ExxonMobil
Signature Polymers

Case Study

Exceed™ Tough+ Exxtra™ Seal

95% PE-based barrier packaging with improved recyclability* potential and uncompromising package functionality

Designed for recyclability | Exceptional toughness | High barrier properties | Good optics

Challenge

Production of recyclable barrier packaging with very high PE content without compromising on package integrity, functionality or optics.

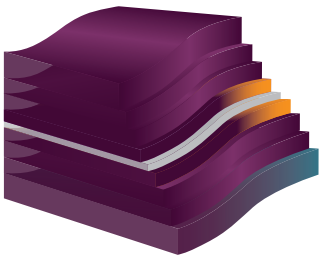
Potential solution

Creation of 95% PE-based barrier packaging with good oxygen barrier and outstanding package integrity. The films were produced with ExxonMobil best in class resins, including Exceed™ Tough+ performance PE and Exxtra™ Seal m 2012 metallocene PE, together with EVAL™ EVOH resins. The films were extruded on an Alpine 9-layer barrier line. Exceed Tough+ performance polyethylene resins can help to provide exceptional toughness, while the EVAL EVOH L171B resin can help to provide high barrier properties.

Recyclable* barrier package

Thickness: 75µm

- Exceed Tough+ m 0512
- Exxtra Seal m 2012
- EVAL™ L171B
- Tie resin masterbatch



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

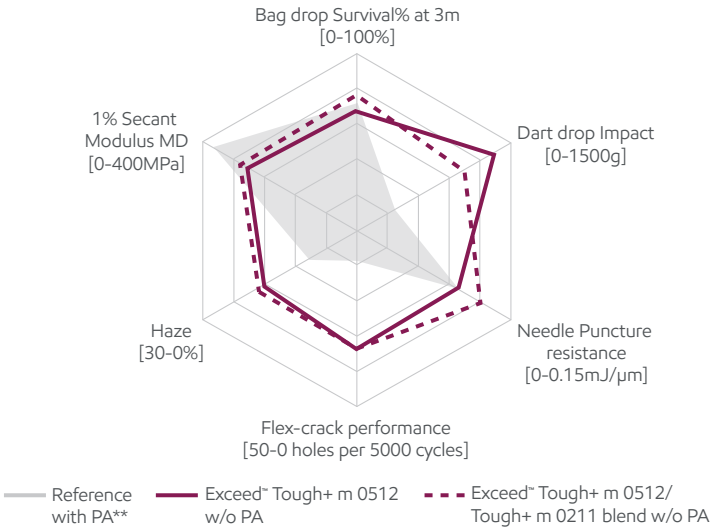
HOSOKAWA ALPINE kuraray EVAL™

Result

The combination of Exceed™ Tough+ performance PE and EVAL™ EVOH resins can deliver outstanding package integrity, including more than twofold better performance on flex-crack and dart drop impact, together with puncture values comparable to that of polyamide (PA) containing barrier film. A solution based on Exceed Tough+ m 0512 can match the needle puncture performance of the PA-containing reference, while a solution based on a blend of Exceed Tough+ m 0512 and Exceed Tough+ m 0211 can deliver an improved needle puncture performance.

Regarding package functionality factors, such as oxygen barrier – not shown in the graph due to space limitations – ExxonMobil data tells that it is comparable to traditional PA-containing barrier films; whereas for other critical aspects, like optics, Exceed Tough+ performance PE-based solutions outperform the PA-containing barrier film in haze.

In summary, using the latest generations of performance resins from ExxonMobil and EVAL, it is possible to create a 95% PE-based barrier package, without compromising on package integrity, optics and barrier properties.



Oxygen transmission rate (OTR) less than 0.4 cc/(m2*day)
Water vapor transmission rate (WVTR) less than 6 g/(m2*day).
Data traceability R2301-011290.
**PE/Tie/coPA/EVOH/coPA/Tie/PE with thickness distribution: 24.2/6/6/2.6/6/6/24.2 with 16% PA

Test item	Test method
Oxygen transmission rate (OTR)	Based on ASTM F1927 (measured at 23°C and 50% RH of the test gas)
Water vapor transmission rate (WVTR)	Based on ASTM F1249 (measured at 37.8°C and 90% RH of the test gas)
Dart drop impact	ExxonMobil test method - Method A
Needle puncture resistance	ExxonMobil test method
Tensile properties film at room temperature in MD	ExxonMobil test method
Total haze	Based on ASTM D1003-21 B
Leak detection / Dye penetration on flexed samples	ExxonMobil test method

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

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, 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 7052	Exceed™ Tough+ m 0512
Exceed™ 2012	Exxtra™ Seal m 2012
Exceed XP 7021	Exceed Tough+ m 0211

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**