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WPS INSIGHTS

Flexible Packaging Industry

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EDITORIAL

Material choices in flexible packaging this month are being framed around what happens after use as well as how a pack performs. The developments covered approach recycling from different points in the value chain, from the polymer and the film to the coating, the structure and the printing layer.

The routes differ. Some keep an established format and change what goes into it, others change the format or remove a material from a demanding application, and one works on how printed decoration comes off during recycling. European packaging regulation features in the background of several of them, and each initiative sits at its own stage of development.

Taken together, the stories show brand owners, converters and suppliers weighing recyclability, recycled content and product protection at once. The articles that follow set out what each development involves and what information is currently available about it.

EXECUTIVE TAKEAWAYS

Four themes run across this month's four stories.

01

Recycling is being addressed at several points in the packaging chain

Each development tackles recycling at a different point.

Nivea and three partners have created a collation shrink film containing post-consumer recycled (PCR) polyethylene (PE). Henkel has developed a heat-seal coating for recycling-compatible paper mailers. SÜDPACK Medica has developed a sterile barrier made only of PE, as an alternative to laminates containing polyamide. Siegwerk has patented a primer designed to let print wash off during recycling.

Across the four, recyclability is being built in at several layers of a pack, from the polymer to the print. See Articles 1 to 4.

02

Recycled content and recyclate quality are closely linked topics

To meet the recycled-content targets of the Packaging and Packaging Waste Regulation (PPWR) for flexible packaging alone, the Circular Economy for Flexible Packaging (CEFLEX) puts the post-consumer recyclate needed from flexible packaging by 2030 at around 2.5 million tonnes.

The Nivea film reaches a reported 22% PCR content, above its aim of at least 20%. Siegwerk's primer targets quality, since removing ink well can cut discolouration, odour and contamination in recyclate.

Hitting a recycled-content figure and keeping recyclate clean are being worked on side by side. See Articles 1 and 4.

03

Packaging regulation forms part of the backdrop

The PPWR appears in three of the four stories. Paper mailers are said to suit its requirements on recyclability and minimal empty space, stated to apply from 2030. From 2030 it also requires minimum PCR shares in plastic packaging, which Siegwerk ties to a greater need for clean recyclate.

The pharmaceutical industry is not currently subject to all PPWR requirements, yet attention to circularity in life science packaging is growing.

Across these stories, 2030 is the key regulatory date, and SÜDPACK Medica's work shows a life science supplier moving on recyclability before all the rules apply to its sector. See Articles 2, 3 and 4.

04

Material changes are tied to specific application demands

Each change answers a particular use.

Paper mailers need reliable seals for automated right-sizing. The sterile barrier must protect process bags without substances that could migrate into sensitive bioprocesses. The shrink film must keep its shrink and puncture performance with recycled content. Printed flexible packs need ink that comes off in recycling.

Each material choice is shaped by its application as well as by recycling, so the solutions differ from use to use. See Articles 1 to 4.

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01

RECYCLED-CONTENT FILM

Source Packaging Europe · 03 November 2026

Four Parties Create a Collation Shrink Film with Post-Consumer Recycled Polyethylene, Aligned with Nivea's 2045 Net Zero Target

WHY IT MATTERS

A collation shrink film for Nivea body lotion bottles and tubs, among other products, is the subject of a joint effort by ExxonMobil Signature Polymers, Green Worms, Vardhaman Polypacks and Nivea itself, aimed at bringing post-consumer recycled (PCR) polyethylene (PE) into the film. Technical knowledge, recycled granules and film conversion each come from a different party, and the work is aligned with Nivea's Net Zero target for 2045.

22%
PCR content dosage the film is said to achieve

At least 20%
Minimum PCR content the partners set as their aim

2045
Target year of the Net Zero target with which the project is aligned

AT A GLANCE

1. The team's film, built on Exceed™ Stiff+ m 0238 performance polyethylene, is said to achieve 22% PCR content dosage, above the aim of at least 20%.
2. Recycled granules from Green Worms, made from Category II flexible waste and described as high-quality, sit alongside Vardhaman Polypacks' conversion capabilities and ExxonMobil Signature Polymers' technical knowledge.
3. Three performance points are attributed to ExxonMobil Signature Polymers, covering shrinkage balance between the machine and transverse directions (MD-TD), tensile properties and puncture performance.

Parties and Their Roles

- Nivea's skincare range is where the film is used, and its three partners joined it in building PCR PE into the collation shrink film, in step with the brand's Net Zero target for 2045.
- Roles divide three ways. Green Worms provides the PCR granules, which are made from Category II flexible waste and described as high-quality. ExxonMobil Signature Polymers brings technical know-how, and Vardhaman Polypacks turns the material into film.
- Exceed™ Stiff+ m 0238 performance polyethylene is the resin behind the film solution the team created.
- Body lotion bottles and tubs are examples of the Nivea products packed in this film.

