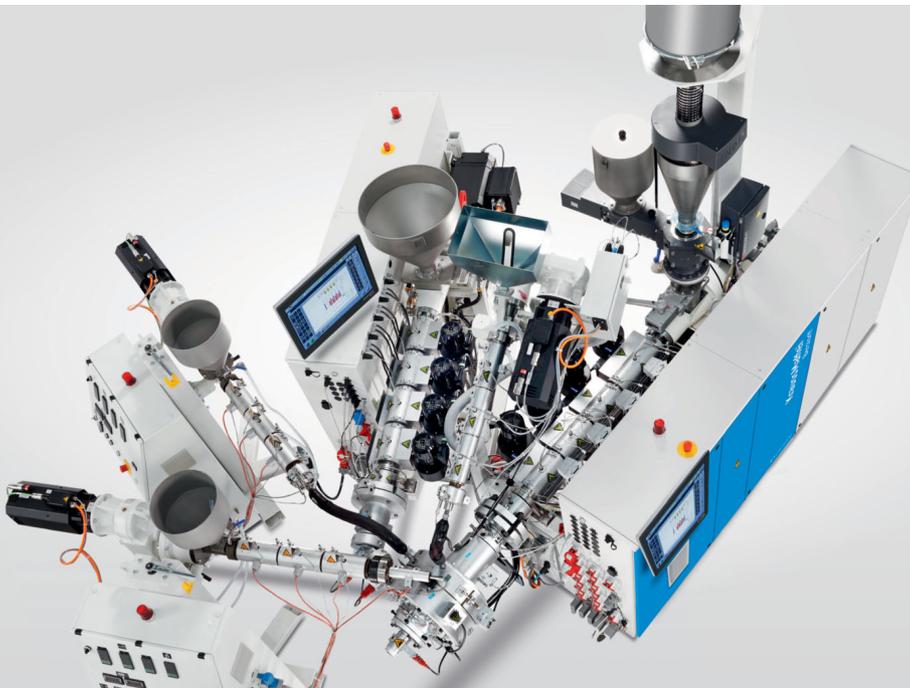
has again raised its product safety and quality standards in compliance with UL94 HB.

The UL standard tests the flammability and fire safety of plastics. The procedure determines the flammability class according to HB and is used mainly for housing components of electronic devices and applications. The certificate serves as proof that GRAFE-masterbatches for polyamides have been tested by the scientific testing organization and meet the applicable standards and requirements regarding possible risk of fire and mechanical hazards. The products will be tested and re-certified annually in the UL testing facilities in order to ensure ongoing compliance with the original requirements.

With the most recent UL-certification, the GRAFE Group has not only secured the smooth introduction of its products onto the international market, but has also enhanced their value and clearly distinguished itself from the competition through investment in product safety. Masterbatches are available in any color customers may request without restrictions to technical properties.



www.grafe.com



www.kraussmaffeiberstorff.com

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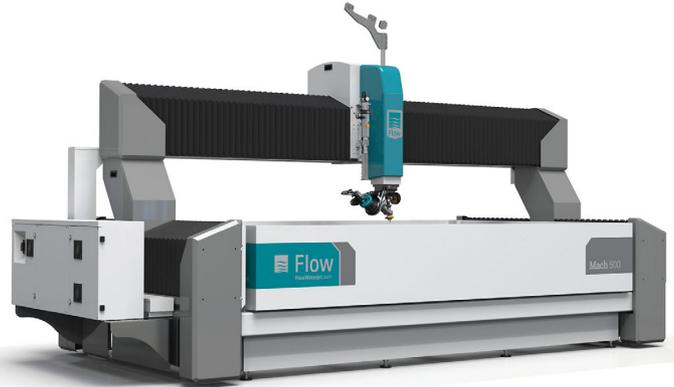
KraussMaffei Berstorff

New Mach 500 waterjet cutting system: a quantum leap in reliability and productivity

■ Flow International Corporation, the developer and manufacturer of ultrahigh-pressure waterjet machines for cutting applications, announced today the release of the Mach 500 in Europe, an entirely new waterjet system marking the arrival of a new industry standard. The Mach 500 combines the latest in machine architecture and waterjet cutting technology with comprehensive service and support programs. The main fields of use are machining metals such as aluminum, stainless steel, copper and brass, synthetic and natural stone and composite materials as well as cutting glass and plastics. Together, the latest generation of FlowXpert® 3-D solid modelling CAD/CAM software and the recently introduced Compass™ 5-axis contour following and collision sensing solution enable the Mach 500 to make a quantum leap in terms of speed, precision and reliability, significantly boosting productivity. Flow was presented this system at 'Schweißen+Schneiden' trade fair in Duesseldorf.

With the Mach 500, Flow has successfully doubled acceleration versus previous models. This means a 15 to 30 percent reduction in cycle time relative to the Mach 3b, the company's best-selling waterjet cutting system worldwide. The Mach 500's Z travel height is 50 percent larger (305 mm) and repeatability (0.03 mm) has been doubled. The modern electrical system improves reliability of the overall system and reduces complexity. The latest generation of FlowXpert® CAD/CAM software is capable not only of designing complete 3-D models and assemblies but also of simultaneously calculating optimum cutting paths.

Thanks to the modular architecture and numerous configuration options, the Mach 500 can be individually tailored to



The new Mach 500 waterjet cutting system combines the latest architecture and cutting technology with a comprehensive service and support package. Image: Flow

customer requirements. For example, a range of pump technologies and cutting heads are available. All pump models are connected via EtherCAT to enhance diagnostics and upgradeability. Compass™, the optional, patented multiaxial contour following system, has an integral collision sensor and enables precision cutting even on uneven surfaces. Service and support packages can also be tailored to a customer's specific requirements. Options include preventive maintenance programs, replacement programs for high-pressure components, prompt delivery of replacement parts, technical assistance and a comprehensive training and development program.

► www.FlowWaterjet.com

Davis-Standard Completes Maillefer Acquisition

■ Davis-Standard, LLC announced today that it has closed its acquisition of Maillefer International Oy of Vantaa, Finland and Ecublens, Switzerland. Maillefer (www.maillefer.net) is the global leader in wire, cable, pipe and tube production technologies.

"We are proud to welcome the entire Maillefer team to the Davis-Standard family, together we become the market leading global extrusion systems and services provider to a world-class customer base," said Jim Murphy, Davis-Standard President and CEO. "It is an exceptional opportunity to team up with an organization that shares our values and commitment to providing superior customer solutions."

"This is a historic day for all Maillefer customers and employees as we join Davis-Standard, an organization built on tech-

nology and service" stated Lars Fagerholm, preceding CEO of Maillefer and newly appointed as Davis-Standard's Executive Vice-President, Maillefer. "Maillefer is proud to join an organization with as strong a brand and industry reputation as its own. Together, the dedication to our products, service and customer support will continue as it has in the past."

Murphy closed with, "This transaction is a major milestone for the growth of Davis-Standard and all our stakeholders. Together with our majority owners, ONCAP, we are enthusiastic to include Maillefer in our vision for the future."

► www.davis-standard.com

Double twin plants for polyolefins recycling

■ AMUT RECYCLING DIVISION awarded two tenders issued by European leading companies both involved in the waste management field. Each supply includes one twin plant suitable for the reclaiming and regeneration of thermoplastic polyolefin scraps to be transformed into granules. The water-saving concept of the AMUT patented technologies are well known all around the world because of the treated water that can be re-used thanks to special recirculation circuits.

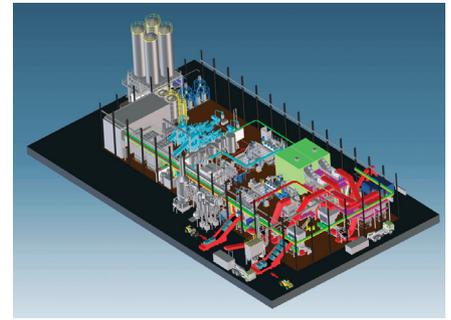
For the first project, the two lines will process, working in parallel, LDPE scraps with a total output of 2500 kg/h. The thermoplastic scraps mainly consist of baled blown films coming from postconsumer recycled packaging. In order to increase the flexibility of the plant, a group of conveyor belts enables the two shredders to feed alternately two buffers on the lines. The decantation phase permits to separate the heavy objects and contaminants from the film whilst a pre-washing action removes other pollutants and dirt. The second high friction action is made during the wet grinding.

Turbo Washer and Friction Washer machines perform an intensive and continuous washing and rinsing action. The process washing water can be thermally adjusted and conditioned by chemicals/detergents to increase the cleaning efficacy. The flakes are separated from water and conveyed to the centrifuge machine for the drying phase. A hot-air drier reduces the humidity value of the flakes and makes the material suitable for the extrusion processes.

For the other project, AMUT will supply twin lines for washing and pelletizing of post-consumer plastic materials: the total output is 1500 kg/h of LDPE film or 4000 kg/h of PP or HDPE containers. The main advantage is the possibility of reclaiming either light or heavy polyolefins with the same machines one at a time. In the first decantation trough, the material is separated from heavy objects and contaminants and then conveyed in two parallel turbines for the pre-washing phase. The second high friction action is made during the wet grinding.

An intensive washing action is made by the Friction Washer where the flakes are con-

tinuously subject to a strong friction action followed by rinsing operation for further removal of residual impurity. The purification from residual heavy plastics and rinsing is completed by special centrifuge called decanter. The decanter performs also drying action. The supply includes an extrusion plant to complete the entire reclaiming process.



www.amutgroup.com



Hall A6, Booth 6110

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BASF to acquire Solvay's global polyamide business

■ BASF and Solvay have signed an agreement related to the sale of Solvay's integrated polyamide business to BASF. The purchase price on a cash and debt-free basis would be €1.6 billion. According to applicable laws, the intended transaction is subject to consultations with the relevant social bodies of Solvay, following which both companies will enter a binding purchase agreement. Solvay and BASF aim to close the transaction in the third quarter of 2018, after customary regulatory approvals have been obtained and the formal consent of a joint venture partner has been received. The partner has already committed to grant its consent subject to the delivery of definitive documents with BASF.

The acquisition would complement BASF's engineering plastics portfolio and expand the company's position as a solution provider for the transportation, construction, industrial applications and consumer industries. Regionally,

the transaction would enhance access to key growth markets in Asia and South America. At the same time, the purchase would strengthen BASF's polyamide 6.6 value chain through increased polymerization capacities and the backward integration into the key raw material ADN (adipodinitrile).

For the full year 2016, net sales of the business to be purchased from Solvay amounted to €1,315 million and EBITDA to around €200 million. It has approximately 2,400 employees globally, thereof approximately 1,300 in France. Worldwide, it operates 12 production sites, 4 R&D locations and 10 technical support centers. The business would be integrated into BASF's Performance Materials and Monomers divisions.

► www.basf.com

SIPA and EREMA hold Open House

■ A very special Open House was held from 4 to 6 September at the SIPA headquarters in Vittorio Veneto, Italy, where the unique direct processing of washed PET flakes to make food contact grade preforms was demonstrated live on the world's first PET Inline Preform system. The system will be in industrial operation next year.

Numerous representatives from the beverage industry and well-known brands attended the three-day Open House held by SIPA and EREMA and saw a compelling live produc-

tion performance of the world's first PET Inline Preform system. SIPA, the leading manufacturer of PET packaging solutions from Italy, and EREMA, specialists in the manufacturing of plastic recycling systems, have together developed a unique, flexible, direct processing solution to make food contact compliant inline preforms from PET flakes in a single step. The pivotal product from EREMA in the collaboration is VACUREMA technology, which is combined with SIPA's XTREME preform production system. The pioneering



Open House of SIPA und EREMA (from left): Enrico Gribaudo, General Manager of SIPA, Anna Horecica Csiki, Product Manager PET Systems at SIPA, and Christoph Wöss, Business Development Manager at EREMA Group

The new PET Inline Preform system combines the efficiency benefits of the proven VACUREMA technology from EREMA with the innovative XTREME preform production system of SIPA
 Photo credit: EREMA



system offers PET processors economic and ecological benefits: energy savings, lower logistics and process costs and higher profitability thanks to the direct link of the two systems eliminating all the waste of the complete process. Another unique selling proposition over conventional injection moulding is that lightweighting up to 8% is possible with the patented XTREME preform design.

