ExxonMobil
Signature Polymers

Case study

Exceed™ Tough+ Exceed™ Stiff+ Exxtra™ Seal

Polyethylene rich (>95%[1]) pouches for edible oil with improved recyclability* and uncompromising package functionality

Recyclable*

High O_2 barrier

Optimal processing

Optimized Vertical Form Fill and Seal (VFFS) operation

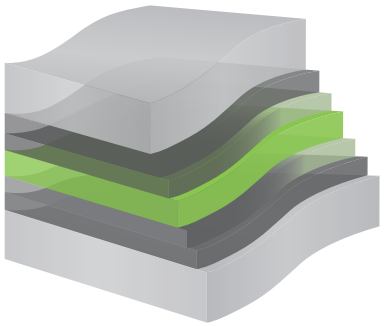
Data and results presented herein apply specifically to the noted application under this fact sheet.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

Challenge

The goal was to produce a recyclable*, edible oil package with very high PE content (>95%[1]) while maintaining physical property performance.

Reference oil film

7 layer structure design

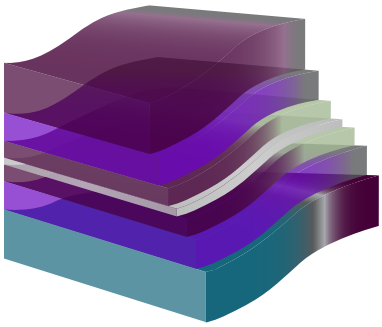


- mC6-LLDPE
- C4-LLDPE
- PA
- Tie resin

Thickness: 80 µm

ExxonMobil PE rich oil film solution

High barrier 7 layer film with extreme performance



- Exceed™ Tough+ m 0814
- Exceed™ Stiff+ m 0820
- Exxtra™ Seal m 1012
- SoarnoL DC3203RC
- Tie resin

Thickness: 80 µm

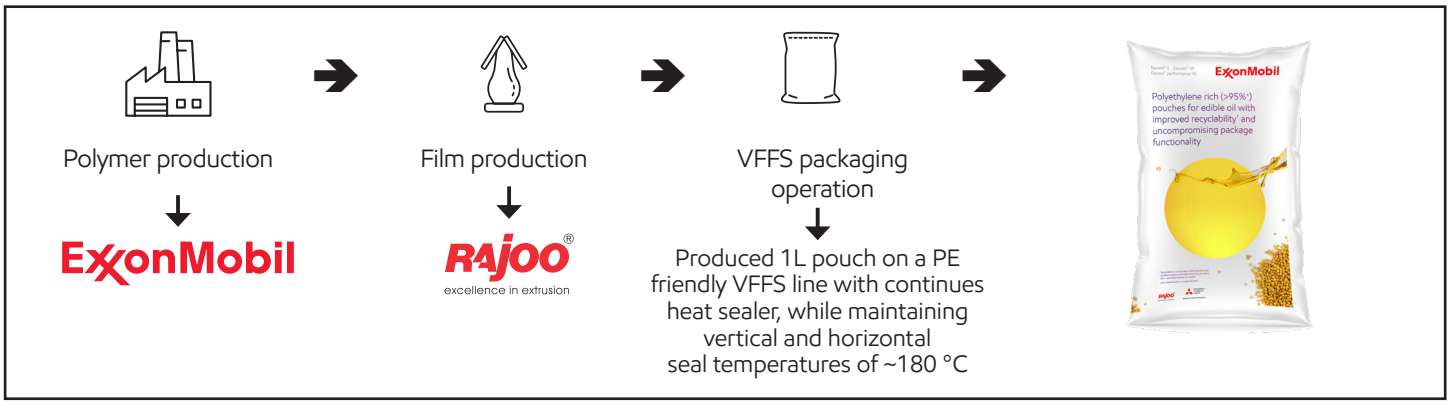
LDPE: 0.924 g/ cm³, 0.75MI; C4-LLDPE: 0.918 g/ cm³, 1 MI
Tie resin (concentrated): MAH grafted LLDPE;

[1] Calculated based on weight (target)
* Recyclable in the few communities with programs and facilities in place that collect and recycle plastic film.