PCR Content Aim and Result

- At least 20% PCR content was the aim the companies set for the film.
- Against that aim, the finished film is said to achieve a 22% PCR content dosage.

22%

Above the stated aim of at least 20%, this is the level of PCR content dosage the finished film is said to achieve.

Performance Claims

- MD-TD shrinkage balance is described as 'superior' compared with the reference film, a claim attributed to ExxonMobil Signature Polymers.
- Against the incumbent virgin film, a different comparator, tensile properties are described as improved.
- Puncture performance is said to remain 'excellent' even though the recycled content is drawn from flexible waste of varying origin.
- The article gives no numerical results, test methods or availability timing for the film.

LESSONS & ACTIONABLES

Brand owners and converters looking at recycled-content shrink film may want to ask for the test data and test methods behind the shrinkage, tensile and puncture claims, including which reference and virgin films were used as comparators, together with information on commercial availability.

02

PAPER E-COMMERCE PACKAGING

Source Henkel · 03 November 2026

Henkel's New Heat-Seal Coating Supports Recycling-Compatible Paper Mailers

WHY IT MATTERS

Mailing envelopes cut from paper rolls and closed by heat are presented as a way to tailor each shipment's packaging in automated fulfillment, and the coating that creates the seal is a central part of the format. Henkel Adhesive Technologies has developed the coating, Aquence HS 2819 RE, for this use, and it is described as recycling-compatible. Henkel's assessment points to requirements under the Packaging and Packaging Waste Regulation

(PPWR) on recyclability and on minimal empty space, which are described as taking effect in 2030.

More than half
Share of worldwide flexible e-commerce packaging demand described as coming from the fashion industry

2030
Year given for PPWR requirements on recyclability and minimal empty space to take effect

AT A GLANCE

1. Aquence HS 2819 RE, a water-based coating, forms the heat seal on paper mailers. A design built around modern e-commerce processes and reliable sealing on paper are among its stated properties.
2. The coating is described as recycling-compatible, with its recyclability said to have been confirmed by accredited testing institutes that are not named.
3. Heat-sealable paper mailers are linked to right-sizing in automated fulfillment, with boxes and envelopes formed in advance described as the traditional norm.

Coating and How It Is Used

- Aquence HS 2819 RE is a water-based coating that Henkel Adhesive Technologies has developed to act as a heat seal on paper mailing envelopes.
- Once a packaging manufacturer has coated the substrate, envelopes can be made straight off the roll by e-commerce businesses using automation. Heat then closes each envelope securely, after it has been trimmed to match the item's exact size.

Stated Properties

- Modern e-commerce processes are what the coating is designed around, and it is said to seal paper reliably.
- The coating is described as containing no mineral oils, with a harmless classification given for every one of its ingredients.
- Under specified conditions, the coating is described as complying with Food and Drug Administration (FDA) and European Union (EU) regulatory requirements and with the food packaging recommendations of the German Federal Institute for Risk Assessment (BfR).
- Recyclability is described as confirmed by accredited testing institutes, which are not named.

Paper Mailers and Right-Sizing

- Using less material and adding less weight to packaging are among the benefits described for paper-based mailers, and their high-strength kraft paper is said to give excellent protection. Durability, flexibility and light weight are the reasons given for their growing use in e-commerce.
- Right-sizing, described as packaging made to fit each shipment exactly instead of one picked from a fixed range of sizes, is said to be drawing growing interest from companies, with automated fulfillment

picked out as one setting. Envelopes and cardboard boxes formed in advance are described as the formats that have traditionally led in e-commerce.

- Built from roll stock that can be heat sealed, paper mailers are described as making logistics more efficient, using less material and leaving less empty space, because they take on the shape of the product they hold.
- Fashion is singled out as a sector where paper-based mailers are becoming especially important, and it is described as accounting for more than half of global demand for flexible e-commerce packaging. The mailers also carry electronics, toys and a wide range of other goods.

More than half

Fashion is the industry to which this share of worldwide flexible e-commerce packaging demand is attributed.

Regulation, Recycling and White Paper

- Requirements under the PPWR on recyclability and minimal empty space, described as applying from 2030, are ones that paper mailers are presented as well suited to meet because of their structural design.
- Paper is put forward as an attractive basis for making online shipping sustainable, because it is among the packaging materials that Europe recycles most often.
- A new Henkel white paper, 'Beyond the Box', looks at right-sized paper mailers in e-commerce. Its topics include upcoming regulatory requirements, what heat-seal coatings contribute when shipping packs are made to size, and how pairing automated packing equipment with paper envelopes can make online shipping more efficient and more sustainable.

Release Date and Availability

- The release is dated 03 November 2026 from Düsseldorf, Germany, and gives no availability date or markets for the coating.