Trials carried out previously on the PET Inline Preform system showed that the weight consistency, viscosity and colour values of the preforms – depending on flake quality – are on a par with those of virgin material.

www.erima.com



Presenting the new, powerful „Next Generation“ NG extruder series

conEX NG / conical twin screw:

- Enlarged processing window through balanced energy input
- Fully insulated barrel for up to 10% energy savings compared to standard executions
- Up to 20% energy savings through optimized processing



New conEX NG extruder



New solEX NG extruder

solEX NG / single screw:

- Up to 25% higher outputs
- Up to 15% less energy costs
- Up to 10 °C lower melt temperature with excellent melt homogeneity & mixing quality



Precision in seven layers

motan conveying and dosing technology at Greiner Packaging GmbH

Fig. 1: Capsules made of a 7-layer composite foil are the modern way of storing coffee in portions. The film combines barrier properties and recyclability Photo: Greiner Packaging



Worldwide, up to 2.5 billion cups of coffee are drunk every day. Much of this is prepared from coffee powder capsule portions in coffee machines. Due to the necessary oxygen barrier to prevent ageing of the coffee due to oxidation, these capsule portions consist of either aluminium or a plastic composite foil with an integrated oxygen barrier. Since 2015, the latter have been produced by the "Greiner Packaging" in Kremsmünster, Austria (Fig.1). For this purpose, a sustainable production concept was developed together with the peripheral equipment manufacturer motan and the Austrian agent Luger. With this concept, the punching waste left over after punching out the deep-drawn capsule bodies is completely fed back into the 7 layer extrusion line in accordance with all quality limits.

As coffee is a natural product, like all living matter it is subject to an oxidative ageing process, in particular when exposed to the open air and moisture. In particular, the flavouring substances released during roasting of the coffee and the unsaturated fatty acids in the coffee bean oil oxidise very quickly. This is perceptible by the associated change in taste and smell. The coffee becomes sour and rancid. This applies to both whole roasted beans and ground coffee and happens very quickly. In this way, freshly ground coffee loses up to 60 per cent of its aroma after only 15 minutes. The only way to prevent this is to stop the oxidation reaction as quickly and completely as possible, namely by packaging it in air tight and water-tight containers, such as coffee capsules.

Greiner Packaging produces coffee capsules from barrier plastic

As mentioned at the beginning, the portion containers consist either of aluminium or plastic, both made of deep-drawn foils. However, without evaluating which is the better packaging solution, there is a significant difference between the two alternatives. Whereas an aluminium foil is a good barrier against almost all external influences, there are only very few plastics which are gas tight and aroma tight. EVOH, an ethylene vinyl alcohol copolymer, offers the best barrier properties against both oxygen and steam. It is just as water tight as an LDPE layer which is 10,000 times as thick. As it is comparatively expensive, it is used centrally as a thin barrier layer within a compound

foil together with other plastics. At Greiner Packaging in Kremsmünster, Upper Austria, a 7 layer compound foil is used to produce coffee capsules. (See fact box “Multi layer foil for coffee capsules”)

motan and Greiner Packaging have developed a sustainable production concept

As the cups of the coffee capsules are produced from the compound foil by deep drawing and punching, more than 50 per cent of the film remains as a punched frame. As this quantity of waste could not have been disposed of logistically or economically due to the projected mass production, Greiner Packaging developed a concept for complete recycling of the punching waste during ongoing production together with the long term system partners, the German motan group, a manufacturer of peripheral systems, and Luger GmbH from Austria, as motan project planners and plant fitters and the extrusion technology supplier. For this purpose, the multi layer foil to be produced must be adapted in such a way that up to 60 per cent of it can consist of the regrind of the original foil. The punched frame and waste parts are ejected directly from the deep-drawing machine and fed into a mill (Fig. 2). The regrind goes either into a storage silo or into BigBags and is fed from there to the extrusion plant, where it is made into a mixed polymer which provides the two main layers of the compound foil. Therefore, including the addition of new material, 70 per cent of the total material throughput of the projected conveying and dosing unit is provided by the recycling circuit. The comparatively small material throughputs of the additional four extruders represent the remaining 30 per cent. These four extruders are arranged on two levels around the central “regrind extruder”, which is on the base level. It is flanked by the extruders for the central barrier layer and the adhesion



Fig. 2: The 7 layer barrier foil which comes out of the extrusion machine runs directly into a multi cavity deep drawing and punching machine. The remaining punched frame and any bad parts produced are then fed directly into a cutting mill (in the background at the end of the machine) and fed back into the production line from there

promoter layers. The extruders for the two top layers are “on the first floor”. The material traps for the extruders underneath are on the second floor (Figs. 3 to 5). Compared to the complex dosing and mixing technology, the design of the pipeline system is simple and direct, with fixed piping to each material trap. There is no coupling station or intermediate material drying.

Dosing precision lies in the detail

As mentioned above, most of the material throughput is from the regrind layers, which are supplied via gravimetric dosing units and a downstream mixing system due to possible fluctuations in the bulk density. Comment by Helmut Reckziegel, Head of Business Unit Capsules: “In this re-

Fig. 3: A 5 aggregate extruder is used to produce the 7 layer barrier foil. The central extruder is responsible for 70 per cent of the foil in the form of the recycling percentage. It is flanked by the extruders for the barrier layer and the adhesion promoter layers. On a production level arranged above this, the extruders for the PP cover layers are arranged, which are connected to the feed block via vertical smelting lines (visible in the background)



Fig. 4: The 7 layer foil machine is constructed in three functional levels on top of each other. On the lowest level (not visible here) there are three extruders (see Fig. 3), on level two there are two extruders for the cover layers, on the top level the dosing units to supply the extruders situated below





Fig. 5: Central mixing station to supply the "regrind extruder". In this, four material components come together (regrind from the silo or from the BigBag, stabiliser for the adhesion promoter and new PP material) which are added from the gravimetric dosing units on the third level. Photo 2-5: Author

INFLUENCE FACTOR | REGRIND

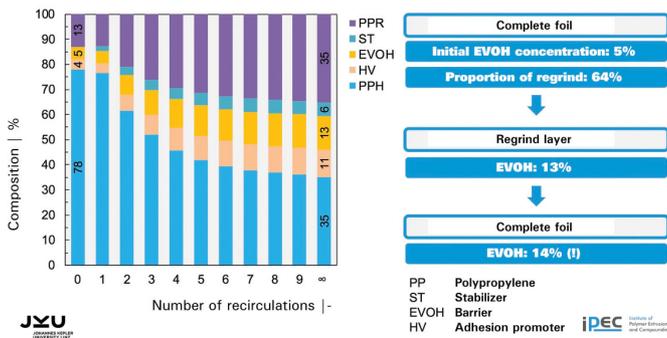
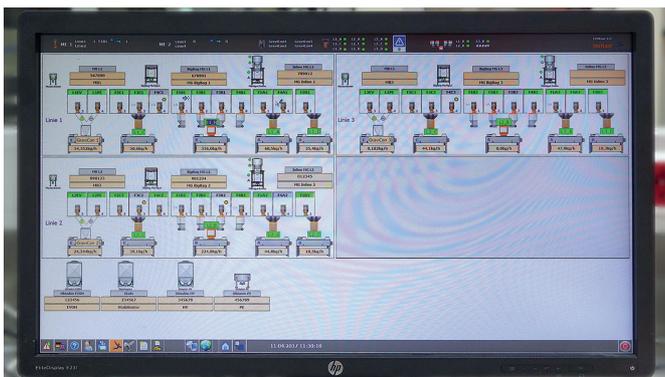


Fig. 6: Factors of influence on the composition of the regrind fed back into the cycle. Greiner Packaging

gard it is worth mentioning that the regrind fed back into the multi layer foil as filler material consists of the 7 layer foil and is therefore composed of the five different viscosity materials which this contains. It was our joint objective to achieve stable mixing and flow properties for this

Fig. 7: All functions and setting data of the complex conveying and dosing machine are controlled by CONTROLnet, an integrated control concept for the operation, monitoring and management of all steps of raw material handling and connected to the motan master computer system via LINKnet 2.0. Photo: Author



5 material mixture. An unstable material composition, whether due to fluctuating bulk density or a change in material proportions, leads to reductions in quality of the extrudate, in particular when seven layers have to harmonise with each other. As we wanted to install a control option for this, we provided for the addition of virgin PP material to the regrind. Therefore, the continual enrichment of the concentrations of the percentage of EVOH and of the adhesion promoter in the total foil, triggered by the return of the stamping grid, can be stabilised at 14 and 12 per cent respectively and consequently the melt flow index." (Fig. 6)

A further concept detail is worth mentioning: due to the shortest possible return of the regrind, it does not cool down completely. A large part of the heat energy contained therein can thus be used for faster melting in the extruder, which leads to an improvement in the energy balance in view of a material throughput on the "regrind extruder" of approx. 500 kg/hr.

All other material percentages are added volumetrically as virgin material in constant quality. The throughput quantities for the barrier material and the adhesion promoter are a maximum of 60 kg/hr. The throughput of PP layers, which are additionally mixed with a white or brown colour master batch, is somewhat more, at approx. 110 kg/hr (see Fig.1).

Complete machine transparently operable via master production computer

All machine components are activated and operated via the remote controlled electronic modules specifically developed by motan for this purpose. These are GRAVInet for gravimetric dosing units and VOLUnet for volumetric dosing units. They are connected to a ControlNet of the central machine control via Ethernet or TCP/IP. This can be extended up to LINKnet, a comprehensive plant management system (Fig.7). It is thus possible with Linknet 2.0 to collect and log the process sequences and application

Fig. 8: Helmut Reckziegel, Head of Business Unit Capsules at Greiner Packaging and Horst Bar, the responsible Project Manager at Luger GesmbH look back on 40 years of co-operation with motan. Photo: Author



data and to operate all connected controls up to device level. All motan controls with communication capability can be connected. Batch tracking is therefore continuously possible.

Success due to many years of proven partnership

Finally, in his résumé of the project process, Helmut Reckziegel sums up the main criterion for the stable production after only a short start up phase: "In view of the introduction to a new dimension of mass production, it was important for us to keep the technical risk at a small, manageable level. It is not least for this reason, therefore, that we decided to continue our long standing, proven partnerships. We have been working with Luger, the systems technology partner of motan, for more than 40 years already. We knew from similar machine projects in the past that the motan components would not call into question the availability of the complete system of 90 per cent required by us around the clock. Likewise, we assumed that the necessary dosing accuracy and the full integration of all setting and performance specifications would also be given in our "big data concept" for the logging of quality data." (Fig.8)

Autor: *TECHNOKOMM, Reinhard Bauer*

Info box: Multi layer foil coffee portion capsules

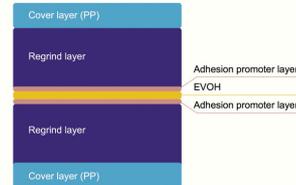
What requirements?

Coffee portion capsules made of foils must form a barrier against the ingress of steam, atmospheric oxygen and other unwanted substances as well as against the effects of UV radiation. The barrier must also protect against the escape of constituents such as aromas and moisture. At the same time, the foil cups can also provide protection against defined mechanical stresses during transport and storage.



Which foil structure?

A 7 layer compound foil is used for the coffee capsules. Its central layer consists of EVOH (ethylene vinyl alcohol co polymer). It forms the oxygen barrier and is embedded on both sides via adhesion promoter layers of recycling material (punching waste). Coloured polypropylene layers (homo polymer and co polymer) are additionally applied as cover layers. Graphic: Greiner Packaging



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The screenshot shows a control interface with a central diagram of a machine. Parameters include: Dauerlauf (2500 1/min), 10min, 600.0 mm, and a Reset button. There are also icons for 'I', 'Program', and 'SERVICE'.

A photograph showing a complex metal extrusion die assembly with various components and tools.

Photographs of three different extrusion machines: X10, X3, and X6.

The battenfeld-cincinnati team was showcase technologically advanced extrusion developments at Equiplast at the booth of long-time partner and agent for Spain Comercial Douma (hall 3, D 474). "For battenfeld-cincinnati, Spain has always been an important market and we have many long-standing customers there. Besides our new NG extruder series, we will present the latest developments for thermoforming sheet extrusion. Plastics packaging, especially for food, is a future trend and food packaging already accounts for more than a third of the global packaging market.

