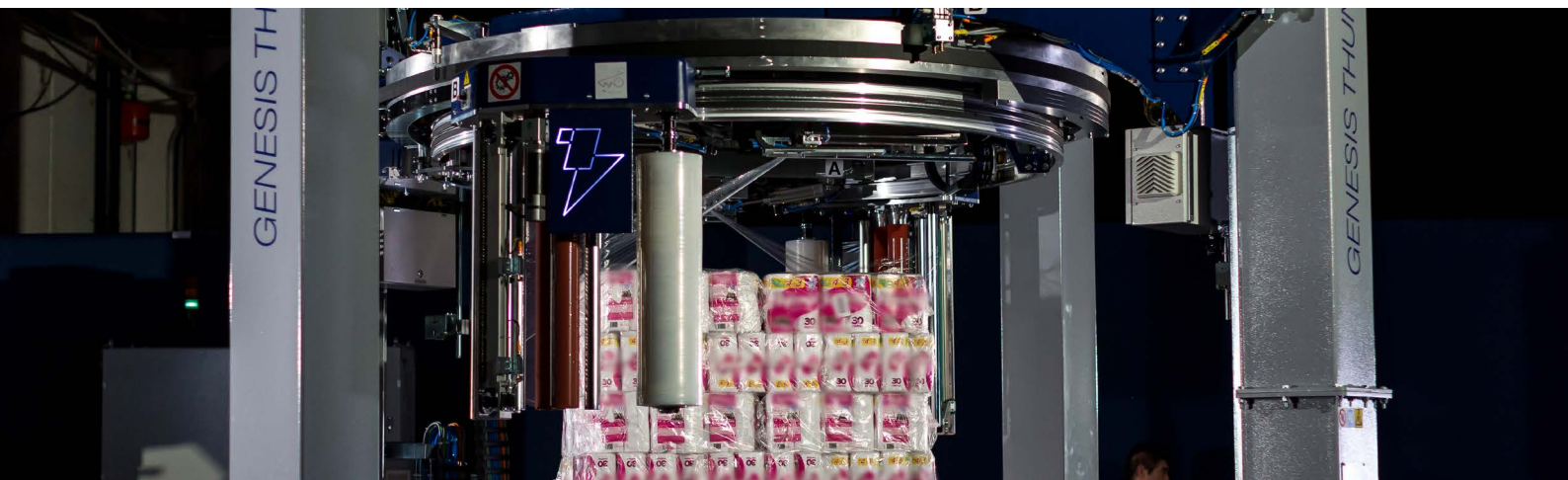




Exceed™ Flow Vistamaxx™

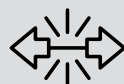
Colines, Robopac, Saica and ExxonMobil Signature Polymers collaborate to develop an innovative, high tenacity power stretch film incorporating 35% PCR content



Incorporates
35% PCR
content



Load stability



High tenacity



High speed
wrapping

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

With the upcoming Packaging and Packaging Waste Regulation (PPWR)¹, brand owners and converters face the challenges of:

- Incorporating post-consumer recycled content (PCR) into stretch films without impairing film integrity
- Maintaining high-speed wrapping capabilities (up to 65 rpm) in industrial lines
- Ensuring load stability with ultra-thin films (8-12 microns)
- Preserving load containment force, without using more material per load.

"The market demanded a solution that could meet regulatory goals and stable operation, without compromise," Mr. Nicola Lombardini, Head of R&D and Member of the Board at Colines. "Expertise and partnership were required for success."

Over the years, the value chain has collaborated extensively to explore the incorporation of PCR into stretch films and to define the operational boundaries of its use. Despite progress, the high-performance machine wrap segment, characterized by elevated stretch ratios and the use of performance polyethylene, remained a critical bottleneck. The incorporation of PCR often led to premature film breakage during high-speed application, resulting in reduced productivity and increased material consumption for end-users.

Solution

In response to this challenge, collaboration between the ExxonMobil Signature Polymers team, Colines, Robopac and Saica Natur Cycle Plus has led to the development of a breakthrough solution: the high tenacity power stretch (HTPS) film, typically stretched to 50% pre-stretch.

This next-generation 7-layer cast stretch film incorporates 35% PCR, enabled by Exceed™ Flow and Vistamaxx™ performance polymers (patent pending).

The Colines line has folded edge technology which is essential for thin HTPS films with PCR. This innovation allows film processing without bleed trims. Losing bleed trims is one of the most significant challenges when running thin films with PCR. During the wrapping process, the folded edge improves consistency, especially at high speeds. When slitting films incorporating PCR, there is a risk of creating edge notches that can lead to film breaks under tension. By folding the edges, this risk is minimized, ensuring greater reliability and performance in high-speed pallet wrapping.

¹ <https://eur-lex.europa.eu/eli/reg/2025/40/oj>

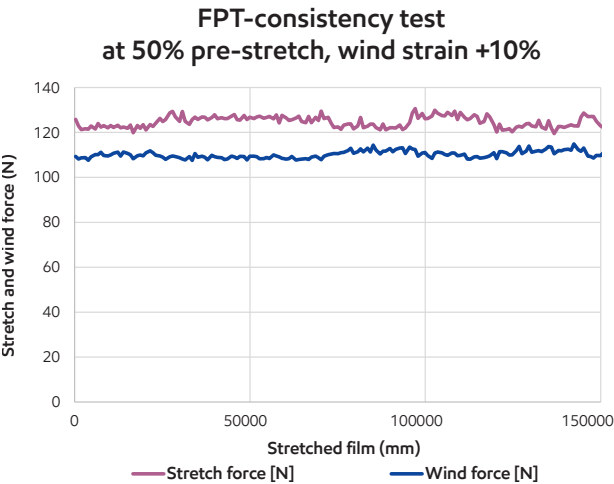
HTPS film is engineered to meet regulatory requirements while delivering high-speed wrapping performance, at low stretch levels, without compromising load containment force, achieving results comparable to virgin power pre-stretch (PPS) films.

HTPS film ensures:

- Excellent containment force
- No increase in material usage
- Consistent performance at speeds up to 65 rpm

To support seamless market integration, the ExxonMobil Signature Polymers team worked closely with high-speed equipment manufacturers to identify and implement key adaptations to wrapping machinery, ensuring optimal performance across the entire value chain. HTPS film requires higher wrapping tension, so the pre-stretch feed-out speed must be lower than the wrapper ring speed. For example, when the pallet circumference is 2800 mm, the feed-out for HTPS film should be lower than 2800 mm. In our test, we used 2500-2400 mm. "Film consistency is critical for our high-speed wrapping equipment to operate at peak performance. The approach of limiting pre-stretch to a maximum of 50% while using very thin film is a new concept that may open future opportunities for high-speed applications by ensuring smooth and reliable operation," said Samuele Fabbri, Lab Operations, Robopac.

"ExxonMobil Signature Polymers HTPS film structure meets this requirement. This patented HTPS concept proves that PCR containing films can match virgin PPS film performance in demanding applications," shares Bart Lauwers, Principal Customer Application Development, Europe, Industrial Packaging, at ExxonMobil.



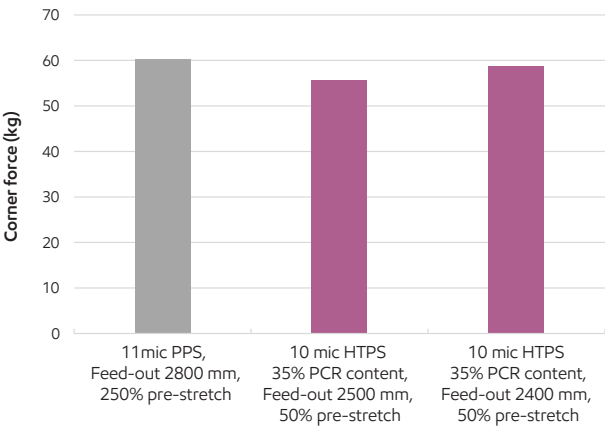
Processing

- Cast extrusion on Colines' 7-layer line
- High-speed wrapping trials conducted at Robopac

Results

- 35% PCR in line with Packaging and Packaging Waste Regulation targets
- High-speed wrapping up to 65 rpm with no loss in output
- Adaptable to pallet weight: 10-12 microns for medium weight pallets, 15-20 micron for heavy weight pallets
- Maintains load stability, no compromise on containment force
- Supports circularity by demonstrating PCR-containing film can compete in performance with virgin films, when designed with the right ExxonMobil Signature Polymers.

Corner force / 100g film on half pallet (2800 mm)



Key materials	Purpose
Exceed™ Flow m 1716.PA	Easy processing and tenacity; enables PCR incorporation
Vistamaxx™ 6000	Boosts consistency and stretchability at high speeds
Exceed™ m 3516 Vistamaxx 6202	Cling layer formulation
ExxonMobil™ C4LL 2818	Anti-cling layer
PCR content from Saica Reference: NC+ 8020AC PCR	

Test item	Based on
FPT* consistency, unwind force 30 N, wind force +10%, speed 4 m/s, W-pattern	ExxonMobil method
Corner force (kg/100 g, can only be used as comparative data)	Robopac

* Film Performance Tester (FPT) from ESTL

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.