LESSONS & ACTIONABLES

Packaging buyers and e-commerce operations teams evaluating paper mailers may want to ask for the conditions behind the food-contact statement, the testing institutes' recyclability findings and seal performance data, including seal strength and behaviour on their own packing equipment, and to review what the white paper says about future regulatory requirements.

03

LIFE SCIENCE PACKAGING

Source SÜDPACK · 22 October 2026

SÜDPACK Medica Develops a Mono-PE Sterile Barrier for Bioprocessing and Cell Culture Bags

WHY IT MATTERS

Packaging for life science applications faces increasingly demanding requirements. Alongside regulatory compliance, product safety and process stability, circularity and resource efficiency are receiving greater attention. Conventional sterile barrier systems typically use laminates combining polyethylene and polyamide (PE/PA/PE) to provide the required mechanical strength and stability. However, concerns about substances migrating from packaging into sensitive bioprocesses have created interest in alternative material structures. SÜDPACK Medica has responded with a sterile barrier system made only of polyethylene, as an alternative to the usual PE/PA/PE laminates.

More than 50%

Lower CO2e emissions in a screening life cycle assessment (LCA), set against an equivalent structure built from PE/PA/PE

100%

Recyclability rate, calculated through an internal assessment with CHIRA software

ISO Class 7

Class of the new clean rooms in Coulmer, one of the facilities where the tubular bags are made

AT A GLANCE

1. Meant as an outer layer around the process bags of sensitive bioprocessing and cell culture work, the mono-PE tubular bag film uses polyethylene as its only material, so it has no polyamide or adhesive agents.
2. SÜDPACK Medica presents the solution as currently the only one on the market, for this application, without the migratable substances of concern associated with conventional PE/PA/PE coextruded films.
3. A calculated recyclability rate of 100% rests on an internal assessment, and a screening LCA by SÜDPACK Medica puts CO2e emissions more than 50% lower than an equivalent PE/PA/PE structure, based on project-specific reference systems and assumptions.

The Offer and Its Intended Use

- For life science work with high demands, SÜDPACK Medica now offers a sterile barrier system in mono-PE.
- Process bags used for sensitive bioprocessing and cell culture work are what the film is intended to enclose, as their outer layer of packaging. Through transport, storage and handling, it is meant to keep

the primary pack from being damaged or put under mechanical stress.

- Avoiding polyamide and other critical formulation components while still matching what a PE/PA/PE structure delivers was the main development objective.
- New clean rooms rated ISO Class 7 in Coulmer are one of the places where the tubular bags are produced, alongside other facilities.

Why Material Composition Is in Focus

- The pharmaceutical industry is not currently subject to all PPWR requirements, even as circularity and resource efficiency draw more attention in life science packaging.
- For years, PE/PA/PE coextrusions have been the default where mechanical loads are high. Within them, polyamide is usually the source of the required mechanical strength and stability, while the polyethylene is what lets the film seal and process well.
- Packaging systems with fewer possible contamination sources have become an industry requirement, because in some life science applications a serious concern can arise from even a trace of a migrating substance.

Material and Performance Claims

- On barrier properties and mechanical performance, the new all-polyethylene barrier system is described as equal to conventional PE/PA/PE structures, and the tubular bags are said to have been optimised so they meet cytotoxicity criteria.
- Three levers are cited for this result, namely screening of raw materials, deliberate material selection and refinements to coextrusion.
- Internal testing is described as showing reliable processing and sealing behaviour, as well as high puncture resistance and excellent flex-crack resistance. High transparency and optical quality are also described as maintained.
- The only-solution statement is limited to this application and to the present market, and it refers to the absence of migratable substances of concern, with caprolactam, antioxidants, slip agents and adhesive agents given as examples.
- What the industry expects from regulation is said to be reflected in the design, and the material approach is described as shaped around the particular needs of sensitive processes.

Recyclability and Life Cycle Figures

- Established PE recycling streams are described as compatible with the mono-PE structure, and an internal assessment using CHIRA software gives the structure a calculated recyclability rate of 100%.
- In a screening LCA run by SÜDPACK Medica itself, emissions of CO2e came out more than 50% below those of an equivalent structure in PE/PA/PE, a reduction described as significant.
- For the life cycle figure, the source states no functional unit or system boundary and no external review, and the result depends on the assumptions behind the analysis and on which reference systems the project looked at.

- The development is presented as evidence that recyclability can coexist with regulatory compliance and high mechanical performance. For bringing current pack designs into line with technical and regulatory demands still to come, it is put forward as one more route open to makers of life science products.

More than 50%

The CO2e emissions of the mono-PE structure came out this much lower than those of its PE/PA/PE counterpart in a screening assessment.