The high-speed extruder with an in-line roll stack is perfect for premium thermoforming sheet



“Next Generation” equipment at Equiplast



STARextruder: ideal for direct processing of PET

Complete line solutions for thermoforming sheet for high outputs and line speeds

battenfeld-cincinnati's portfolio for thermoforming sheet includes the high-speed extruder series that offers extremely high outputs (from 30 to 1,500 kg/h for PP, 35 to 1,750 kg/h for PS) and features energy savings around 15 to 20%.

High-grade packaging products such as thin-walled plastic PET containers for food packaging produced out of post-consumer bottle flakes show a high

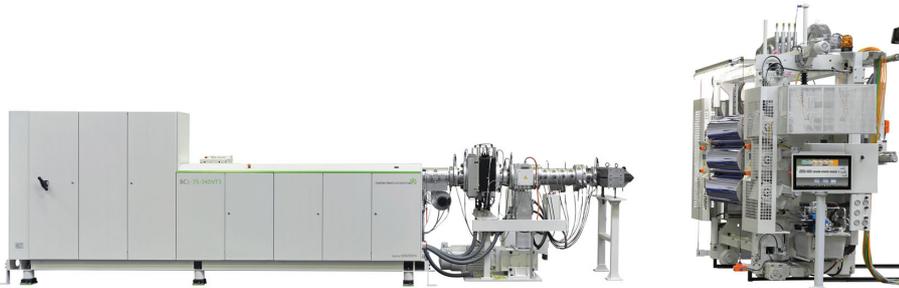
growth rate. This type of packaging benefits from the rising trend for food "on the go". For direct extrusion of PET, the STARextruder series is the best choice. It offers highly efficient degassing of the melt due to the combination of a single screw for plastification and a planetary roller section for degassing. The system offers important advantages such as energy savings, less IV degradation and the possibility to obtain a mono-layer sheet with food grade approval. The available machine sizes of 90, 120 and 150 mm are perfectly suited for small and medium

output ranges. The STARextruder also has extremely low operation and maintenance costs.

To complement its extruder series, battenfeld-cincinnati offers unique and powerful roll stacks. The Multi-Touch XXL roll stack has an innovative multi-nip process that achieves stress-free sheet with thickness tolerances of +/- 1% even at high line speeds, as well as high transparency and surface gloss. It delivers enormous outputs of up to 3,300 kg/h (PET) and

The new single screw series soLEX NG with a completely redesigned processing unit for lower melt temperatures, higher outputs and energy cost savings





The new conEX NG extruder series has a completely new processing unit, offers highest flexibility and has an excellent price/performance ratio. Just like the new soLEX NG extruder, this machine is also equipped with the new BCtouch UX control for Industry 4.0 applications

up to 3,000 kg/h (PP), depending on the width and thickness of the sheet.

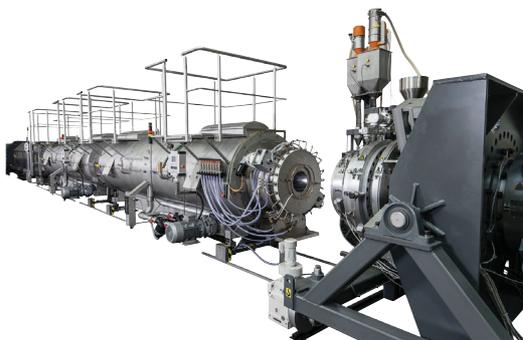
Cost savings and energy efficiency for pipe and profile extrusion

“Last year we introduced two “Next Generation” extruder series for PO pipe and PVC pipe and profile extrusion. The new extruders have many new features and are even more energy-efficient than their predecessor series. We also developed a completely new extruder control, the BCtouch UX, which is ideally suited for Industry 4.0 applications. At Equiplast, we will show a soLEX 45-40 extruder which has already been sold to a Spanish customer. It offers top performance for the extrusion of smooth and corrugated PE-HD and PP pipe,” says Vedat Gültekin, Regional Sales Manager for pipe and profile applications.

soLEX NG extruders for PO pipe

soLEX NG extruders are based on the proven soLEX range, but their core processing components (barrel, screw and grooved bushing) have been completely

With the FDC line, changeover to different pipe dimensions currently takes about 20 min at Emtelle’s plant, and the change to a different automatic dimension range is possible within one shift



redesigned to offer up to 25% higher outputs per machine size (from 1,000 to 2,500 kg/h). In addition, the melt temperature can be reduced by up to 10°C for comparable outputs, and energy costs can be reduced by up to 15%. This makes the soLEX NG also particularly suited for large diameter pipe extrusion.

conEX NG extruders for PVC pipe and profile

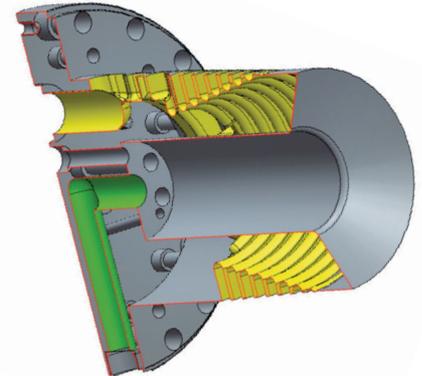
The conEX NG extruders have outputs from 20 to 250 kg/h for PVC profile and WPC/NFC and from 60 to 450 kg/h for PVC pipe. The extruders feature a longer pre-heating zone and an optimized screw design. The fully insulated barrel offers energy savings of up to 10% and balanced processing enables energy savings of up to 20%. The conEX NG is also an excellent choice for co-extrusion. Several different space-saver or pedestal designs are available and can be adapted to every main extruder through improved height and tilt adjustment facilities.

Cost savings for pipe producers with inline pipe dimension change

The FDC (fast dimension change) system allows for a change of external diameters and pipe wall thicknesses during production, as well as fast color changes. This ensures greater production flexibility and substantial material savings thanks to shorter changeover times. In production, battenfeld-cincinnati’s customer Emtelle in Denmark can effect changeovers to different pipe dimensions in only 20 minutes, while the change to a different automatic range – e.g. from 200 – 355 mm to 400 – 630 mm - can be made within one shift.

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Innovation in the plastic pipe industry: PVC-O fittings ecoFIT TOM[®]

Along the years, plastic pipes have become a main solution for water transportation and distribution, gaining market share to the traditional materials. These pipes present characteristics not present in pipes made of other materials.

Many aspects, as installation cost and speed, maintenance, pumping energy, flow capacity, etc., are usually underestimated and not taken into account in infrastructures that should last 50 years or more, being in the long term much more important than the pipe price.

PVC-O Background

In the last years and under the leadership of Molecor, PVC-O pipes have had a very intense evolution in the range of products availability, spread of the standards worldwide and promotion of projects.

There are many advantages that are common to plastic pipes that determine the election of these materials for water transportation, well known for everyone, among them: corrosion resistance, light weight, easiness of installation, etc. PVC-O maximizes these excellent features and the competitiveness of the installed pipes in this material is still difficult to achieve. Then, although there are cheaper solutions in the market, PVC-O can still continue its evolution.

PVC-O fittings, a new milestone on the market

Fittings are widely used for connecting pipes and forming pipe systems. They are essential since no pipes can be installed without the use of fittings to change their direction, to fit different sizes or shapes, and for other purposes such as regulating and measuring fluid flow. For each use there is a specific fitting – i.e. adapters, elbows, tees, reducers, valves, couplers, etc.

One important deterrent for the expansion of PVC-O has been the lack of fittings in this material, being duc-

tile iron ones the most popular for high pressure and diameters above 200 mm.

After a hard process of R&D, ecoFIT TOM[®] are the first PVC-O fittings for this range of products and applications. Currently, piping systems (whether plastic, concrete, cast or ductile iron) mostly use ductile iron fittings. In the last decades the rise of plastic systems has steadily substituted concrete or cast iron water pipes, but not the fittings. Existing technology for producing plastic-fittings is based on injection, which requires very expensive molds and also large amounts of raw material growing exponentially as the diameter increases. Therefore, there were no efficient plastic solutions for big-diameters and high-pressures.

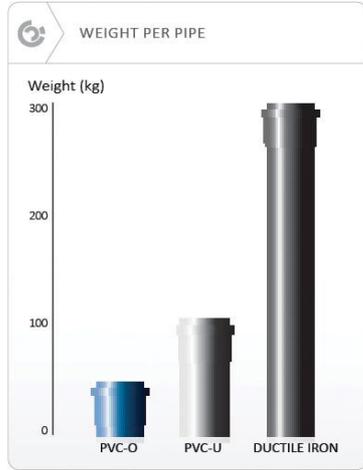
Based on the patented technology of Molecor, cost-effective fittings are now a reality. The competitive advantage of ecoFIT TOM[®] is that the manufacturing system developed by Molecor is cheaper than injection ones, and requires less raw material usage than any other process. Moreover, these new systems have brought about a vast variety of technical, economic and environmental benefits as they proved to be of a higher resistance and efficiency, being ecoFIT TOM[®] the cutting-edge solution.

Based on the results obtained from the Product Environmental Footprint Test (PEF), PVC-O pipes are expected to have a much lower environmental impact

than its plastic competitors, and much lower than metal fittings. ecoFITTOM® is defined as an eco-friendly product with the environment since it contributes to the reduction of global warming by:

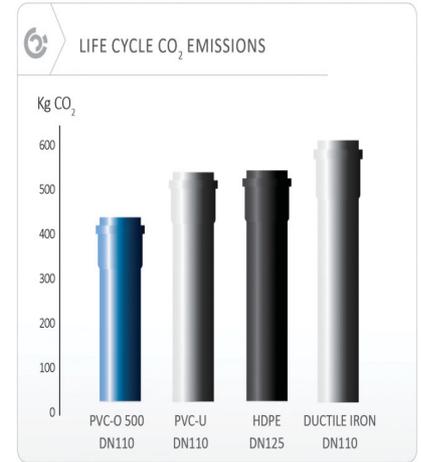
- The optimization of natural resources consumption.

PVC is a synthetic material derived from natural resources (oil and salt). 57% of PVC it is made out of chlorine, derived from common salt which is abundant on earth. Therefore PVC contributes significantly to saving oil and gas (non-renewable resources) in comparison to other materials which composition depends entirely on oil.



ISO 16422. For a 6 m pipe DN250 mm PN16 bar

- The reduction of raw material needed. The patented Molecular Orientation process of PVC-O makes possible to manufacture with less need of raw material, offering the best mechanic performance, but with a significant reduction of the end-product weight compared to other competing solutions: 50% reduction compared to other plastics solutions and over 80% compared to ductile iron. Therefore PVC-O is far more efficient than other competing solutions in terms of costs, raw material consumption and lighter weight, making easier manipulation and installation.



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Orienting the future

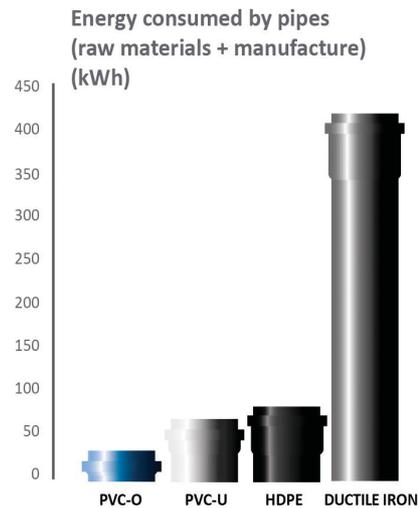
- The durability and recyclability of the endproduct.

Plastics are durable materials, since they do not rust or corrode. Consequently, PVC-O pipes, used for different applications such as water supply, irrigation, sewage, etc., can last over 50 years. But in addition to this, PVC-O is 100% recyclable material, maintaining the same properties after the recycling process as the initial material. It can therefore be

reintroduced into the PVC-O pipe production or used in many other applications (packaging, cable sheathing, etc.).

- The reduction of CO₂ emissions in all energy-consuming activities along its lifecycle: i.e. extraction of raw material; processing of raw material; production of pipes; product transportation and installation; product use and waste. PVC-O manufacture supposes a 33% reduction of CO₂ emissions in relation to ductile iron emissions.

PVC-O pipes manufactured with the technology developed by Molecor are the most ecological solution currently available on the market with the highest degree of energy efficiency throughout its whole service life. In the following table we can see in detail the different advantages presented by the PVC-O fittings ecoFIT TOM®.