Solution

Creation of > 95% PE[1] edible oil package, with high oxygen barrier & outstanding package integrity through exceptional stiffness and toughness balance. The film was produced with ExxonMobil metallocene PE resins like Exceed™ Tough+, Exceed™ Stiff+, Exxtra™ Seal and a special SoarnoL EVOH resin for high clarity and high gas barrier.

The films were made on a HEPTAFOIL®- 7 layer co-extruded blown film line from Rajoo Engineers Limited run at apx. 490 kg/h. ExxonMobil resins such as Exceed™ Tough+ m 0814 provide step-out toughness, Exceed™ Stiff+ m 0820 provides high dart-drop impact and stiffness balance, Exxtra™ Seal m 1012 provides excellent heat sealing and hot tack performance. The SoarnoL DC3202RC is designed for high clarity with high gas barrier properties. The package was then formed and filled with edible oil on a commercial scale VFFS packaging line at VFSS OEM end, which resulted in good hermetic packs while achieving desired packaging line speeds.



Results

The solution contains no polyamide (PA) in the formulation which was developed using Exceed Stiff+ m 0820, Exceed Tough+ m 0814, Exxtra Seal m 1012 metallocene PE and SoarnoL DC3203RC provides the following benefits compared to that of the reference film which contains PA.

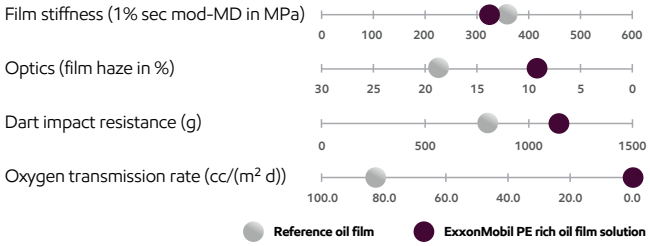
- Deliver outstanding package integrity
- Comparable film stiffness
- Up to 50% lower haze
- Up to 40% higher dart impact load
- Much higher oxygen barrier

Packaging trial observation:

- Smooth machineability
- Up to 55 packs/min line speed achieved

Pack integrity test observation:

- Zero failures during hand squeezing test (tested 10 samples)
- 100% pass (out of 10 pouches; each dropped from 1.5 m, 3 sides consecutive drops)
- No leakage (out of 200 pouches) during transportation trial (~700 km by road)



In summary, using the latest generations of metallocene PE from ExxonMobil and SoarnoL DC3203RC, it is possible to create >95%[1] PE-based pouches for edible oil packaging, while maintaining packaging integrity, optics, machinability and packaging line speed during VFFS operation.

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.

What's new: ExxonMobil Signature Polymers

All our polymers are now positioned under a single portfolio brand: Signature Polymers. The aim is to simplify our product architecture and naming to improve portfolio navigation for you. We would like to stress that our commitment to high quality products remains the same, it is the names that change. Everything else remains the same. We will be making these modifications over the next six months so you will see both old and new grade names highlighted during that time.

Here's a quick overview of brands and grade names that have changed in this document:

Legacy commercial name	New commercial name
Exceed™ XP 8784	Exceed™ Tough+ m 0814
Enable™ S 9272	Exceed™ Stiff+ m 0820
Exceed™ 1012	Exxtra™ Seal m 1012

Some of our existing Exceed, Achieve, Paxon and premium PP/HD grades have moved to Exceed brand; most existing Enable grades have moved to Exceed Flow[+]; most of our existing Exceed XP grades have moved to Exceed Tough[+]; most of our existing Exceed S grades have moved to Exceed Stiff[+]. More details here **https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers** or contact your ExxonMobil representative to know more.

Want to see what's changed in our portfolio? Go to **exxonmobilchemical.com/sptransform**