LESSONS & ACTIONABLES

Life science packaging teams evaluating the film may want to ask for the methods and mechanical results behind the internal testing, the cytotoxicity criteria applied, the assumptions and system boundaries of the screening LCA, and the recycling streams that the recyclability assessment reflects.

04

DEINKING AND RECYCLING

Source Siegwerk · 20 October 2026

Siegwerk Secures European Patent EP4107326 for Deinking Primers Used in Printed Plastic Packaging

WHY IT MATTERS

As European recycling requirements for plastic packaging become more demanding, removing printed ink effectively is increasingly important for recyclate quality. Siegwerk has secured European patent EP4107326 for a primer technology designed to let print come off plastic packaging during alkaline washing. The patent also extends to flexible packaging with more complex structures and complements the US patent granted in May 2025.

Around 2.5 million tonnes

Post-consumer recyclate from flexible packaging that CEFLEX cites as required by 2030 for the PPWR's recycled-content targets, counting flexible packaging alone

May 2025

Grant date of US Patent US12291051B2

2030

Year from which the PPWR is summarised as requiring minimum post-consumer recycled shares in plastic packaging

AT A GLANCE

1. A functional primer under the print on the plastic substrate is designed to let the ink layer come off in alkaline washing, ahead of the polymer being reprocessed.
2. Both solvent-based and water-based deinking primers fall under the patent, and its scope also takes in packs whose ink lies sandwiched among further layers, such as shrink sleeves, labels and complex flexible packaging.
3. Joint research and industry projects, together with Siegwerk's own deinking laboratory, are where the technology is described as having been validated.

What the Patent Protects

- Siegwerk has secured EP4107326, a newly granted European patent, which is presented as one more step in the company's efforts to develop ways of removing ink when plastic packaging is recycled. No grant date is given.
- Printing inks that commercially used conditions cannot deink are what the protected primer technology targets. Printed flexible packs with more involved structures are within its reach too, and in recycling it is meant to let those inks come away from the plastic.
- The working principle is a functional primer laid on the plastic substrate underneath the print. When the material goes through alkaline washing, this primer is designed to free the print layer so it can be stripped off, and only then is the polymer reprocessed.
- Beyond the patent, Siegwerk's wider deinking range also offers options for UV printing, while the patented technology itself covers deinking primers in both solvent-based and water-based form.
- Shrink sleeves, labels and complex flexible packaging are all covered, because the protection applies to structures where other layers enclose the ink, with plain surface printing making up only part of that coverage.

Validation, Example and Positioning

- The technology is reported to have been validated through joint research and industry projects, as well as testing in Siegwerk's in-house deinking laboratory. The work covers different packaging structures, ink technologies and substrates.
- A deinkable mono-material flexible pouch concept from Siegwerk and partners, one example of this work, won the German Packaging Award in Gold. The concept demonstrated that the pack could remain recyclable while its print was removed during recycling.
- Each ink system and packaging structure can be given its own deinking solution, drawing on Siegwerk's work across primers, inks and coatings, with the print still working as required. The aim is better recyclate quality without giving up print performance.
- Siegwerk's deinking work on printed plastic packaging is reported to span several years. European patent EP4107326 protects one of the resulting technologies and complements US patent US12291051B2, granted in May 2025.

German Packaging Award in Gold

Honour received by Siegwerk and partners for a deinkable mono-material flexible pouch concept, one example within the technology's validation work.

Regulatory Context

- From 2030, the PPWR will require minimum post-consumer recycled content in plastic packaging, which Siegwerk ties to a greater need for clean recycle of high quality.
- CEFLEX estimates that meeting these targets for flexible packaging alone will take around 2.5 million tonnes of post-consumer recyclate from flexible packaging by 2030.
- Ink that comes off well can leave recyclate with less discolouration, odour and contamination, and so of higher quality.

Why Flexible Packaging Is More Complex

- Multilayer structures, barrier layers and adhesives can make flexible packaging harder to sort, wash and recycle. Ink can also take up more of the surface or sit trapped inside laminates.
- Within mechanical recycling, an extra deinking stage is drawing more interest, because removing ink well helps produce better recovered polymers.
- CEFLEX identifies five technologies to address recyclate quality in flexible packaging, namely advanced washing, delamination, extraction, dissolution and deinking.

LESSONS & ACTIONABLES

Converters and brand owners designing printed flexible packaging with recycling in mind may want to ask Siegwerk for the validation results by substrate and ink system, the recyclate-quality data from the laboratory and project work, and how the solvent-based and water-based options fit their own ink, substrate and recycling process choices.



For inquiries & market intelligence

- 11490 Westheimer Rd Suite 970, Houston TX 77077, United States
- +1 832-341-1222
- info@webpackagingsolutions.com
- www.webpackagingsolutions.com

Sources Packaging Europe, Henkel, SÜDPACK, Siegwerk