PVC-O pipes manufactured with the technology developed by Molecor are the most ecological solution currently available on the market with the highest degree of energy efficiency throughout its whole service life. In the following table we can see in detail the different advantages presented by the PVC-O fittings ecoFIT TOM®.

PERFORMANCE	SAVINGS
<ul style="list-style-type: none"> ✓ Plastic solutions: System with non-discontinuity, ensure water tightness, diminution of breakages, leakages and failures in comparison to other systems. ✓ Water quality: ecoFIT TOM® is immune to corrosion and to chemical attacks from micro and macro organisms. The quality of the conveyed fluid remains unaltered, in compliance with health standards for water's human consumption. ✓ Water hammer reduction up to four times less than other materials. ✓ Higher hydraulic capacity. PVC-O piping systems have between 15% and 40% more hydraulic capacity than systems with pipes made of other materials and with the same external diameter. ✓ Molecular Orientation process makes possible to manufacture PVC-O pipes with a greater internal diameter and flow section. 	<ul style="list-style-type: none"> ✓ Raw material savings. The excellent mechanical properties of PVC-O enable a significant reduction on the use of raw material compared to other products with the same physical requirements, reaching important material savings. ✓ The petrol consumption needed to manufacture the raw material is, therefore, lower than for other plastic conduits. ✓ The energy consumption needed in the manufacturing process is slightly lower than other PVC-O pipe manufacturing processes and considerably lower than other plastic pipes. ✓ No protection or coating is needed vs iron. ✓ Non heavy machinery is required, being this necessary only for diameters bigger than DN315 mm. ✓ High savings in production, installation and maintenance processes.
ENVIRONMENTAL	INSTALLATION
<ul style="list-style-type: none"> ✓ Sustainability. ecoFIT TOM® preserve the environment considering aspects such as energy saving or sustainable use of natural resources, among others. More than 50% of PVC resin is made out of chlorine, derived from common salt, which significantly contributes to non-renewal resources savings. ✓ Product environmental footprint. The best known environmental parameter is the Carbon Footprint; TOM® pipes system has the eco-label Environmental Footprint FVS Seal. ✓ PVC is chemically inert, immune to corrosion, or microorganism attacks, maintaining the water quality for human consumption without the migration or oxidation problems that other materials have. ✓ 100% recyclable. It can be re-used not only for new piping production, but for urban furniture, road safety elements, window profiles, soundproofing panels... ✓ PVC-O pipes produce the lowest CO₂ emissions throughout their life cycle compared to other piping solutions. 	<ul style="list-style-type: none"> ✓ Lightness. PVC-O pipes system is lighter and easier to install in comparison with other materials, since no machinery is required to handle them. It is between six and twelve times lighter than ductile iron. ✓ Ductility. PVC-O's excellent elasticity allows the recovering of its initial shape even after being crashed or hit during its manipulation, eliminating risks of breakages or cracks and ensuring optimum performance once is buried. ✓ Joints Plug-in system. The efficient socket design provides a robust rubber sealing ring and faster connection between pipes and fittings; the plug-in limit mark facilitates installation and ensures their correct assembly. ✓ Durability of the PVC-O against degradation prevents leakage of channeled water and ensures a useful life of over 50 years versus other materials 30 year useful life. ✓ Easy assembly since there is no need of welded union. Its weight allows higher performance and installation speed compared to the rest of materials.



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 756698

In the past, blown film producers were struggling over many years with wave phenomena and surfaces not perfectly plane. Especially stiffer films containing HDPE or PP are affected by these problems which frequently also occur in the production of barrier films. Reifenhäuser Blown Film offers the right solution with their EVOLUTION Ultra Flat haul-off. This novel system allows to produce films of considerably improved flatness and ensures better printability and lamination capability.

Für die Produktion von Laminierfolien mit hervorragenden Planlageeigenschaften hat sich EVO Ultra Flat etabliert



Blown films perfectly suited for lamination

But what makes EVO Ultra Flat so special? The secret of the new optimized film flattening system is mainly its position within the process. While in the past flattening systems were arranged just in front of the winder, EVO Ultra Flat is installed exactly at the point where optimum processing conditions are available for flattening the web, that means upstream between the haul-off nip roll assembly and turner bar system. This arrangement offers the following advantages: At this stage of the process the film has still a temperature of over 50°C and is thus not fully crystallized. Stretching of the film is not only much easier while it is still flexible, but also more energy efficient than all other commonly available systems used at the end of the process.

Further benefits are low investment costs and high functionality and flexibility: Four heating-cooling rolls and two nip rolls designed for independent speed and temperature control allow producers to obtain the desired flattening effect. In this way, it is possible to obtain optimum results with different raw materials and film thicknesses. In addition, sagging of the web can be reduced by a targeted control of the rolls.

The result: Flatness of lamination and barrier films can be improved by up to 40 per cent while sagging of the web can be reduced by up to 90 per cent. In subsequent conversion processes the films can be more easily laminated, printed and converted into packaging products.

Reifenhäuser technology meanwhile is well established in the market to an extent that about 70 per cent of all

relevant new Reifenhäuser lines are equipped with EVO Ultra Flat. Film producers who convert their own films recognized the huge benefit of this technology very early and don't want to do without it.

EVOLUTION Ultra Flat is well-established in the market due to excellent web flatness properties in the production of lamination film. EVOLUTION Ultra Flat is well-established in the market due to excellent web flatness properties in the production of lamination film.

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Piovan, which has always been committed to the development of integrated solutions for the plastics industry, has also established new standards in the extrusion industry thanks to the Quantum E series.

With a view to continuous improvement, Piovan's goal is to produce dosing machines and technologies that are remarkably efficient, especially in terms of energy use, increasingly reliable, easy-to-manage and maintain, ready for the smart factories of Industry 4.0

15" touch screen control panel



Quantum E

From raw material management to production and logistics, industrial systems need to adapt to constantly changing demand and this requires flexibility, adaptability and performance continuity. This is why the various equipment used needs advanced

and constant controls throughout the process, able to communicate with each other and with external systems thanks to open and customizable communication protocols. With the Quantum E dosing system, Piovan improves both the effective-

ness of the production processes and the product thanks to the high technological content of the new dosing systems, which ensure maximum precision in pellet dosing and total processing control.

The benefits of the Quantum E solution

Quantum E is the new gravimetric batch dosing unit with continuous extrusion control that completes the Quantum series of next-generation dosing units introduced on the market in 2015. With this innovative design, Piovan combines, in a single high precision system, both gravimetric dosage versatility and the accuracy of the continuous loss-in-weight system.

- Modularity: the native control of Quantum E can manage 1 to 8 dosing stations.
- Precision: accurate weighing and complete traceability of each component of the blend.

Quantum E - gravimetric batch blenders with continuous extrusion control



- Easy to use, to clean and to maintain: the weighing station and mixing shaft are removable without the need for tools and are fully accessible, as well as the mixer chamber. The load cells are equipped with an integrated automated cleaning system (patent pending) that comes into operation after each cycle.
- No waste of material: the new design of the discharge system allows the entire hopper to be emptied, leaving no residue; the material is conveyed optimally, without mechanical stress or the risk of crushing the pellets.

Innovation and versatility

Quantum E allows a versatility of use that has never been achieved before, thanks to 8 dosing stations: each station is added or replaced by a simple mechanical operation without the need for complex manoeuvring and in conditions of complete safety for

the operator and for nearby equipment.

The gravimetric batch dosing system precisely weighs each of the ingredients of the mixture, while loss-in-weight technology allows total control of the extruded product output and maximum weight continuity per metre of the film.

Quantum E evolves with respect to similar systems:

- Thanks to the two load cells with loss-in-weight technology, whereby material consumption is measured continuously and gravimetricly;
 - In substitution of the slide gate station it is possible to install an auger station to precisely modulate the micro-dosage of the ingredients.
- Quantum E is the ideal gravimetric dosing system for the production of flexible packing film. For this reason, it integrates technological solutions that offer the best dosage accuracy and maximum pre-

cision in weight control per meter of output.

Keeping the weight/metre ratio constant is essential in blow film extrusion, as it means:

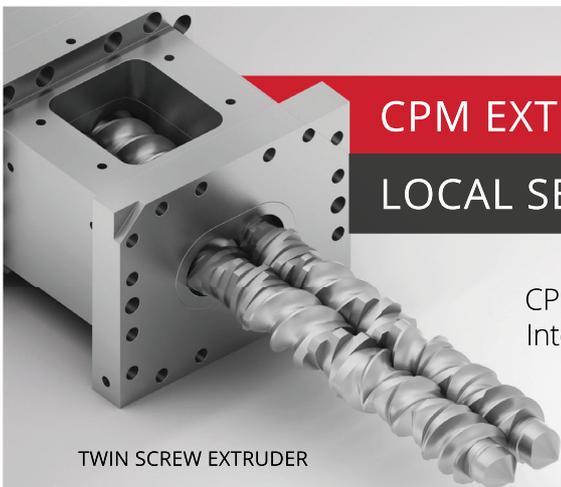
- savings in material;
- optimisation of material use;
- reduction of waste.

Accuracy, control at every stage, effectiveness

The Quantum E dosing system has been designed and built in such a way as to allow complete traceability of each component and the repeatability of each cycle, also as a consequence of the new trapezoidal shape of the dosing gate, which allows further precision (in dosing), with the integration of a rapid unloading device.

The particular design of the patented spherical mixer, also prepares a completely homogeneous blend of the various ingredients with loss-in-

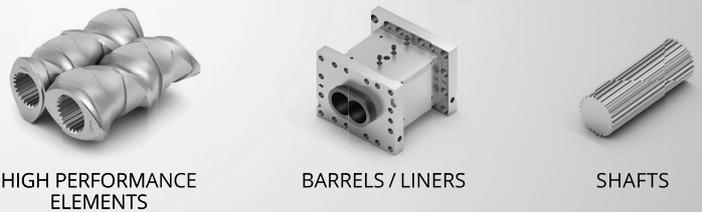


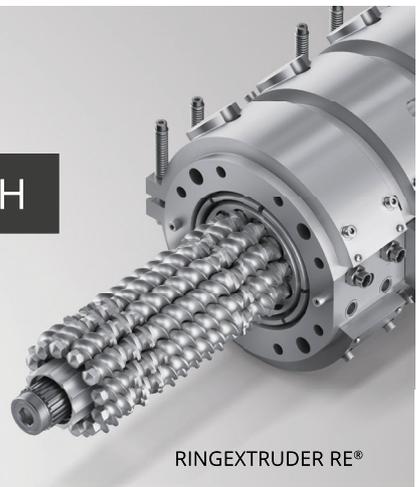



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Dosing station

weight control. The mixing action is improved and the hemispherical form of the mixer prevents any pellet stagnation. Quantum E guarantees the consistent quality of the final extrusion in terms of composition and characteristics.

Quantum E can be configured both for single extrusion lines and for co-extrusion. In the co-extrusion configuration, the Quantum E dosing and control system adjusts the flow rate of each individual extruder.

Managing each parameter in real time thanks to an advanced control system

The use of Quantum E is simple and intuitive: control is achieved through a latest-generation PLC system, while a new HMI allows the operator to view the running of the process and all the operating parameters in real time. Any measurements and adjustments can be made directly and quickly. The Quantum E control, available in 11 languages, guarantees extreme flexibility in customisation.

The advanced control provided by Quantum E was developed by Piovan and acts in accordance with a new algorithm for the calibration of dos-

ing stations. It allows management of a 1 - 11 layer system and guarantees maximum accuracy of the blend right from the first batch: there is no waste of material, not even during calibration, since the dosing unit ensures that the pellet mix is precisely as desired. It is a control that allows maximum personalization and flexibility, operating through various data exchange standards (Ethernet, Profibus), to configure and use the dosing unit, adapting it to the plant's production needs and the type of extruder. The extrusion line is controlled by a 7" or 15" colour touch panel, from which it is possible to monitor the plant's productivity parameters and the weight/metre of the film. A second 4" panel, also a colour touch screen, is dedicated to configuring the machine according to the customer's operational needs. Quantum E can be controlled remotely through a normal network connection, and is ready for complete integration with Winfactory 4.0, the new Piovan software release for supervising production processes conceived for the Smart Factory. Winfactory 4.0 allows complete plant management

and accurate measurement of material and energy consumption. Thanks to the OPC-UA protocol, Winfactory 4.0 establishes communication between the production, distribution and information structure, allowing complete interchangeability of data and the management of equipment and processes via mobile devices, so it is possible to control virtually every parameter in real time.

