ExxonMobil
Signature Polymers

Case Study

Exceed™ XP Exceed™ Enable™ performance polymers

Full* PE thermoformed packaging that can offer recyclability** and uncompromising package functionality and optics

Recyclable* | Exceptional puncture performance | Excellent optics | Optimized formability | High O_2 barrier

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.

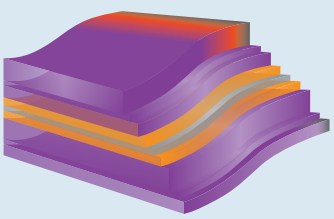
Challenge

To produce a recyclable, thermoformed package with 95 wt% PE content without compromising on functionality or optics.

Top web

Thickness: 75µm

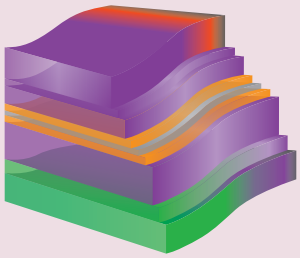
- Exceed XP 7052ML
- Exceed 2012MA
- EVAL™ L171B
- Slip & AB Masterbatch
- ADMER™ NF518E



Thermoformed bottom web

Thickness: 170µm

- Exceed XP 7052ML
- Exceed 2012MA
- Enable 4009MC
- EVAL™ LT172B
- Slip & AB Masterbatch
- ADMER™ NF518E



*95% PE based on weight.

**Recyclable in communities with programs and facilities in place that collect and recycle plastic film.

kuraray EVAL™ MULTIVAC Reifenhäuser BLOWN FILM

Solution

Creation of a 95 wt% PE thermoformed package, consisting of a formed PE/EVOH bottom web and PE/EVOH lid film-with both high oxygen barrier and outstanding package integrity through optimized corner thickness and puncture.

The bottom web was produced with ExxonMobil best-in-class resins like Exceed™ XP, Exceed™ and Enable™ performance PE and a special EVAL™ EVOH resin for thermoforming. The films were made on a Reifenhäuser Aqua Cool 9-layer barrier line.

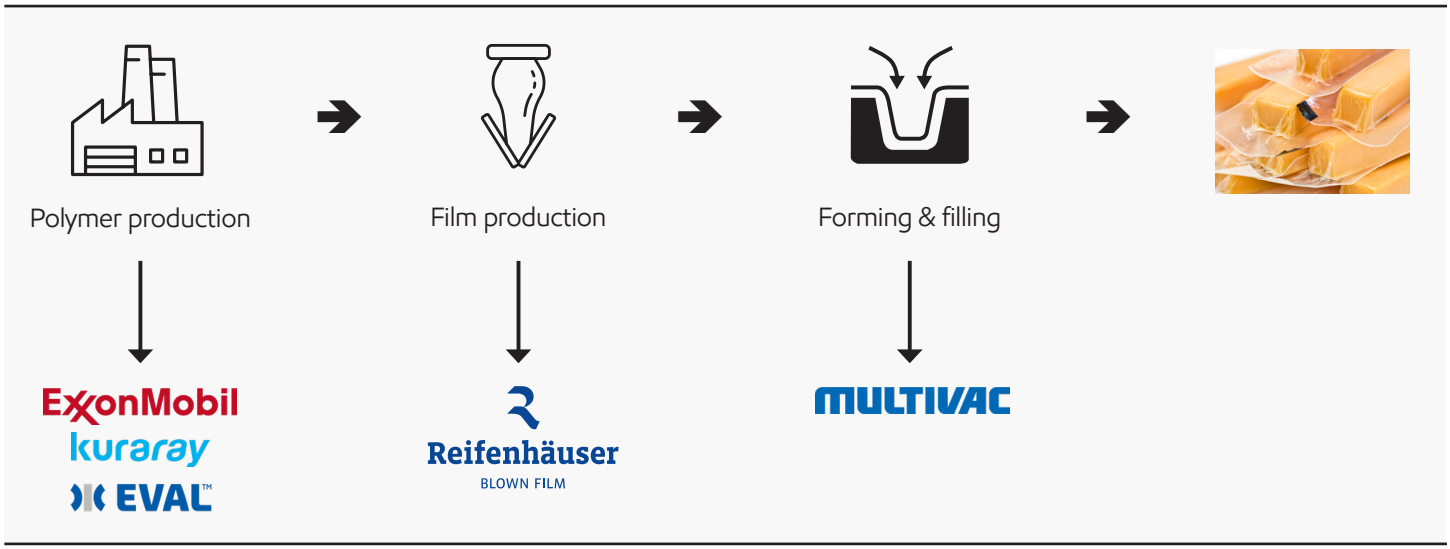
ExxonMobil resins Exceed XP 7052ML and Enable 4009MC provide exceptional puncture performance and formability, while the EVAL™ EVOH resin LT172B designed for thermoforming, combines low thickness with high barrier properties.

The top film consists of a PE/EVOH coex film produced on a Reifenhäuser Aqua Cool 9-layer barrier line with Exceed XP 7052ML, Exceed 2012MA and EVAL™ EVOH high barrier resin L171B.

The combination of Reifenhäuser's Aqua Cool technology and ExxonMobil's high performance resins can result in excellent optics, exceptional puncture performance and formability.

The package was then formed and filled on a MULTIVAC R126 machine according to industry standard process conditions.

