

Plastics Loop Closed

Key Elements of Recycling Live at the K 2016

For the first time in history of the K trade fair, plastic waste recycling will take place on site – in part with the plastic waste produced at the show itself. One type of pellets that can serve as an alternative to multilayer films to produce clean-sorted packaging plays an important role here.

It was already clear in the run-up to K2016 that Industry 4.0 would be the central topic of the trade fair. At the outdoor area Erema, an Austrian manufacturer of recycling systems and technology, will present the recycling industry's first Smart Factory package called Careformance, based on the high degree of automation offered by the Intarema system: the recyclete is not only customized in line with the requirement profile of the end products, the quality of the recycletes can also be measured in real time comprehensibly.

The exhibition "Products made of recycletes" (see Box on page 142) will show the opportunities of the ecological and economical use of recycletes. The products there are undoubtedly only the start, as the Industry 4.0 approach enables the conver-

sion of recycletes into raw materials with precisely predefined properties.

The plastics industry will have to consider the intended use and, ideally, recyclability of products already in the production stage, in order to make more products containing recycletes available in the mid to long term. The key to this lies in product design. A company collaboration which takes place in the 480 m² outdoor exhibition area will show the undertaking using the example of stand-up pouches based on polyethylene (**Title figure**).

Plastics Waste Recycling at K 2016

An Intarema TVEplus 1108 with integrated Laserfilter will process printed and in-

part metallized multilayer films, LDPE edge trims, rolls and also post-consumer waste such as stretch films with paper labels and PE washed cuttings. The recycling process results in high-quality recyclete with a requirement profile which is customized to the respective application. The basis for this are the Counter Current technology, already presented at K2013, and automation processes integrated in the system such as Smart Start or Recipe Management. What is new in 2016 is that the system incorporates a Smart Factory package that on the one hand analyses the individual machine process data and otherwise links the production and recycling units of an entire machine range with each other.



Pouches: stand-up pouches produced for the first time ever using a material mix based on PE (© Borealis)

Manufacturers have previously worked with several sites and systems, whose key figures such as throughput and downtime are available for each unit due to the already high degree of automation but cannot yet be called up across all plants, sites or countries taken as a whole. The developers at Erema took this challenge as an incentive to explore the potential of Industry 4.0 for the recycling sector. With the Careformance package, specially integrated sensors ("QualityOn") will measure MVR and color of the recyclates at the show and transfer the data online from the Careformance Recycling Centre at the outdoor area to a monitor at Erema's booth (Hall 9/C05).

The manufacturing execution system (MES) re360 will also be in use, enabling the system in the Recycling Centre of the

Products with Recyclate

The exhibition "Products made of recyclates" shows the importance that high-quality recyclates will have in the concept of closed loop recycling. In cooperation with customers and members of the association Plastics Recyclers Europe, Erema presents the most innovative products containing recyclates. The products range from those suitable for food and drink such as rPET beverage bottles and technical injection-molded and modern packaging materials to lifestyle products such as sunglasses and skateboards. The exhibition aims to highlight the ecologically and economically worthwhile use of secondary raw materials. It will be held at the Careformance Recycling Centre in the outdoor area.

→ FG 09.1

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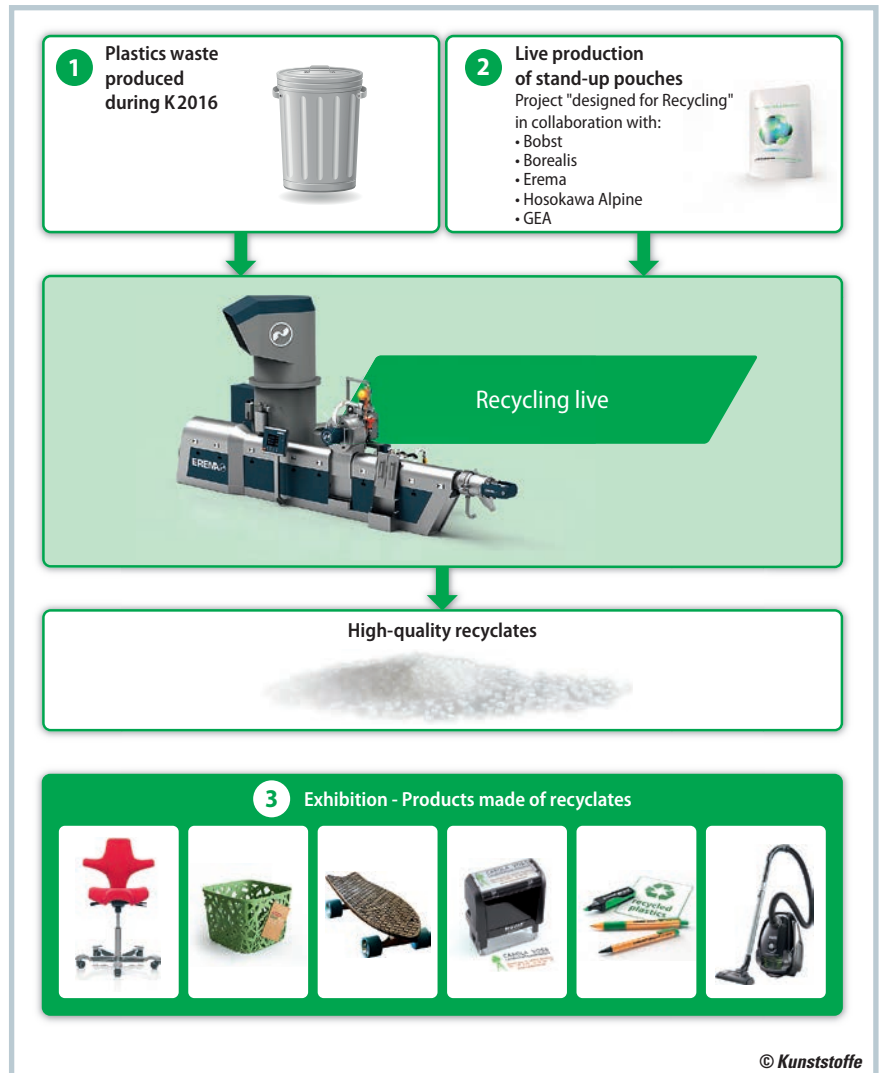