Quality of construction

The quality of the new Piovan dosing system is also evident from the outside: an industrial cabinet guarantees full protection of the components and sturdy casing protects the motor. The strength of the construction is reflected in the machine's stability, which does not produce interference in the extrusion phase and can operate for 24 hours even under difficult environmental conditions.

Quantum E has been subjected to EMC electromagnetic compatibility tests in accordance with EN 61000-6-1,2,3,4 and Climatic Chamber Tests at Eurotest laboratories in accordance with EN 60068-2-2 with temperature profiles of 40°C - 50°C and humidity from 50% to 93%.

Energy saving and safety

Quantum E complies with the latest safety and consumption regulations; for more reliable and simple maintenance, it is equipped with high-efficiency motors that use 30% less energy than previous models.

Configurations

To satisfy any extrusion application, Quantum E is available in three models - QE200 - QE600 - QE1200 - with different initial configurations:

- for capacity - from 50 to 1200 kg/h - according to the model, all with the ability to natively control up to 8 dosing stations;
- available with integrated control to manage both the speed of the extruder and the winding speed of the film.

“It’s not a tube you’re investing in – it’s safety“

For many years, APT has been relying on inline X-ray measuring systems from SIKORA

Founded in 2011, the German company APT is specialized in the production and processing of fluoropolymers. At their location in Neuss, over 30 employees ensure daily that fluoropolymers become high-quality tubing, shrink tubes and profiles. Since the start of 2017, APT now belongs to the publicly listed Masterflex Group based in Gelsenkirchen, Germany

What customers can expect from APT is already visible in the company name. “APT stands for ‘Advanced Polymer Tubing’ and describes high-quality tubes with characteristics that are well above the standard market portfolio“, says Erich Kipping, who, together with Holger Heuser, is Managing Director of the company since its foundation. There are only a small number of manufacturers worldwide, who specialize in fluoropolymer tubing with a similar portfolio. The reason is that fluoropolymers are very specialized. Not only are they extremely temperature resistant, but they are also resistant to almost all types of

chemicals, such as fuels, solvents or lye and are even long-time weather-resistant. “Fluoropolymers are becoming essential when high temperatures, aggressive chemicals or both are involved“, says Kipping. Additionally, fluoropolymers are ultra-clean and biocompatible and, therefore, suitable for especially demanding applications, which would not be achievable with common polymers.

Applications for fluoropolymer tubing

Due to their chemical resistance, the polymers are used in process and plant engineering, amongst others, for



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heat exchangers for power plants or the transport of aggressive media. In the paint industry, entire painting lines are equipped with hoses from APT for the paint supply. Fluoropolymer tubing can also be found in the sector for consumer goods. The low surface energy allows an easy cleaning of the products and prevents, for example, fried egg sticking to the familiar Teflon® frying pan. In automatic coffee machines, tubes are applied for the supply of hot water. Here, the special demands are: They must withstand constantly high temperatures while simultaneously being pure – meaning without any kind of additives and plasticizers - so that they are physiologically safe. “Purity is not just essential for food and nutritional products”, says Kipping. In the semiconductor industry, so-called silicon wafers for the manufacturing of computer chips are exposed during the production process, developed and corroded. “The used chemicals pass through ultra-pure, resistant fluoropolymer tubing”, explains Kipping. A further exciting field of application for these hoses is the laboratory, analytics and biotechnology. “During criminal investigations, a DNA analysis is commonly done with automatic equipment. Our tubes are also built into these devices. Thereby, each centimeter of tubing must meet the highest quality standards. After all, no one should be sent to prison if innocent”, says Kipping.

Due to the fact that tubes from APT are being used in various operating and security related areas, their production is subject to numerous standards. In the USA, for instance, drinking water and food compatibility is certified by the FDA (Food & Drug Administration). Furthermore, for medical technology, there are standards or regulations, such as ATEX, which regulate constructions in potentially explosive areas. For such application, tubes must be electrically conductive in order to avoid electrostatic charges. In addition, there are fire protection regulations, as well as fire protection classes, for example, for the use of tubes in airplanes. This ensures that in case a tube ignites

through fire, it will melt eventually, but it will not burn because it is self-extinguishing due to its structure.

Professional Quality Management

For APT it is crucial to comply with standards to fulfil customer demands. Here the Quality Management plays a significant role. “Naturally, we are certified according to ISO 9001. All of our products are manufactured according to this standard and documented”, explains Kipping. To ensure the quality of the tubing and optimization of production processes, APT applies online measuring and control technology from SIKORA in their extrusion lines. In the past, the classical testing technology was a mere sampling inspection. Tubing sections were measured randomly regarding their inner diameter, outer diameter, wall thickness and ovality of the tube. The tube was run on the machine and after a certain time a sample was taken, which was then measured with the aid of a caliper rule and test pin. If the tube met the specifications, it was manufactured for the customer in the requested length. At the end of production, another sample was taken and measured. The quality of the complete tubing length was evaluated by the two samples.

Inline X-ray measuring systems from SIKORA

Over the years, the used measuring equipment was further developed and optimized. The sampling inspection was gradually replaced by the continuous inline quality control. “There are a number of methods for dimensional control”, says Kipping. “Since our foundation, we have chosen to use X-ray measuring technology from SIKORA. The decision was made on grounds of experience we gained by using other technologies and which showed us its limitation for the kind of measurements we needed. This was mainly regarding reproducibility of the data and their accuracy.”

The X-ray measuring devices of the X-RAY 6000 PRO series from SIKORA reliably and precisely measure the wall thickness, eccentricity, the inner and outer diameter and the ovality of up to three different material layers of a tube. With the inline measurement, the measuring values are visualized on a big display of the corresponding processor system both numerically and graphically. The operator at the line can see at a glance if the values are within the defined tolerances. “The application of our X-ray measuring devices is very flexible. As with APT, it can be installed directly after the extruder - thus, before the cooling trough - or alternatively between two cooling troughs”, explains Peter Hügen, Area Sales Manager at SIKORA AG and first contact for APT.

Right from the start, APT wanted to take a leading role regarding the quality of their products. We define ourselves mainly by the characteristic quality and this is a crucial aspect, as meanwhile, there are various suppliers of tubing from other countries. For this, a continuous quality control is necessary. With an inline-measurement of the

Picture 1: SIKORA's X-ray measuring system X-RAY 6000 measures all hose parameters. At the monitor of the processor system ECOCONTROL 6000, the product data are being visualized





Picture 2: Close cooperation between APT and SIKORA: Peter Huegen, SIKORA Area Sales Manager (l.) and Erich Kipping, APT Managing Director (r.)

products, quality can be quicker assessed, controlled and reproduced", explains Kipping. Measuring devices do not just serve for quality control, but also assist the machine operator to operate his equipment efficiently. An eccentricity of the wall thickness, for example, is displayed on the monitor as an eccentric ring, whereas the position of the thinnest wall thickness is highlighted in color. With this information, the operator can intervene and control the process much sooner and prevent the production process exceeding the tolerance limit. Therefore, with the automatic control of the line speed or the extruder rpm in consideration of the minimum values, the devices from SIKORA ensure an optimal process control.

Recording is also a crucial element of Quality Management, as customers usually require a measurement report. Each centimeter of tubing that APT delivers to

customers can be assigned to a corresponding recorded measuring value. "This is an essential element of our Quality Assurance", emphasizes Kipping. "Naturally, we are not the only manufacturer who is using X-ray devices from SIKORA, but hardly any businesses are on the same quality level as we are. Furthermore, we have a very low customer complaint rate, which is constantly below one percent. Sometimes it is just wiser to invest in a higher-quality product right from the start. I always tell our customers: It is not a tube you're investing in – you're investing in safety. These are not gardening hoses with which you water the lawn, but tubes where a breakage can be very costly and can have severe consequences", explains Kipping. In addition to the continuous inline-dimension measurement, material saving is an important topic for APT. "Ultimately, we have a relatively low material waste – effectively, we have little to dispose of", says Kipping. "This is always desirable considering the comparatively high costs of raw material for fluoropolymer." SIKORA's X-ray measuring devices help to reduce waste, as measuring values are available immediately after the start-up of the line. Therefore, the start-up process is relatively short and is carried out without significant material loss. Erich Kipping is especially pleased with the cooperation with SIKORA; not only regarding the measuring technology and the accompanying benefits, but also with the customer support. "In SIKORA, we have found a reliable and competent partner who is available at any time and offers perfectly customized solutions. Therefore, we will continue to use measuring devices from SIKORA in our lines in the future."

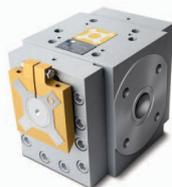
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One year ago EREMA announced the relaunch of the Multi-Purpose Reactor (MPR) at the Discovery Day. Since then, the trend towards the food contact grade direct processing of PET products has continued to grow. More and more customers are enhancing their existing extrusion plant by adding the attribute of food contact compliance

Christoph Wöss in front of the MPR of Sky-Light at EREMA's production facility. Photocredit: EREMA



rPET packaging trend

Manufacturers count on energy-saving

add-on technology from EREMA – including food contact compatibility

Some 1.3 million tonnes of PET are already recycled every year around the world with VACUREMA technology from EREMA. The end products include food contact compliant preforms for the beverage industry, thermoforming sheet, fibres and strapping.

The order figures at EREMA show that the trend in PET recycling is clearly towards direct processing. This does without pellet production as an intermediate step and post-consumer PET flakes or PET production waste are processed directly and in one step to make end products. Twenty-four of these VACUREMA Inline systems have been shipped in the last 15 months alone and, additionally, a new process for the direct production of food contact grade preforms from post-consumer bottle flakes has been presented.

EREMA also offers the MPR, a highly efficient crystallisation dryer, for customers who are converting their existing PET extrusion plants for food contact compliant end products. The decontamination, dry-

ing, dedusting and crystallisation of different PET input materials takes place in just one step in preparation for extrusion. "The MPR is becoming increasingly popular for customers who have a conventional crystalliser and pre-dryer and are confronted with long process times and high operating costs. With energy consumption at only 0.1 kWh/kg, the MPR is a crystalliser and pre-dryer at the same time, making it the economically interesting alternative," says Christoph Wöss, Business Development Manager for the bottle sector at EREMA. Input materials such as washed PET bottle flakes, ground PET flat sheet waste and virgin PET material plus mixtures of them are decontaminated and therefore already food contact compliant before extrusion. "The list of alternative suppliers of these PET extruders without pretreatment is long and tempting. However, later investments in dryers or high-maintenance decontamination modules reduce the profits of the PET producers in the end," warns Christoph Wöss.

Everything in a single working step: the input material goes from the MPR into the extrusion system and is then processed directly to make an inline sheet product. Photocredit: EREMA, Humer / Wallmen





The MPR from EREMA allows the decontamination, drying, dedusting and crystallisation of different PET input materials already prior to extrusion. Photocredit: EREMA, Humer / Wallmen

Ideal addition for existing extrusion

On the one hand the relaunch of the MPR last year aroused the interest of new customers and, on the other hand, is confirmation for many existing custom-

ers to count on EREMA technology in the future, too. "We at Sky-Light place our trust in the MPR from EREMA when it comes to the food contact compliance of PET – and this is already the second time. In the new expansion of our production capacity we once again added an MPR to the twin screw extruder," says Sky-Light owner Søren Larsen. "The growth in output through the increase of the bulk density of PET flakes and flat sheet waste and the stable IV value are more than convincing from the point of view of an entrepreneur." Sky-Light is a specialist for individual packaging solutions. The Danish company produces several hundred million snap-on lids, cups, inserts, blister and transport trays for customers in the food, electronics and pharmaceutical industry.

The technical and economical improvements in the course of the relaunch include being able to reduce the connected load by over 30 per cent while maintaining output. "The calculable operating

costs in combination with the reliable output performance make for a foreseeable and short amortisation period," says Alimpet President Roberto Alibardi. The Italian company – as part of the Aliplast Group – makes thermoforming sheet from post-consumer PET which is then used to make thermoforming containers for the food industry, for example. Besides two MPRs the Aliplast Group also has VACUREMA systems from EREMA to produce food contact grade PET recyclates. Additionally, the relaunch came with a higher degree of automation and improved ease of maintenance with the vacuum system. The process water tank has been replaced by a utility-free vacuum pump which reduces operating costs. The compactness of the system has in general been reworked, which can be seen in a 20 per cent saving in space.