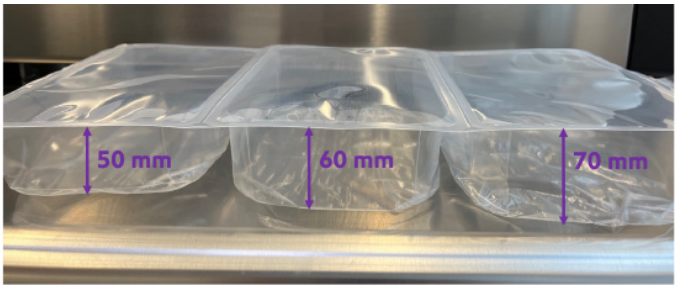
The package was also successfully produced on a MULTIVAC R245 machine at high line speed.



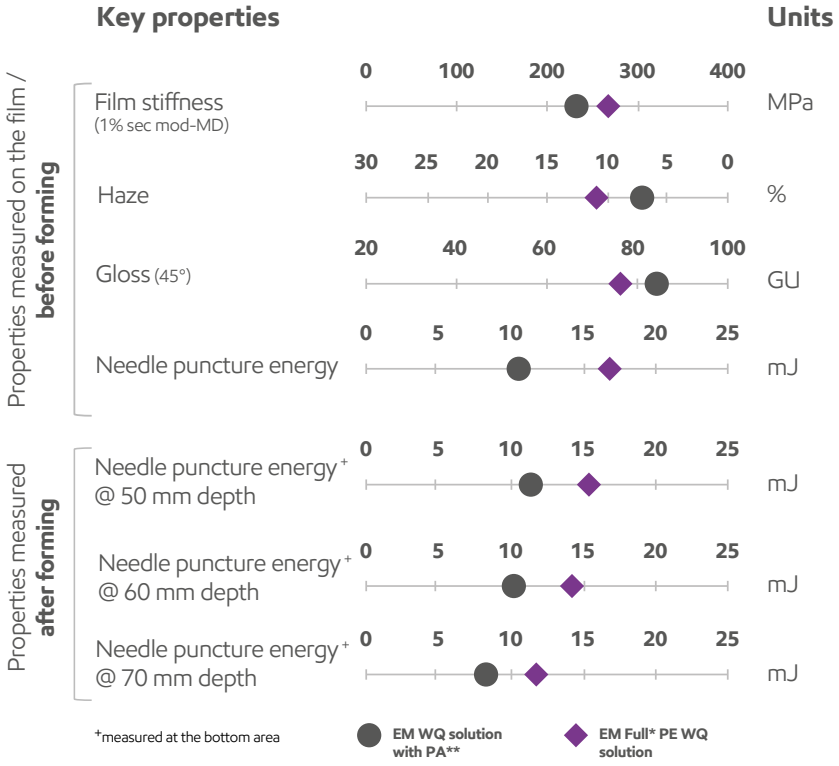
Result

The combination of ExxonMobil Exceed™ XP, Exceed™ & Enable™ performance PE and EVAL™ EVOH resins can deliver outstanding package integrity, with comparable film stiffness and exceptional puncture performance compared to PA containing thermoformed film. Package functionality such as oxygen barrier and optics are comparable to PA containing thermoformed films.

The film has excellent machinability on the MULTIVAC R245 forming and filling machine at standard and high line speed. Under optimized thermoforming trial conditions (*) on the R245 MULTIVAC line, maximum line speed (>12 cycles/minute) was achieved.



(*) Sealing: 1 second at 120°C with 3 bar, forming: 2.3 seconds at 100°C, mold size: 182mm x 112mm, with depths of 50mm, 60mm and 70mm.



Data from tests performed by or on behalf of ExxonMobil on representative samples.

Full* PE solution with Exceed XP 7052ML, Exceed 2012MA & Enable 4009MC vs. PA containing WQ solution, both 170 µm films can offer:

- Comparable film stiffness and optics
- Step increase in puncture performance before and after forming

* 95% PE based on weight.

**PE/PE/PE/Tie/PA/EVOH/PA/Tie/PE with thickness distribution: 46/10/10/7/10/10/46/6/25.

Both 170 µm films have OTR below 0.5 cc/(m².day) and WVTR below 3 g/(m².day).

WQ: Aqua Cool water-quench
EM: ExxonMobil
PA: polyamide

The combination of ExxonMobil Exceed™ XP, Exceed™ & Enable™ performance polymers and EVAL™ EVOH with Reifenhäuser's Aqua Cool technology, allows you to create a 95 wt% PE-based thermoformed package, without compromising on package integrity, optics or machinability.

Contact us for more information: **exxonmobilchemical.com/pe**

Test item	Test method
Tensile properties on film at room temperature	ExxonMobil test method
Gloss 45°	ExxonMobil test method
Haze	ExxonMobil test method
Oxygen transmission rate (OTR)	ExxonMobil test method (measured at 23°C, 50% RH of the test gas)
Water vapor transmission rate (WVTR)	ExxonMobil test method (measured at 37.8°C, 90% RH of the test gas)
Needle puncture resistance	ExxonMobil test method

ExxonMobil Signature Polymers

Bring your impossible

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. The composition of the products are unchanged, it is only the names that updated. We will be making these modifications over the next few months, through mid 2025, 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 will be changed in this document:

Legacy Commercial Name	New Commercial Name
Exceed™ XP 7052ML	Exceed™ Tough+ m 0512.ML
Exceed™ 2012MA	Exxtra™ Seal m 2012.MA
Enable™ 4009MC	Exceed™ Flow+ m 0938.MC

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