



Collation shrink solution incorporating Post Consumer Recycled (PCR) content



At ExxonMobil, we believe in a collaborative approach that harnesses collective expertise across the value chain to help us advance sustainable solutions, together. That is how together we create tomorrow's performance today for **collation shrink solutions**:

Collation shrink packaging can now be made using PCR and virgin performance polyethylene (PE) polymers without compromising performance. The consideration of performance PE polymers helps to consider increased level of PCR incorporation in the structure, helping customers to create sustainable solutions.



Toughness:
puncture, and
dart impact



**Stiffness
and holding
force**



**Shelf appeal,
brand visibility
with the
incorporation of
up to 50% PCR**



**Comparable
shrink performance
with the
incorporation of
up to 50% PCR**



This collation shrink solution using performance PE polymers and PCR can be recycled in communities with programs and facilities in place that collect and recycle plastic film.

Challenge:

Sustainable collation shrink film solution incorporating up to 50% PCR.

As consumers become increasingly interested in the environmental impact of packaging, the value chain is looking at using recycled plastic content to help address their concerns.

As part of its desire to help customers create sustainable solutions, **ExxonMobil** wanted to aid in the development of a thinner, tougher collation shrink solution that would include PCR, while maintaining packaging quality and integrity.

Solution:

Extrusion technology with performance PE polymers allow the use of different PCR streams.

A collaboration between ExxonMobil, **Windmüller & Hölscher**, **SAICA** and **KHS** has resulted in a 40µm, 5-layer POD collation shrink film, which incorporates up to 50% PCR. The solution is designed to bundle 6 x 1.5l bottles.

The collation shrink film, which incorporates up to 50% recycled PE, was processed on a **OPTIMEX™** blown film line and maintains performance due to the inclusion of **Exceed™ S** and **Enable™ performance PE polymers** in the formulation.

The combination of OPTIMEX[®] technology and ExxonMobil performance PE polymers, allows different recycled polyethylene streams to be used. The processing challenge presented by recycled materials with a broad melt index and density range can be solved by using Exceed[™] S and Enable[™] performance PE polymers.

Result:

Thin film with excellent toughness and stiffness, excellent optics ensuring shelf appeal and brand visibility. This collation film solution also exhibits excellent shrink performance and package integrity while incorporating 50% of PCR.

Superior stiffness/toughness balance and excellent optics with Exceed S

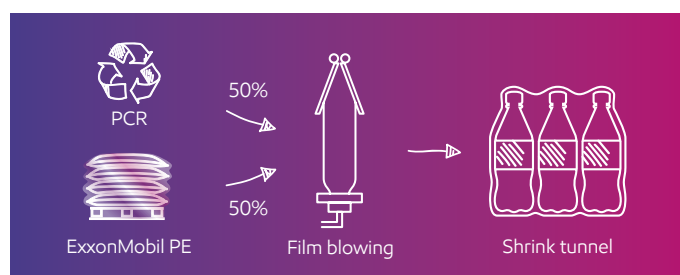
Exceed S performance PE polymers deliver industry leading combinations of stiffness and toughness while being easy to process.

Optimized performance and processability with Enable

Enable performance PE polymers deliver optimized performance by combining excellent processability and bubble stability with HAO properties in a single resin for more stable operations and better line output.

Package integrity and process consistency, even with recycled PE

Medium density Enable 4002 performance PE polymer delivers collation shrink packaging films with excellent properties including shrinkability and holding force. The shrink speed of the film can be adjusted for different shrink process conditions using ExxonMobil[™] LDPE.



Comparable performance with up to 50% PCR content

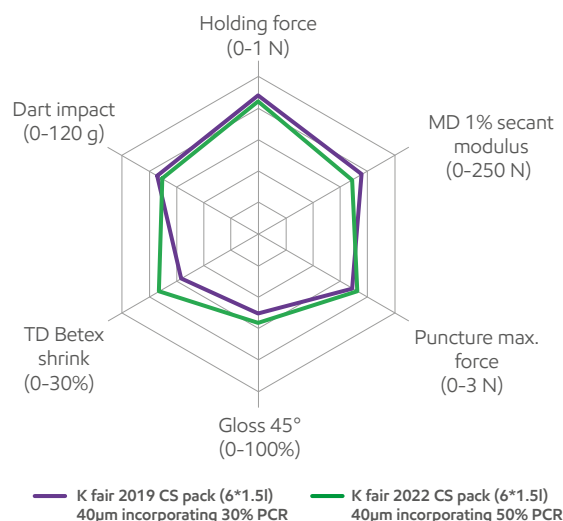
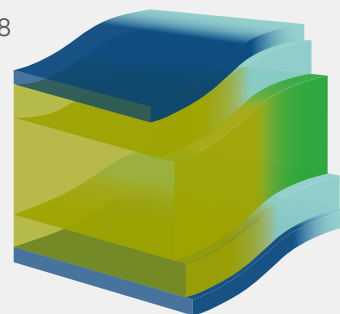
Enable 4002 performance PE polymer allows high PCR content incorporation while exhibiting excellent mechanical properties such as puncture and dart impact. It acts as a booster for PCR inclusion.

Collation shrink solution incorporating 50% PCR

5-layer film structure

Thickness: 40 µm

- Exceed S 9243ML
- Enable 4002MC
- Nexxstar[™] LDPE 00328
- PCR - Saica 5008FF



All data from tests performed by or on behalf of ExxonMobil.

Polymer properties	Exceed S 9243ML	Enable 4002MC	Nexxstar LDPE-00328	Test method* (based on)	Unit
Melt index (190°C/2.16 kg)	0.85	0.25	0.35	ASTM D1238	g/10 min
Density	0.926	0.938	0.929	ASTM D1505	g/cm ³

* For detailed product information, please consult the individual grade data sheet, available on our website: www.exxonmobilchemical.com. Values given are typical and should not be interpreted as specifications. Data generated by or on behalf of ExxonMobil.

Test item	Test method
Tensile properties on film at room temperature	ExxonMobil test method
Impact resistance by free falling dart	ExxonMobil test method
Puncture – needle test	ExxonMobil test method
Betex shrinkage of film	ExxonMobil test method
Retratch shrink force	ExxonMobil test method
Gloss 45°	ExxonMobil test method



5-Layer collation shrink film 40 µm (1.57 Mils)

MODEL: Optimex"

With passion for innovation we deliver value for our customers. With the OPTIMEX" we redefined the way our customers can achieve consistent high quality film, better output and best in class flexibility by providing standard machine configurations.

The OPTIMEX" is suited for a wide range of films with 3- or 5-layers and combines high output rates with outstanding film quality. Many components originate from the VAREX" high-end product family and have been adapted for OPTIMized EXtrusion, especially for PE products.

- OPTIMEX" extruders deliver excellent melt quality
- Field-proven MAXICONE die concept - the perfect fit for your application
- Cooling ring and profile control for OPTIMEX" ensure perfect film quality at maximum output and best film tolerances
- Full integration of all machine components to enable our unique control and automation system
- Long collapsing unit for excellent flatness
- Intelligent automation modules for economic production

Technical specifications:

Features:	
Line widths:	1300 - 2600 mm
Number of film layers:	3 or 5
Extruder screw diameters:	60, 70, 90, 105 mm
Die diameters:	160 - 630 mm
Raw materials:	PE, PP, PLA, Ionomers, biomaterials, recycling materials
Winders:	FILMATIC" O (surface / center winder) FILMATIC" T (turret winder)

See the Optimex" in action:



Advancing sustainable solutions. Together.

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WINDMÜLLER & HÖLSCHER

Get in the loop - flexible packaging solutions
made for circular economy



Filling and Packaging – Worldwide

Sustainable turnkey systems for
the beverage industry



ExxonMobil

Advancing sustainable solutions.
Together.



Managing and valorising waste





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