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CHINAPLAS 2018 will move to the new National Exhibition and Convention Center (NECC) in Shanghai – the largest single block building and exhibition complex in the world

CHINAPLAS is ready for new breakthroughs

CHINAPLAS, a technology-oriented plastics and rubber trade fair, offers sustainable manufacturing solutions for enterprises aiming at technological innovation and upgrading. The next edition of CHINAPLAS will move to the new National Exhibition and Convention Center (NECC) in Shanghai – the largest single block building and exhibition complex in the world. With the new venue, it is expected that the exhibition area will increase to 320,000 sq. meters, a 28% growth compares with the last edition. About 4,000 domestics and international exhibitors will showcase 3,800+ sets of advanced machinery. It is anticipated that 150,000+ professional buyers from 150 countries/ regions will visit the fair

2 new theme zones to debut and 3D Technology Zone

“3D Technology Zone” and “Thermoplastics Elastomers & Rubber Zone” will be debut at CHINAPLAS 2018 in response to the rising market demands. Industrial 3D printing is more technologically mature. More industry sectors are adopting the technology in their production or design processes to cater for the market demands of customization and small batch production, while saving molding time and cost. “3D Technology Zone” will be setup at CHINAPLAS 2018 to gather leading suppliers of 3D technology.

Thermoplastic Elastomers & Rubber Zone

With improved performance, TPE and silicone rubbers are not only having wider applications but also high-end application, whether as lightweight materials in automotive, soft touch materials in electronic devices, or a safe alternative of medical plastics etc. Asia-Pacific region consumes around 45% of the global TPE supply, and the demand is still rising. In response to this market trend, Thermoplastic Elastomers & Rubber Zone is setup for the first

time. Leading overseas and local suppliers will gather and showcase their latest technologies and applications!

18 theme zones to facilitate successful sourcing of buyers

It is expected that about 4,000 domestics and international exhibitors will showcase 3,800+ sets of advanced machinery



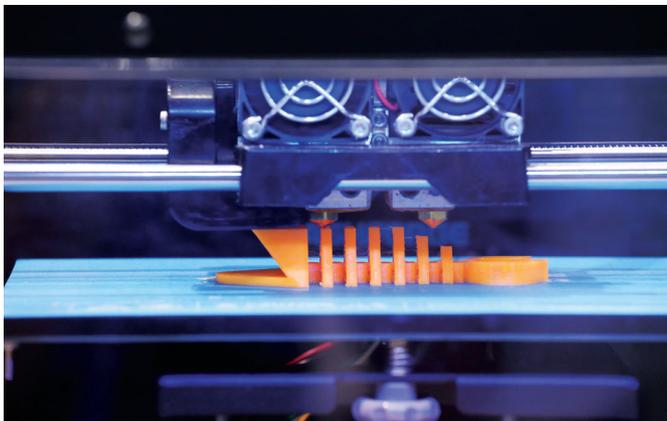


18 theme zones to facilitate successful sourcing of buyers



With introduction of the two new theme zones, there are 18 theme zones at CHINAPLAS 2018. Theme zones to showcase machine exhibits include 3D Technology Zone, Die & Mould Zone, Injection Molding Machinery Zone, Rubber Machinery Zone, Auxiliary & Testing Equipment Zone, Extrusion Machinery Zone, Plastic Packaging Machinery Zone, Smart Manufacturing Technology Zone, Chinese Export Machinery & Materials Zone, Film Technology Zone, Recycling Technology Zone. Theme zones to gather materials suppliers include Additives Zone, Colour Pigment and Masterbatch Zone, Thermoplastic Elastomers & Rubber Zone, Bioplastics Zone, Composite & High

Industrial 3D printing is more technologically mature. More industry sectors are adopting the technology in their production or design processes



Performance Materials Zone, Chemicals & Raw Materials Zone and Semi-Finished Products Zone. The setup of the 18 theme zones will certainly facilitate sourcing and purchasing of buyers.

Pre-register for CHINAPLAS 2018

CHINAPLAS 2018 will be held in National Exhibition and Convention Center (NECC), Hongqiao, Shanghai, PR China on 24 - 27 April, 2018. Visitors can purchase a 4-day pass at a discounted price RMB 50 or USD 7.5 through online pre-registration. Visitors pre-register before 11 February, 2018 will receive a badge in advance to avoid long queue. Visitors can visit the official website www.ChinaplasOnline.com/prereg to pre-register for CHINAPLAS 2018.

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Fakuma 2017: Full House for 25th Birthday!



Fakuma International Trade Fair for Plastics Processing

The Fakuma international trade fair for plastics processing will celebrate its 25th birthday "as befits its social status" in the fall of 2017! "As befits its social status" above all because the exhibition centre in Friedrichshafen on Lake Constance will once again be fully booked out for the 2017 edition of the world's second ranking event for industrial plastics technology and plastics processing. Previously unused floor space reserves will even be occupied this year in the two foyers at the east and west entrances, in order to meet the floor space requirements of established as well as various new exhibitors, and to significantly reduce the waiting list of hopeful aspirants. But also "as befits its social status" because the more than 915,000 square feet of overall exhibition floor space will be occupied this year by roughly 1800 exhibitors from 37 countries (including Germany) – and the proportion of manufacturers and distributors from outside of Germany lies within a range of greater than 35%, thus resulting once more in growing internationalism!



The plastics industry is having to reinvent itself to a given extent

The lasting trend towards participation at Fakuma, which is held in the technology region on Lake Constance where Germany, Austria and Switzerland meet, can also be explained by the fact that large segments of the plastics processing industry are changing – or are being forced to change – through the use of new materials, technologies and processes. 3D/4D printing technologies, as well as techniques and solutions for highly efficient processing of hybrid, composite and sandwich materials can be mentioned here as examples – above all and especially because the automobile industry and its suppliers are also making use of the opportunities offered by a broad-ranging portfolio of chemical solutions to a greater extent than ever before due to multifaceted requirements for affordable lightweight structures. The process sequence for material and resource-conserving processing of these new or alternative materials is based in turn on elementary building blocks such as new machines, adapted moulds and mould standards, integrated quality assurance systems and controllable hydraulic/pneumo-hydraulic/electric drives, as well as network-compatible and thus communication-capable controllers plus software – keyword: Industry 4.0!

Knowledge and Technology Transfer in Theory and in Practice

In actual practice, plastics processing at Fakuma includes injection mould-



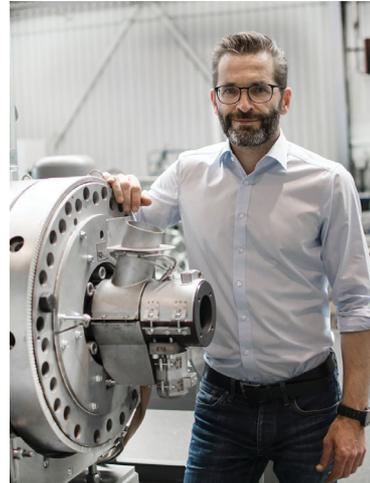
ing, extruding, thermoforming and 3D printing, as well as further processing right on up to integrated module assembly and sterile packaging under cleanroom conditions, for example of technical medical components and assemblies. But plastics processing at Fakuma also includes beneficial theory in the form of presentations held at the highly popular, time-tested exhibitor forum which is booked out every year. Top experts present new technologies, enhanced processes, product innovations and new solutions for improved economic efficiency in the production of plastic parts at the forum in brief talks, and then place themselves at the disposal of their audience for an in-depth exchange of views. And thus by being a convincing, living example of its anniversary maxim, namely "Plastics Meets Business", and by presenting it in a practically oriented fashion, the Fakuma international trade fair for plastics processing sees itself as an innovation engine for the plastics industry once again on the occasion of the 25th edition of its successful existence.

Premiere at Fakuma: EREMA founds POWERFIL business unit

With the founding of the POWERFIL business unit, EREMA, the manufacturer of plastics recycling systems, once again extends its portfolio and now also offers the proven melt filter as individual components for existing extrusion plants. Technical modifications were made to the filter systems prior to the foundation of the business unit and visitors at the Fakuma trade fair will be able to see on the EREMA stand.

In line with the motto "Plug in Performance" the new business unit POWERFIL offers both the SW RTF partial surface backflush filter system and the Laserfilter as individual components from now on. Potential users can upgrade their existing extrusion plant from alternative suppliers by adding one of the proven EREMA melt filters. "With the new POWERFIL portfolio we aim to show even more clearly that our filter systems represent a high-performance solution also for third-party extrusion systems – although the technology used is not new, but has already been tried and tested thousands of times. EREMA filters are in use on over 5,000 plastics recycling systems around the world. Customers who count on our melt filter can rely on EREMA quality", says Manfred Hackl, CEO EREMA Group.

Besides fast availability, customers will above all appreciate the filtering quality and the quick amortisation which comes with it," says Robert Obermayr, head of the new business unit POWERFIL. "In recent years the growing recycling market and the noticeable parallel increase in more heavily contaminated input materials have led to a growth in the demand for efficient filtration systems – also in the case of existing extruders. We can meet this demand with POWERFIL and offer – especially with the Laserfilter – a functional concept which unites high quality requirements and stable, inexpensive operating costs.



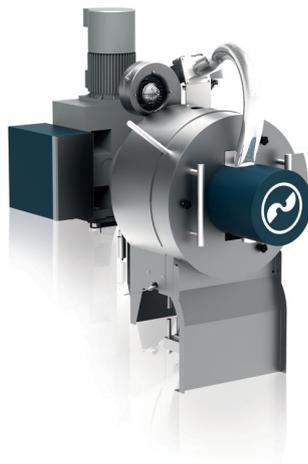
Robert Obermayr, head of the new business unit POWERFIL, next to a Laserfilter in the EREMA assembly building. Photocredit: EREMA

EREMA Laserfilter for PET

With the EREMA Laserfilter, a continuous filter system with screen fineness of 70µm is now in operation for the first time. An even gentler filtration process has been made possible by rheological optimisation of the support breaker plate, enabling a reduction of flow resistance.

Inquiries for the Laserfilter, which is already established in the post-consumer field, are also increasing from customers in the PET sector. The reason for this is that the increased use of rPET in end products requires high process stability despite higher degrees of contamination at times. The Laserfilter processes input material with a degree of contamination of over one per cent without any difficulty. The functional principle avoids dead spaces and makes for short dwell times which in turn prevents "black spots" with PET. Thanks to the newly developed discharge unit, melt losses are reduced from the normal 1 to 2 per cent with piston filters down to a tenth. "At EREMA it has always been clear: melt filters are a decisive component in reaching top standard material quality. With POWERFIL, recyclers and producers can benefit from EREMA's 30 years of development work and upgrade their existing extrusion unit quickly and easily," says Robert Obermayr, outlining the advantages. The new business unit will be launched on the EREMA stand at the Fakuma show in Friedrichshafen, Germany:

The EREMA Laserfilter: its innovative scraper technology enables the highest throughputs with remarkable melt quality. Photocredit: EREMA



Hall A6, booth 6314

EREMA Group
www.erima-group.com

HERBOLD's main emphasis in recycling

Herbold Meckesheim is a family business based in Northern Baden. Herbold's scope of supply includes single machines and plants for size reduction and agglomeration of clean plastics waste. Herbold's scope of supply is also comprised of single machines and plants for size reducing, washing, separating, drying, and agglomerating contaminated, mixed post-consumer plastics.

Special emphasis is on high-performance plants, i.e. over 3 t/h for rigid plastics or over 1 t/h for films which have recently seen a growing demand. Another focus is on extremely thin films that are particularly difficult to wash, separate and dry. A third key aspect is in regard to extreme contaminations, such as sand, stones and soil in agricultural film, or remaining acid in battery cases. A further focus is on energy-saving recycling of PET bottles for bottle-to-bottle applications. Another emphasis is on Herbold's great experience and the diversified scope of supply for retrofitting, upgrading, modernizing

and refurbishing existing washing lines that have reached their limits.

Compacting of PET carpet waste from the production of interior linings for cars with the help of the Herbold Plastcompactor

During the production of textile interior car linings, production waste arises in the form of edge trims and faulty parts. It is high-quality waste, generally PET and very voluminous.

HERBOLD MECKESHEIM has delivered a turnkey recycling concept to an internationally leading automotive supplier for the recycling of this scrap.

The boxes used for transporting the scrap from the production plant to the recycling plant are automatically emptied and pre-shred in a special granulator. The Herbold HB series granulator can cope with the complete contents of a box; with the help of a hydraulic ram, the material is fed to the granulator's rotor in portions and load-controlled.

After size reduction, the material ground to a size of 20-25 mm and in the current state very soft and fluffy is fed to a HERBOLD plastcompactor. There the material is slightly compacted between two grooved discs equipped with kneading bars and the final particle size is achieved with a secondary granulator. The bulk density is increased from approx. 30 g/l to approx. 300 g/l; the good flowing properties allow a return of the material directly to the production process. Due to a particularly gentle recycling, where the IV-value (viscosity) remains almost unchanged, the material can be added to new materials without any restrictions.

Optimized anti-wear protection for granulators

For abrasive materials, such as glass fiber reinforced materials, Herbold Meckesheim offers wear-protected rotors for granulators and a chamber equipped with exchangeable wear parts. This offers considerable cost saving compared to time-consuming armour-plating of housing and rotor.

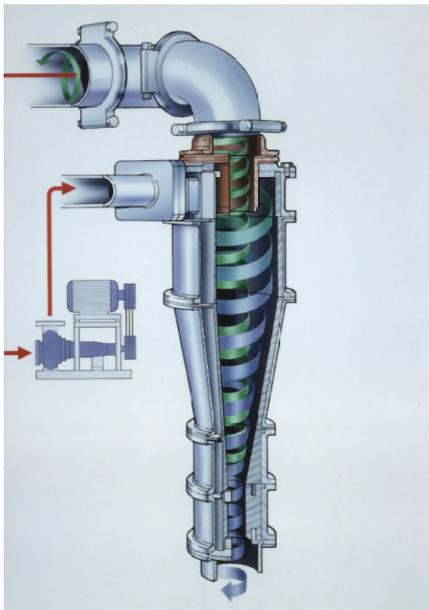


Fig. 1:
Hydrocyclone
principle

Worthless dust becomes valuable raw material

Many manufacturing processes produce dust and fines, which are separated from the production process and are looking for a reclamation. Here some examples:

- Textile flock in textile finishing
- Fines when recycling post-consumer PET bottles, arising with friction washers and centrifugal dryers
- Fluffs arising during the recycling of bottle crates which are separated by air separation after size reduction
- Textiles or fibres arising when separating compound materials, e.g. the recycling of used tires

Up to now many of these materials ended up in combustion, but this is not ideal due to the high calorific value that might damage the waste incineration plants.

HERBOLD Meckesheim has a different approach to solving the problem: the material is slightly compacted in the HERBOLD Plastcompactor and transformed into agglomerate with a high bulk density and with excellent flow properties. The material is processed in continuous operation, between a fixed and a rotating disc, equipped with replaceable kneading bars. The pre-granulated material is conveyed continuously from the buffer silo by means of a continuously adjustable feeding screw into the processing zone through the center of the fixed disc. Due to the friction on and between the compacting discs, the amount of friction is determined by the distance between discs which is adjustable, the material is heated quickly, spun off and conveyed via a central downstream blower to the secondary granulator. Since the dwell time of the material in the compacting zone is only a matter of seconds, the thermal impact on the material is minimal contrary to extruders.

Herbold Meckesheim's developments are groundbreaking. Herbold has developed wet size-reduc-



Fig. 3: PET dust before and after compacting in a Herbold Plastcompactor

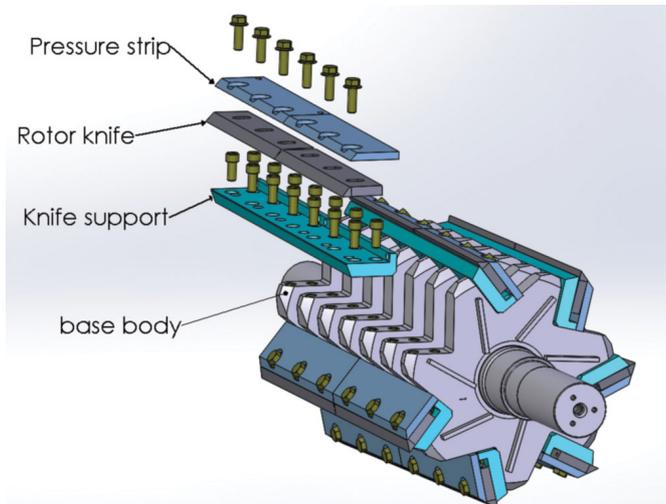
tion with granulators and made many further improvements to recycling techniques using state of the art equipment.



Hall A6, booth 6511

Herbold Meckesheim GmbH
www.herbold.com

Fig. 2: Base body with exchangeable wear parts



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SIKORA: Innovative measuring, control, inspection

At Fakuma, SIKORA is following seamlessly on from its earlier performances at renowned trade fairs for plastics, such as K in Düsseldorf and Chinaplas in Shanghai. Innovative measuring, control, inspection, analysis and sorting devices for the hose, tube, sheet and plastics industries will be presented. In the extrusion area, the focus will be on the CENTERWAVE 6000 for the measurement of large plastic tubes and the PLANOWAVE 6000 for the thickness measurement of plastic sheets. Further highlights are the PURITY SCANNER ADVANCED for the online inspection and sorting of plastic pellets as well as the PURITY CONCEPT systems for the offline inspection and analysis of pellets, flakes and films/tapes.

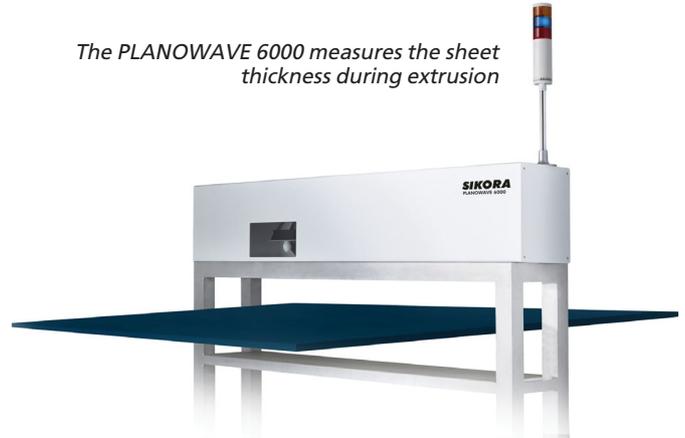
CENTERWAVE 6000: Measurement of large pipes with millimeter waves technology

With the CENTERWAVE 6000, SIKORA presents a main actor for the measurement of diameter, ovality, wall thickness and sagging of large plastic pipes during the extrusion. The system is based on millimeter waves technology and measures pipes from 90 to 3,200 mm. The CENTERWAVE 6000 R is available in a rotating version and thus offers the complete recording of the wall thickness at 360 points of the entire circumference of the pipe. Alternatively, a multiaxial system is available with static sensors. Both systems measure completely contact-free, they do not require any coupling media nor calibration and are independent of the material and temperature of the pipe. "Already one year after its market introduction, the CENTERWAVE 6000 is successfully in use in production lines", declares Holger Lieder, Sales Director SIKORA AG. "The benefits are obvious: continuous, reliable and precise



The CENTERWAVE 6000 measures plastic pipes with a diameter of 90 to 3,200 mm

The PLANOWAVE 6000 measures the sheet thickness during extrusion



measurements over the entire circumference of the pipe. The technology delivers information for the centering of the extrusion tools and the thermal control of the line. Simultaneously, the minimal wall thickness is ensured – and this saves costs. Modern quality assurance cannot be more perfect", says Holger Lieder.

PLANOWAVE 6000: Second member of the millimeter waves family for sheet extrusion

The PLANOWAVE 6000, like the CENTERWAVE 6000, is based on millimeter waves technology with the resulting technical benefits. The PLANOWAVE 6000 precisely measures the thickness of plastic sheets continuously during extrusion and over the entire width. "The PLANOWAVE excels through highly precise and non-contact measurements of the sheet thickness during the running extrusion and delivers measuring values for the adjustment of the crosshead", says Holger Lieder.

PURITY SCANNER ADVANCED: Online inspection and sorting of plastic pellets with a flexible camera concept

Another highlight at Fakuma is the PURITY SCANNER ADVANCED for online inspection, and sorting of plastic material. The unique combination of an X-ray camera with a flexible, optical camera system is the only technology at present that reliably detects contamination on the surface as well as inside of plastic pellets. Contaminated pellets are automatically sorted out. The user decides with which camera configuration the PURITY SCANNER ADVANCED will be delivered. Depending on the type of contamination and application, optical high-speed cameras as well as X-ray, color and infrared cameras are coming into use. "In conversations with customers we observe that not only in-



The PURITY SCANNER for online inspection and sorting of plastic pellets

spection but also data control and recording are becoming increasingly important. After all, it is this information that is finally leading to optimized processes and end products of the highest quality”, explains Holger Lieder.

Offline inspection and analysis of pellets, flakes and films/ tapes with the PURITY CONCEPT systems

For smaller material throughputs and for applications where sampling analysis or incoming goods inspection are sufficient, SIKORA’s engineers developed the PURITY CONCEPT Systems. Alternatively, these analysis devices can be equipped with X-ray technology, optical cameras or infrared sensors and detect contamination in pellets, flakes, films/tapes and crosshead parts. The PURITY CONCEPT Systems are used, for example, for analyzing pellets, which were detected and sorted out by the PURITY SCANNER. “The interaction of online and offline inspection and analysis allows a complete control of the cleanliness of the material and the setup of a database in order to further improve processes and to avoid future contamination”, explains Holger Lieder.

Comprehensive portfolio for measuring devices for hose and tube extrusion

For hose and tube extrusion lines, SIKORA’s product spectrum ranges from devices for innovative diameter mea-

The PURITY CONCEPT Systems are applied for the offline inspection and analysis of pellets, flakes and films/tapes



The X-RAY 6000 measures the inner and outer diameter, ovality, wall thickness and eccentricity of hoses and tubes



Holger Lieder, Sales Director SIKORA AG



surement with the LASER Series 2000 and 6000 to lump detectors for the detection of irregularities on the product surface and further to the X-ray measuring systems of the X-RAY 6000 series. Due to the precise measurement of the inner and outer diameter, the wall thickness of up to 3 layers, the eccentricity as well as the ovality of products, the systems ensure manufacturers the highest quality as well as cost savings and profitability during extrusion.



Hall A6, booth 6110

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Gneuss: new at the Fakuma



Fig.1: Pressure and process constant Rotary Filtration System RSFgenius

Increased Demand for Filtration Systems

At the last „K“ show in 2016, Gneuss presented new generations of their Rotary Melt Filtration Systems. Since then, the demand for the Gneuss process- and pressure- constant Melt Filtration Systems has increased dramatically. The demand has come from all sectors of the industry, from not only recycling industry but also from sheet (including foam sheet) and film producers. The number of Melt Filtration Systems supplied for compounding has also seen a major increase.

In the compounding industry, there has been a trend to ever more different colours and material formulations with shorter production runs. This requirement for increased flexibility means that fast material changes become an important economic factor. The Gneuss Rotary Filtration Systems are especially well- suited to such applications. In addition to process-constant operation, they offer streamlined melt flow paths. A special version of the process- constant, automatic KF screen changer is available, which in addition to having extremely efficient flow paths, is designed to be individually customised for the specific requirements of compounders with short production runs and drastic material grade changes – and thermally/ residence – time sensitive materials.

Permanent pressure- and process-constant melt filtration is important in the manufacture of sheet and foam sheet. Parallel to the requirement for every higher quality, manufacturers of such sheet are constantly striving to reduce material costs, which usually means higher contamination levels, thus increasing the importance of melt filtration. For such applications, Gneuss has seen a surge in interest for the RSFgenius screen changer, which permits filtration fineness of for example 56 µm whilst maintaining constant running conditions

and automatically cleaning its filter elements in situ. Constant pressure is an important added bonus for foam sheet manufacturers, for whom constant pressure means a constant foam structure.

