ExxonMobil
Signature Polymers

Case Study

Exceed™ XP performance PE

Innovative double bubble polyethylene-based shrink film solution offers excellent performance and improved recyclability* compared to multimaterial solutions

- Improved recyclability*
- Exceptional shelf appeal
- Small and soft corners
- Excellent shrink performance

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

Challenge

Improve the recyclability* of shrink films while maintaining shrink performance, softness and optics

Shantou Mingca Packing Material Co Ltd, a leading shrink film manufacturer based in China, wanted to improve the recyclability* of its shrink films. Shrink film can be used to package products in a variety of shapes, such as electronics, household and personal care products, medicines, food, books and magazines, plastic utensils, and toys.

"From raw material suppliers, film converters, to brand owners, the value chain has ambitious recyclability goals," said Mr. Liu Kun, General Manager at Shantou Mingca Packing Material Co Ltd. "For Mingca, it is important that we develop a new shrink film structure that can be more easily mechanically recycled."

The ultimate goal of Mingca was to create a polyethylene-based shrink film with improved recyclability*, which could help them address their customers' needs.

Solution

Ultra-low density Exceed™ XP performance polyethylene can be used to create PE-based shrink film

After four years of collaboration, Mingca and ExxonMobil Asia Pacific Research & Development Co., Ltd (ExxonMobil), developed an innovative double bubble polyethylene-based shrink film (PEF) solution that incorporates ultra-low density Exceed XP performance polyethylene.

The traditional shrink film is a polyolefin-based solution (POF), and its typical co-extrusion structure is composed of PP/PE/PP. ExxonMobil provided Mingca with its new polyethylene-based shrink film formulation that incorporates Exceed XP PE resins. Starting from this formulation, Mingca made custom modifications to its lines to arrive at a polyethylene-based solution.

*The terms "recyclable" and "recyclability" are intended to refer to the potential for recyclability of packaging solutions designed and manufactured in accordance with recycling guidelines. Ultimate recyclability of packaging incorporating ExxonMobil's performance PE resins will depend on a number of factors outside of ExxonMobil's control including, but not limited to, availability of programs and facilities that collect and recycle plastic packaging within a given community. Any and all claims about the recyclability of packaging are the sole responsibility of the packaging manufacturer.

Mingca 明嘉

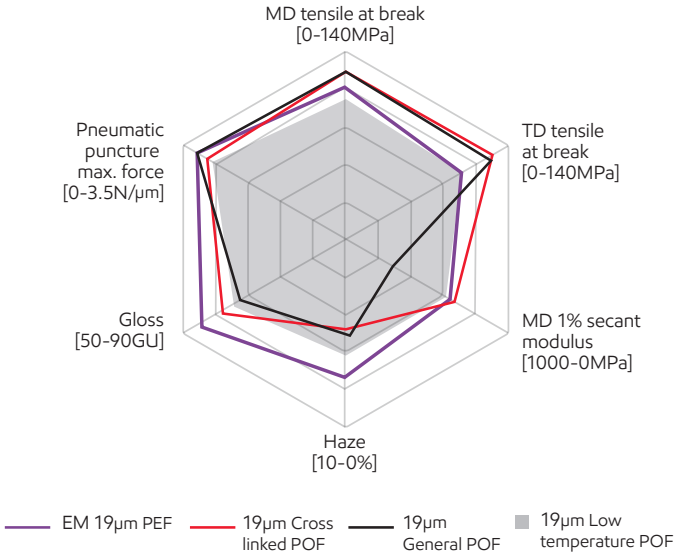
Results

Polyethylene-based shrink film solution that offers improved recyclability* while maintaining excellent performance

The solution's polyethylene-based structure creates packaging that can be more easily mechanically recycled* than conventional multi-material POF solutions. The recyclability of the film structure has been third party validated and certified by TÜV Rheinland[1].

PEF shrink film can also enable exceptional "shelf appeal" for products (enabling the items contained inside the film to look attractive to consumers). In addition, the PEF solution can provide a snug fit with small and soft corners, further increasing appearance aesthetics.

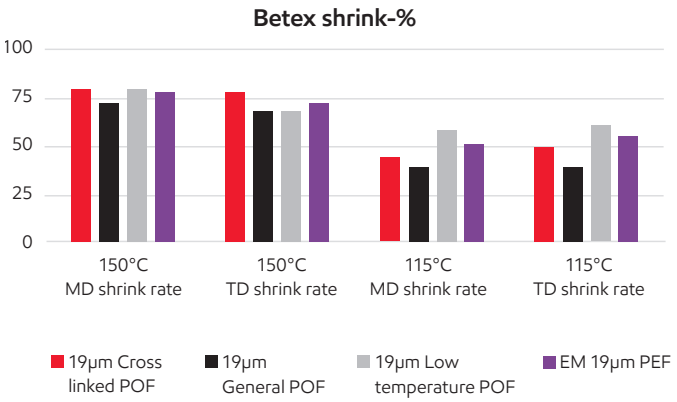
- With haze as low as 2.8 percent and gloss up to 86 GU, the Exceed™ XP-based PEF demonstrated excellent optical properties.
- Exceed XP performance polyethylene delivered outstanding softness (1% secant modulus as low as 374 MPa), with tensile strength at MD/TD as high as 100 MPa.



PEF can shrink more than 70 percent upon heating and can enable excellent shrink performance at lower temperatures. Thanks to its low-temperature shrinkage capability, the new solution can offer potential cost savings due to the shrink tunnel consuming less energy than what is typically needed with conventional POF solutions[2].

"PEF is a game changer when it comes to the recyclability* of shrink films, bringing more end of life options to the packaging world," said Mr. Liu Kun. "Similar to POF, the new PEF shrink film can be produced using double bubble technology. Brand owners can adopt the new solution under normal circumstances without upgrades or changes to their packaging lines."

"Development of this PEF solution was driven by the growing desire for companies to deliver products in recyclable* packaging," said Karen Chui, Polyethylene North Asia Market Development Manager, ExxonMobil. "At ExxonMobil, we believe it is essential to collaborate closely with value chain members to continue to introduce new solutions that can help meet evolving market needs."



Data traceability:
LIMS R2310-017007, R2309-015967, R2308-015658, R2308-015305

Test item	Test method
Tensile	ExxonMobil test method
Haze	ExxonMobil test method
Gloss	ExxonMobil test method
Betex shrinkage	ExxonMobil test method

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1. Per DIN EN ISO 14021:2021-10
2. Based on calculation of Mingca Packaging

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

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