ExxonMobil
Signature Polymers

Case Study

Exceed™ Flow+ Exceed™ Tough Exxtra™ Seal

Maintaining performance with full-PE laminated packaging solutions

- Improved recyclability*
- Excellent optical properties
- High stiffness
- Bag drop performance

Challenge

Develop packaging solutions with improved potential for recycling while maintaining performance

Flexible packaging often includes multiple layers of different types of plastics to meet functionality requirements, but this may present a difficult end-of-life issue. Laminated films may consist of multi-materials that are difficult to sort and separate by recyclers, making them challenging to recycle.

Huangshan Novel Co., Ltd., a leading converter based in China specializing in plastic color printing, laminated films, vacuum metallized films and multi-functional films for packaging, wanted to develop a solution that would help address the problem of recycling multi-material flexible plastic packaging waste.

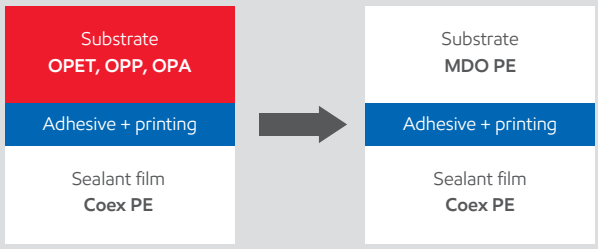
While improving potential for recycling, Huangshan Novel needed to make sure that packaging performance is maintained or even boosted.

Solution

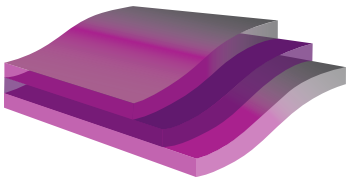
PE//PE laminated film structure based on ExxonMobil's performance polyethylene portfolio to help boost performance

Design for recyclability*
A high quality mono-material packaging solution that can be mechanically recycled*

Full polyethylene laminates

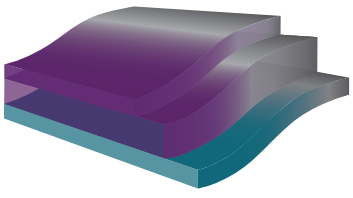


MDO PE substrate provides stiffness and optical properties for good printing**



- Exceed™ Flow+ m 0938 metallocene PE
- Exceed™ Tough metallocene PE

PE sealant film provides toughness and low temperature sealing performance



- Exceed Tough metallocene PE
- Exxtra™ Seal m 2012 metallocene PE

* Recyclable in the few communities with programs and facilities in place to collect and recycle plastic film.
** MDO: Machine Direction Orientation

Results

Easier-to-recycle full PE solution with excellent end-use performance

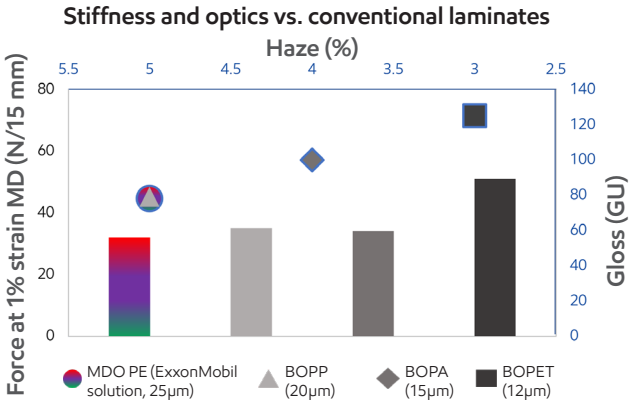
Huangshan Novel and ExxonMobil worked together to test formulations of stand-up-pouches (SUP) made of MDO PE// PE laminate film including ExxonMobil's Exceed™ Tough and Exxtra™ Seal m 2012 performance PE. The films showed high stiffness and good optical metallocene, as well as outstanding bag drop and package integrity. They satisfy end users' needs for packaging performance, while helping them deliver sustainability benefits due to the mono-material structure that can improve recyclability*.

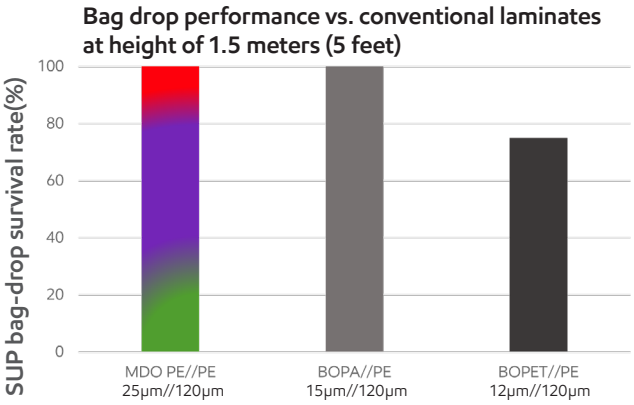
Compared to conventional laminated films, the MDO PE//PE show equivalent optics vs. BOPP//PE film, and similar stiffness to BOPP//PE and BOPA//PE films. During the bag drop test from 1.5 meters (5 feet) height, better performance than that of BOPET//PE film and equivalent to BOPA//PE film is demonstrated.

"Exceed Tough performance PE's extreme performance, such as tensile strength, is critical for smooth MDO production. Together with medium density Exceed™ Flow+ m 0938, the substrate film made using the MDO process can provide excellent stiffness and optical properties for shelf appeal; while the sealant film based on Exxtra Seal m 2012 provides low SIT and high seal strength for package integrity. The performance of MDO PE//PE SUP is well-proven on packaging lines and in transportation tests. More importantly, this mono-material solution helps us and our customers deliver on our sustainability commitment by by increasing the recyclability of flexible packaging waste," said Mr. Wang Changchun, Deputy General Manager of Huangshan Novel. He continued, "This innovative full PE solution has been commercialized and we are receiving positive market feedback with interest from more and more brand owners. Due to the increasing global demand for packaging that can be recycled*, for example the strong regulatory drive for 'design for recyclability'* in Europe, we believe it has great potential in flexible packaging for food, dairy, pet food and personal daily care products, and will significantly help improve our competitiveness in both domestic and export business."

"ExxonMobil has been at the forefront of PE innovation for almost thirty years," said Royce Chen, North Asia Marketing Manager for polyethylene at ExxonMobil. "In April 2022, we commercialized Exceed™ Stiff performance PE, which delivers industry leading combinations of stiffness and toughness while being easy to process. This new PE platform provides opportunities to reduce the complexity of film formulations, further enhance performance of full PE mono-material solutions, and increase production efficiencies."

Mr. Wang Changchun concludes, "The close collaboration between the two companies will definitely help us stay at the leading edge to meet evolving consumer needs and trends towards the creation of solutions with sustainability benefits."





Based on ExxonMobil typical formula; data from tests performed by or on behalf of ExxonMobil.

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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
Enable™ 4009	Exceed™ Flow+ m 0938
Exceed™ 2012	Exxtra™ Seal m 2012
Exceed™ XP	Exceed™ Tough

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**