MRS-Extruder with exceptional decontamination performance

The MRS Extruder (a single screw extruder with an innovative multiple screw devolatilising section) provides excellent devolatilisation of the polymer melt. The multiple satellite screws (which rotate in the opposite direction to the main screw) ensure a rapid surface area exchange of the polymer melt under vacuum, thereby achieving a huge improvement in the diffusion process. The system is therefore ideally suited to the processing of heavily contaminated polymers.

The high polymer melt exchange rate by means of the Multi Rotation System is achieved during an extremely short residence time, with low shear and temperature stress for the polymer. At the same time, additives can efficiently and homogeneously be introduced into the melt.

As a result, the polymer decontaminated on the Gneuss MRS extruder fulfils the strict requirements of food contact application standards such as FDA, EFSA and Invima without restrictions.

Odour- Free Products

„Decontamination“ refers to harmful volatiles such as oils, solvents etc.. These need not necessarily be harmful but can nevertheless be a problem if the volatiles create an unwanted odour. This is especially often a problem when recycling polymers. Under temperature, the polymer can absorb residues from the washing process and other contaminants can de-

Fig.2: Gneuss Processing Unit (GPU) with MRS-Extruder, Rotary Filtration System RSFgenius and Online Viscometer VIS





Fig.3: Examples of food containers made from foamed PET sheet

compose and create strong unwanted odours. Additionally, polymers, with simple molecular structures can already have absorbed odours from their first "life" as packaging materials. Typical cases are films (e.g. LDPE) which have been used for packaging meat or fish. The high diffusion rate in the MRS extruder reliably removes such odours and enables the production of odour- neutral products.

Technology Leader in PET Recycling

Gneuss has been at the forefront of polymer recycling technology for over 30 years now and offers a range of innovative solutions for the processing and recycling of polymers.

Gneuss' systems are optimised for the challenges of PET recycling. They are perfectly harmonised with one another and can their modular design can be configured flexibly. The Gneuss-Processing-Unit, consisting of the unique Gneuss MRS Extruder, Rotary Filtration Systems and Online Viscometer represent are the heart of the Gneuss recycling systems.

With the MRS Multi Rotation System, Gneuss provides a processing system which can handle a wide range of input materials with different qualities and properties. It can process 100 % recycled material without pre-drying or crystallising. In addition to the unmatched devolatilisation performance of this extruder (for example input material with up over 1 % residual moisture level) the decontamination performance is so good, that the extruder matches EFSA and FDA requirements without restrictions or compromises.

The especially gentle direct processing without pre-drying, crystallisation and above all without the need for frictional heat makes the processing of materials and mixtures of materials with differing melt temperatures possible and eliminates steps in the processing chain.

Polymer purification takes place not only in the MRS extruder but also in the Gneuss Rotary Melt Filtration Systems which ensure a purified polymer melt, without foreign particles or specks. Gneuss has continued to develop the Rotary Filtration Systems and introduced new generations with a host of detailed enhancements last year.

The Online Viscometer from Gneuss completes the Gneuss-Processing-Unit. With its sophisticated control system, it ensures that the IV value of the melt matches the setpoint. (The vacuum setting of the extruder is automatically adjusted to compensate for variations in the input material IV). Different IV values can be set for different applications, ensuring excellent flexibility.

PET Foam – new at the Fakuma

At the Fakuma, Gneuss will present its latest development in PET sheet: the manufacture of PET foam sheet. The sheet lines from Gneuss are characterised by their extremely flexible operation with regard to the input material and the sheet manufactured. These sheet extrusion lines can be quickly and flexibly switched to foam sheet. The MRS foam sheet module enables a weight / density reduction of over 50 %, and this from input materials of up to 100 % post consumer material, regrind, virgin or blends of these materials. With equivalent mechanical product properties, a wide range of PET foam products for food packaging can be manufactured cost efficiently.

Thanks to the excellent low shear mixing properties of the MRS extruder, both the nucleating and the blowing agent are completely dispersed and homogeneously distributed in the polymer melt. After extrusion and filtration, the polymer melt is conditioned so that it has the optimum viscosity and ductility so that material foams with the required density as it emerges from the die.



Hall A6, booth 6501

Gneuss GmbH
www.gneuss.de

ERGE Elektrowärmetechnik · Franz Messer GmbH
 91220 Schnaittach · Hersbrucker Straße 29-31
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The FED 52 MTX extruder will be on exhibit at Fakuma 2017

At Fakuma 2017 the mechanical engineering firm FEDDEM GmbH & Co. KG from Sinzig/Germany will debut a line concept for manufacturing LFT compounds based on pultrusion technology. The ICX® technology concept presented at K 2016 has been expanded to include LFT technology enabling global production of high-quality plastic compounds



FEDDEM: ICX® technology expanded to include LFT process

In developing their own pultrusion technology, FEDDEM has overhauled and optimised all relevant line components, including the clamping device tensioner, impregnating tool die and take-off unit. "Factors that were particularly important to us during this development project were the product quality of the LFT compounds, a cost effective production process and a high degree of flexibility", explains Dieter Groß, Managing Director of FEDDEM.

FEDDEM used the same ethos to develop their LFT technology as they did to develop their ICX® (Innovative Compounding and Extrusion) technology, which was developed in partnership with AKRO-PLASTIC to supply complete compounding lines. The company's focus has always been to provide benefits for its customers: Dieter Groß sums up the concept with these words: "High-

quality compound production flexibility and short response times, all at a competitive price. FEDDEM supplies the same "Made in Germany" system technology worldwide, enabling its customers to manufacture consistently high product quality at all locations.

At Fakuma 2017 the company will also be exhibiting its FED 52 MTS extruder for manufacturing high-quality carbon fibre reinforced plastic compounds. Like all machines in the MTS model series, the extruder is customisable and versatile, and is therefore suitable for a broad range of applications and a variety of compounding jobs.

For every compounding application, whether it be engineering plastic compounds, masterbatches or biocompounds, FEDDEM has just the right machine in its product range. FEDDEM's standard MTS range of-

fers sizes between 26 and 82 mm and a product-dependent throughput range between 40 kg/h and 4 t/h, extruders with a larger Do/Di and a screw diameter up to 135 mm are also available to manufacture high-filled plastic compounds.

FEDDEM's customer focus philosophy is completed with rapid spare parts supply, used machine reconditioning and on-site customer consultations.



Hall A6, booth 6217

FEDDEM GmbH & Co. KG
www.feddem.com

Maag: new underwater pelletizing system

Maag today is formed by for successful and experienced companies: Maag Pump Systems, Automatik Plastics Machinery, Gala Industries and Reduction Engineering Systems have joined forces to help customers in plastics processing better than ever before. At the upcoming Fakuma, Maag will show system solutions from a single source.

The highlight of the Maag booth will be the new PEARLO® Underwater Pelletizer: Designed to process spherical pellets for raw materials, compounds, masterbatches, engineering plastics, wood and nature filler-filled polymer composites, thermoplastics elastomers, hot-melt adhesives and gum bases at capacities that can reach 36,000 kg an hour.

Other Maag products that will be on display at Fakuma 2017 include:

The new x6 class Gear Pump offers improved volumetric efficiency and pressure capabilities that allow it to be operated at reduced rpms, shear rates and temperatures, resulting in reduced residence time and energy consumption with improved production rates, polymer quality and pump life cycle.

CSC Series Screen Changers feature a double-piston design that allows tailor-made adjustment of the filtration unit per the user's specific process requirements while allowing the use of five different filter-cavity shapes within the same screen-changer housing: circular, oval, arched, leaf-disc and candle.

Successfully applied by hundreds of customers, the proven WSG dry-cut strand pelletizing system with PRIMO E pelletizers produces the highest quality of cylindrical pellets or microgranular compounds particularly suitable for further processing. Variable system configurations allow for optimal matching with your specific production requirements and also provide the utmost flexibility in terms of product changeover.



The mill stand of a REX basicPLUS pulverizer, consisting of a mill chamber with patented disposable disc, drive, feeder and control, demonstrates the advantages of Maags pulverizing systems that are available for multiple materials and throughput ranges.

"Our systems are designed to be a one-stop solution for its users as all of the components are produced by Maag companies. All of the Maag brands are focused on delivering exceptional value to their customers through a blend of product leadership and customer service," said Alaaddin Aydin, VP/GM Maag Germany.



Hall A6, booth 6202

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ILLIG: Delivered 60 Percent More Sheet Processing Machines

ILLIG Maschinenbau, inventor of UA universal machines for thermoforming of sheet and roll material, delivered over 60 percent more machines of the UA g series in 2016 compared to the previous year. The demand for the reliable ILLIG sheet forming technology with accelerated processes is still continuing on a high level this year as well. This high demand is based on the innovations implemented in all machine types of this series during the last years. At this year's Fakuma, the Heilbronn technology leader in the thermoforming sector will be showcasing a state-of-the-art UA 100g. An organizer box for screws and a stackable storage shelf will be manufactured at the same time on this machine out of 2 mm TPU/ABS sheet material, using a 2-up mold. A beam cutting press, 1600 mm x 1700 mm, manufactured by HN Maschinenhandel, subsequently punches both parts by means of a 2-up punching tool.

Sheet processing machines of the UA g series

The UA 100 g presented at the trade fair stand features a maximum forming area of 960 mm x 660 mm. The machine is suitable for thermoforming of sheet and roll material. The servo-driven UA g machines work in a process-controlled manner and provide impetus for part production in terms of cleanliness in production with high productivity and quality at the same time (Cleantivity®), as well as ease of operation. The current sheet processing machines feature a large variety of optional equipment and different forming areas.

Innovation driver for thermoforming systems

ILLIG, system supplier of machines and mold systems, and inventor of the first UA thermoforming machine with clamping frame ever employed in industry, developed into a world-wide leading thermoforming company based on its innovative strength. During the last years the Heilbronn company initiated numerous innovations for automatic thermoforming machines and filed corresponding patent applications.

Competitors also became aware of many further ILLIG innovations. These innovations are employed in their machines as technological progress.

Some of the frequently patented developments in sheet processing machines are: Servo motor drive, reliable sheet de-stacking, compensation of surrounding influences during heating and reduction of temperature decrease of the heated material until forming, prevention of chill marks and obtaining a uniform wall thickness distribution during forming, reduction of cooling time by using e.g. an air shower in the clamping frame and blowers which can be individually switched in groups. Moreover, ILLIG is the only system supplier of thermoforming equipment to offer patented process-controlled cooling air guidance to ensure part quality at a consistently high level. Machine operation is simple



Fakuma visitors are always very interested in sheet processing machines of the ILLIG UA g series

thanks to the fact that all important commands can be found on one page, the so-called „auto page“, and the online optimization support allows easy forming pressure setting in combination with a frequency-controlled vacuum pump.

Cleantivity® Cleanliness in machine manufacturing and high availability

Derived from the comprehensive expertise in the field of hygiene in form, fill and seal lines (FFS lines), ILLIG transferred the technology of cleanliness in the production process to its thermoformers. This is accompanied by improved machine availability. The trendsetting Cleantivity® concept – a combination of the words „cleanliness“ and „productivity“ helps to extend operating time, running time and, ultimately, quality time of the thermoforming machines, in order to achieve a high line output of high-quality parts. At Fakuma ILLIG will demonstrate Cleantivity® implementation in sheet processing machines.

ILLIG is a leading global supplier of high-performance thermoforming machines and molds, as well as solutions for the packaging industry. The company's product and services portfolio includes the development, design, manufacture, installation and commissioning of complex production lines and components. With branches and sales agencies in over 80 countries, ILLIG is locally present in all markets around the globe. For nearly 70 years, the owner-operated enterprise has been serving its customers across the globe as a reliable partner for the cost-effective manufacturing of complex precision thermoplastic parts with innovative technology of unsurpassed quality and comprehensive worldwide after-sales support.



Hall A3, booth 3208

ILLIG Maschinenbau GmbH & Co. KG
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PLASTICS PROCESSING: PRACTICAL SOLUTIONS



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150+ participants



KEY TOPICS

- Optimization of each production process (transportation, dosing, mixing, heating-cooling, extrusion or molding, quality control, etc) – best way to increase profit
- Low self cost not equal high profit?
- Know-how from market leaders (machines and equipment supplier, raw materials and additives producer, converters) – cases and presentations

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Contacts

in Russia +7 499 346 68 47, info@iptf.ru
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