



Exceed™ Tough+

## 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™ Tough+ 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 Tough+ 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 Tough+ 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.

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<sup>1</sup>.

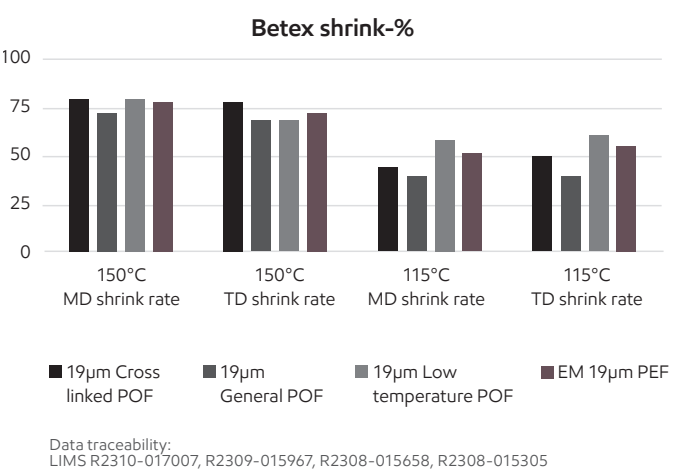
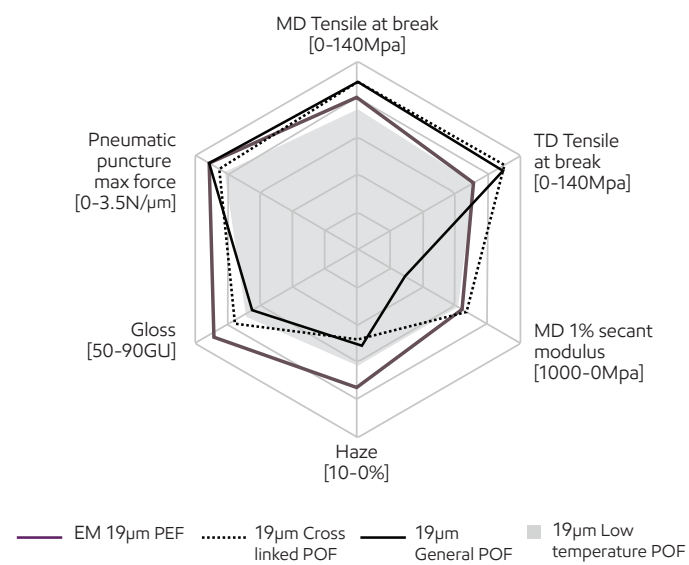
PEF shrink film can also enable exceptional “shelf appeal” for products (enabling the items contained inside the film to look attractive to consumers). In addition, the PEF solution can provide a snug fit with small and soft corners, further increasing appearance aesthetics.

- With haze as low as 2.8 percent and gloss up to 86 GU, the Exceed™ Tough+-based PEF demonstrated excellent optical properties.
- Exceed Tough+ 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<sup>2</sup>.

“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.”



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

Contact us for more information: [exxonmobilchemical.com/pe](https://exxonmobilchemical.com/pe)

**ExxonMobil**  
*Signature Polymers*

**Bring your impossible**



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# 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   | Exceed™ Tough+      |
| <small>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 <a href="https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers">https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers</a> or contact your ExxonMobil representative to know more.</small> |                     |

Want to see what's changed in our portfolio? Go to [exxonmobilchemical.com/sptransform](https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers)