



Exceed™ Exceed™ Flow+ Exceed™ Tough+ Exceed™ Stiff ExxonMobil™ HD ExxonMobil™ LD

Sustainable collation shrink packaging using recycled PE content



Toughness –
puncture, and
dart impact



Stiffness
and holding
force



Shelf appeal,
brand visibility
with up to
30% recycled PE



Comparable
shrink performance
with up to 30%
recycled PE

Collation shrink packaging can now be made using recycled polyethylene and virgin performance polyethylene (PE) polymers without compromising performance, helping customers create sustainable solutions.

This collation shrink solution using performance PE polymers and recycled PE is a mono-material, lightweight solution that uses less materials and can be recycled where programs and facilities to collect and recycle plastic films exist.

Challenge

Sustainable collation shrink film solution containing up to 30% recycled polyethylene.

As consumers become increasingly concerned about the environmental impact of packaging, the value chain is looking at using recycled content as part of the solution.

As part of its commitment to helping customers create sustainable solutions, ExxonMobil wanted to develop a thinner-tougher collation shrink solution that would include recycled PE, while maintaining packaging quality and integrity.

Solution

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

A collaboration between ExxonMobil, Windmöller & Hölscher, and Grupo Armando Alvarez has created a 40-micron, 5-layer POD collation shrink film, which includes up to 30% recycled polyethylene (PE). The solution is designed to wrap 6 x 1.5L bottles.

The collation shrink film, which includes up to 30% recycled PE, was processed on a VAREX II blown film line and maintains performance due to the inclusion of Exceed™ performance PE polymers in the formulation.

The combination of VAREX II 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 is solved by using Exceed™ performance polyethylene polymers.

Results

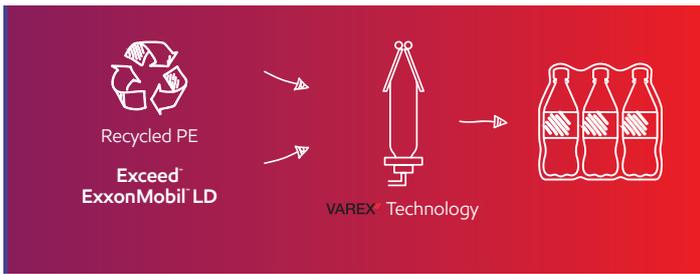
Thinner film with excellent package integrity, optical properties and processability while adding recycled PE.

Toughness and excellent optics with Exceed

Exceed performance polymers boost the mechanical properties of the film, so that recycled PE can be added without having to increase film thickness. Exceed maintains the toughness, optical properties and improves processability. The extreme performance properties provided by Exceed allow more recycled materials to be included in film formulations. Converters can optimize film formulations and increase output, helping them to produce extremely tough 5-layer polyolefin-dedicated (POD) collation shrink packaging solutions.

Package integrity and process consistency, even with recycled PE

Medium density Exceed performance PE polymers deliver collation shrink packaging films with balanced properties including shrinkability, holding force and toughness-stiffness. The shrink speed of the film can be adjusted for different shrink process conditions using ExxonMobil™ LD.



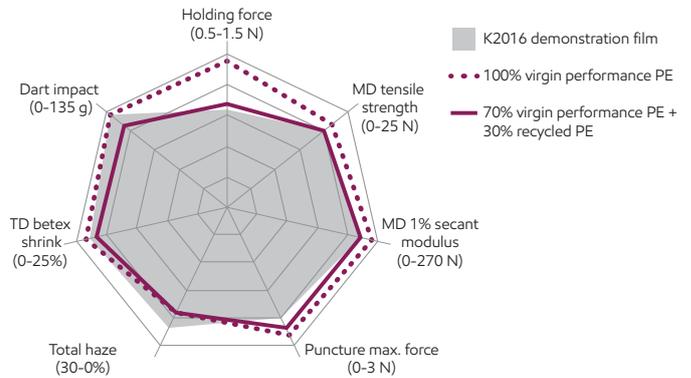
Comparable performance with up to 30% recycled content

The new collation shrink packaging with Exceed delivers eXtreme Performance properties, which allows up to 30% recycled PE to be included and delivers:

- **Toughness** - puncture and dart impact
- **Stiffness** - MD tensile strength, excellent holding force
- **Optics** - Shelf appeal, brand visibility with up to 30% recycled PE
- **Shrink performance** - comparable shrink performance with up to 30% recycled PE.

	40 µm 100% performance PE with Exceed ¹	40 µm 100% virgin performance PE with Exceed ²	40 µm 70% virgin performance PE with Exceed + 30% recycled PE ²
Layer configuration	1/2/4/2/1	1/2/4/2/1	1/2/4/2/1
Skin layer	Exceed + ExxonMobil LD	Exceed + ExxonMobil LD	Exceed + ExxonMobil LD
Sub-skin	Exceed	Exceed	Exceed + ExxonMobil LD
Core	Exceed + ExxonMobil LD	Exceed + ExxonMobil LD	Recycled PE + ExxonMobil LD/HD
Sub-skin	Exceed	Exceed	Exceed + ExxonMobil LD
Skin layer	Exceed + ExxonMobil LD	Exceed + ExxonMobil LD	Exceed + ExxonMobil LD

1. presented in K2016
2. presented in K2019



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

ExxonMobil performance PE for collation shrink

Grade	Density (g/cm ³)	Melt index (g/10 min)
Exceed Flow+ m 0516	0.916	0.50
Exceed Tough+ m 1019	0.918	1.0
Exceed m 2018	0.918	2.00
Exceed Flow+ m 0938	0.940	0.90
Exceed Stiff+ m 0238	0.940	0.25
ExxonMobil HD 6107FL	0.961	0.70
ExxonMobil LD 05529	0.929	0.55
ExxonMobil LD 03322	0.922	0.33

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 and business goals.



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