Fig. 1. Loop: An Intarema system at the Careformance Recycling Centre will recycle plastics waste produced during K2016 (1) and stand-up pouches produced at the show plus waste generated in the production process (2). Numerous products can be made using regranulates (3) (source: Erema)

trade fair to be virtually connected to other systems at different locations. This makes it possible to compare the performance of the systems at a glance and check process and quality data at any time. Additionally, the MES is linked with the webshop Spare Parts Online where spare parts can be ordered with the aid of a button to keep downtime as low as possible.

Design for Recycling

As over half of the plastics produced are used for packaging, this segment has enormous potential for recycling. Packaging is an integral part of a product as it enables the transportation of food from the field to the factory, extends its shelf life at retailers and improves its functionality in

the households. Once it has been used, plastic packaging is simply too valuable to end up on landfill sites. Its value should be further utilized in the form of energy recovery or recycling.

Erema has joined forces with Borealis AG, Vienna, Austria, Hosokawa Alpine AG, Augsburg, Germany, Bobst Italia SpA, San Giorgio Monferrato, Italy, and GEA Group AG, Düsseldorf, Germany, to develop recyclable pouches. The results will be presented at the K2016 show. In the past, these pouches were produced using a combination of PE and films such as OPET (oriented polyethylene terephthalate) or BOPP (biaxially oriented polypropylene). Such multimaterial laminates limit the recyclability of the packaging: the only options were incineration or recycling for injection molding applications.

This collaboration made it possible for the first time to produce pouches based entirely on PE. The property profiles of the films produced using Borealis Borstar Bimodal PE resins in combination with MDO processing technology are like plastics mixtures for films so far. They are suitable for the pouch making, fulfil the performance requirements of MDO process, pouch production and FFS (form – fill – seal) packaging machines and offer sufficient protection for food and non-food products.

The PE pouches made this way can also be processed in their entirety to make recyclates suitable for use in injection molding and applications in blown film production, even when used pure in thin blown films. This opens up opportunities for additional second-life applications in extrusion and film which are unattainable with multilayer films. These developments offer packaging producers a combination of lightweight pouches with a functionality which benefits sales, consumers and finally also a sustainable recycling loop.

The full PE laminate will be used in the Recycling Centre for the production of pouches on a vertical packaging machine (type: VFFS, manufacturer: GEA). The pouches produced on site and any production waste that accumulates will then be fed into Erema's Intarema system and repelletized (**Fig. 1**). The recyclates produced in this way are in turn ideal for further processing in film appli-

cations. Visitors will be able to judge the quality of the film made of the recycled PE pouches as carrier bags will be made with it prior to the K trade fair and distributed at the event.

From Recycler to Producer

Plastics recycling has grown in importance in recent years, helping to promote a trend in the process: plastics recyclers see themselves more and more as producers of raw materials. The reason for this lies in two developments:

- Firstly, the constantly growing global population uses 8% more plastic every year. This means that growing quantities of post-consumer materials are available for reuse.
- Secondly, there is a steady stream of progress in recycling technologies and systems. Thanks to modern developments it has been possible above all to increase the process stability of the systems considerably, so that the recyclates have the customer's desired properties.

One result of these developments is that apart from recyclers, producers of virgin material are also increasingly discovering recycling as a profitable business model. One example of this is the recent acquisition of the German plastics recyclers mtm plastics GmbH and mtm compact GmbH by Borealis. By incorporating mtm plastics, the technology leader in the field of recycling mixed post-consumer

polyolefin recyclates, Borealis is signaling that recycling is becoming more and more of a fixed part in the group strategy of producers and brand article manufacturers in the plastics sector. ■

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Masthead

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