ExxonMobil
Signature Polymers

Case study

Exceed™ Tough+ Vistamaxx™

ExxonMobil Signature Polymers and Reifenhäuser launch high-performance stretch hood films incorporating up to 35% household-sourced PCR content

- Incorporates household-sourced PCR content
- High holding force and elastic recovery
- Good tear propagation resistance
- Smooth and robust hooding

Data and results presented herein apply specifically to the noted application under this case study.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

Challenge

Rising consumer awareness and evolving regulations, such as, for example, the EU Packaging and Packaging Waste Regulation (PPWR)[1], are driving brand owners to seek packaging solutions that incorporate recycled content. With demand for high-quality post-consumer recycled content (PCR) from industrial and commercial sources expected to rise in the years to come, industry is being driven to explore the use of lower-quality PCR, such as waste sourced from household streams. Household-derived PCR streams have traditionally been considered too contaminated for high-performance applications like stretch hood films. Yet, this is exactly where innovations in materials science and process engineering, combined with the right collaborations, can redefine what's possible.

Solution

In collaboration with Reifenhäuser Blown Film, ExxonMobil Signature Polymers developed a high-performance stretch hood film that can incorporate up to 35% PCR derived from household sources. This breakthrough is enabled by Reifenhäuser's EVO Fusion line, whose twin-screw technology provides the intense shearing, thorough homogenization, and volatiles extraction required to process lower-quality PCR materials into a high-quality film.

At the core of this innovation are ExxonMobil Signature Polymers resins. The 5-layer film formulation features Exceed™ Tough+ m 0512 high-performance polyethylene for its excellent bubble stability, good openability features, and high holding force, alongside Vistamaxx™ 6102 performance polymer, which facilitates PCR incorporation by enhancing the film toughness. The Vistamaxx polymer content was kept ≤ 15% for potential compatibility with design for recyclability guidelines[2]. The PCR resin (Systalen LD-C12200), kindly provided by Der Grüne Punkt, is derived from post-consumer waste collected through Germany's 'yellow bag' recycling system. This PCR fraction is blended with Exceed Tough+ m 0211, a low-MI high-performance polyethylene that can act as a gel grinder, further improving film performance and optics.

Friction control is essential for stretch hood applications, yet difficult to achieve with heavily contaminated PCR. Permanent and non-migrating slip additives (such as CONSTAB SL 05077 LD, kindly provided by CONSTAB GER) may ensure a stable and consistent coefficient of friction throughout processing and usage.

[1] https://eur-lex.europa.eu/eli/reg/2025/40/oj

[2] The terms "recyclable" and "recyclability" are intended to refer to the potential for recyclability of packaging solutions designed and manufactured in accordance with recycling guidelines such as RecyClass (https://www.recyclass.eu/) for certain products in Europe. Ultimate recyclability of packaging incorporating ExxonMobil's performance PE resins will depend on a number of factors outside of ExxonMobil's control including, but not limited to, availability of programs and facilities that collect and recycle plastic packaging within a given community. Any and all claims about the recyclability of packaging are the sole responsibility of the packaging manufacturer.

https://recyclass.eu/wp-content/uploads/2024/03/2023-PO-013014-vf.pdf

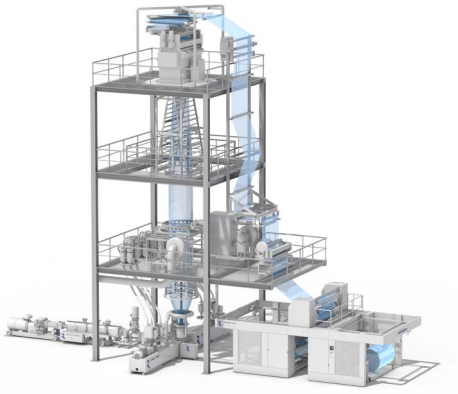
LACHENMEIER A SIGNODE BRAND
Reifenhäuser BLOWN FILM
DerGrünePunkt
CONSTAB GER

Reifenhäuser's twin-screw extruder technology ensures thorough mixing and homogenization of PCR blended into virgin resin(s). Its shear action effectively breaks down gels and distributes them evenly, minimizing the risk of film failure during the stretch hood application. Additionally, the EVO Fusion line is equipped with an in-line degassing system that effectively removes volatiles (which tend to be particularly prevalent in household-sourced PCR), ensuring a bubble-free film that is capable of withstanding the high mechanical stresses of industrial packaging.

Results

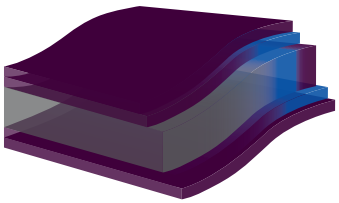
The film was rigorously tested on the Lachenmeier hooding system, where it was evaluated against key performance metrics including friction control, tear resistance, and load retention. Despite the incorporation of lower-quality PCR derived from household sources, the film met the performance requirements, delivering good holding force, elastic recovery, and tear propagation resistance to ensure secure load containment and help protect goods during transit.

This achievement underscores the power of combining Reifenhäuser's advanced machine technology with the material innovation behind ExxonMobil Signature Polymers. Through close collaboration across the value chain, it was demonstrated that even lower-quality, household-sourced PCR can be transformed into a high-performance packaging solution.



Thickness: 90 µm

- Exceed™ Tough+ m 0512.RA
- Vistamaxx™ 6102
- PCR*
- Exceed Tough+ m 0211.RA

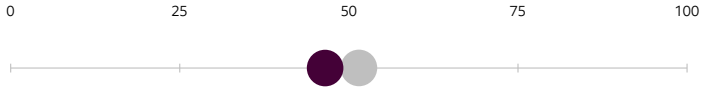


*PCR density = 0.959 g/cm³
Melt index (2.16 kg, 190°C) = 1.0 g/10 min as measured by ExxonMobil

1% Secant modulus, TD [MPa]

Holding force, TD [N]

Elastic recovery, TD [%]



Tear propagation force drop [%]

Kinetic coefficient of friction, film-film [-]

Property	Test method based on
Tensile properties	ExxonMobil method
Holding force & elasticity	ExxonMobil method
Tear propagation	ExxonMobil method
Coefficient of friction	ASTM D1894-14
Density	ASTM D792-A
Melt index	ASTM D1238-A

Data from tests performed by or on behalf of ExxonMobil.

ExxonMobil Signature Polymers 3-layer stretch hood film formulation without PCR (90 µm)

ExxonMobil Signature Polymers 5-layer stretch hood film formulation incorporating 35% household-sourced PCR (90 µm)

ExxonMobil Signature Polymers

Bring your impossible

ExxonMobil Signature Polymers was born from the belief that people fuel progress. From automotive and construction to packaging, agriculture, industrial, and beyond, we leverage the scale and reach of ExxonMobil to deliver the insights and innovations that empower our diverse, global partners to take their businesses to new heights. We continuously work to provide the listen-first, service-driven, game-changing collaboration that unlocks opportunities for our partners and advances their business goals.