



Exceed™ Tough+

Help producers protect their liquid products with high performance packaging

Exceed™ Tough+ performance polymers offer a new benchmark for liquid packaging film solutions that require high performance. This solution enables converters to fabricate extremely damage-resistant film to protect and preserve liquid products with high integrity packaging — from production to utilization.

Flex-crack resistance and dart impact performance

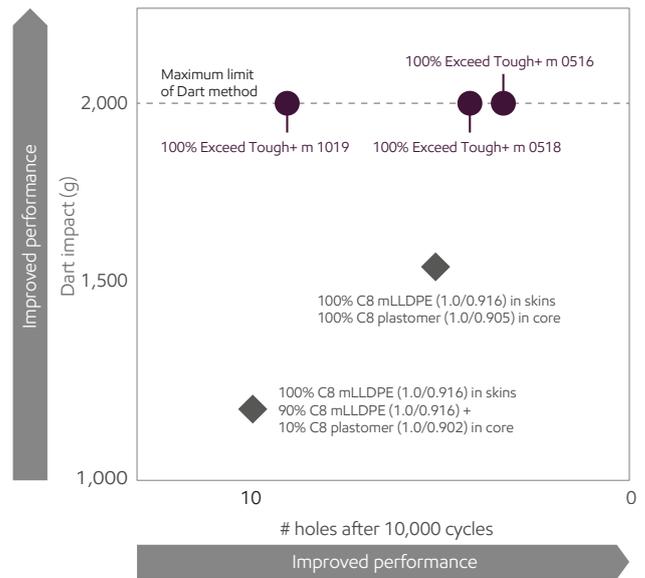


Figure 1: Exceed Tough+ provides exceptional flex-crack resistance and high dart impact versus traditional bag-in-box film formulations - 1/3/1 - 2 mil/50 µm.

Delivered attributes

- Exceptional flex-crack resistance
- Extreme toughness

Derived benefits & potential value

- High package integrity from reduced risk of pinholes
- Minimized waste from production through to the consumer
- Potential to optimize film formulation solutions via downgauging/linear blends

- Excellent seal performance
- Reduced risk of leakage
- Potential for longer shelf life

High integrity packaging

Exceed™ Tough+ performance polymers allow converters to fabricate films with exceptional flex-crack resistance and toughness that deliver excellent liquid packaging integrity. Films made with these polymers absorb shock and mitigate the risk of flex-crack pinholes that are caused by the repeated movement of packaged liquids during production, handling and transportation. Additionally, excellent sealing performance minimizes leakage and waste through to the consumer.

Innovation opportunities

Converters and producers can create new-to-the-world packaging film solutions or can improve current solutions.

Using Exceed Tough+ eliminates the need for plastomers and offers opportunities to replace coextruded film formulations with mono-layer structures, while at the same time improving film performance.

Exceed Tough+ delivers outstanding benefits for applications such as:

- Bag-in-box bladder film
- Flexi-tank container liner film
- Pillow and stand-up pouch film

Cost optimization

Exceed Tough+ allows converters to leverage processability and optimize film formulations. These polymers offer a range of solutions for bubble stability and ease of extrusion to optimize solutions. The outstanding flex-crack resistance and toughness, eliminates the need for high cost polymers and allows converters to tailor film solutions through linear polyethylene blends or downgauging.

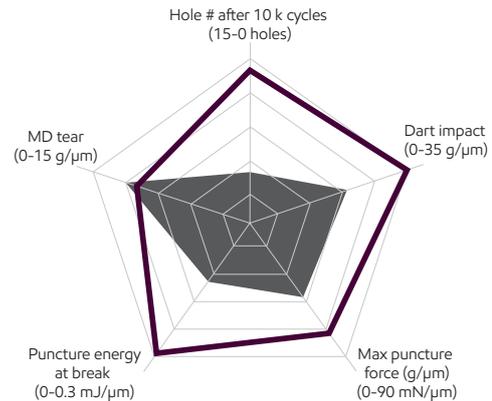


Grades	Melt index (g/10 min)	Density (g/cm ³)	Melt flow ratio (I ₂₁ /I ₂)	Distinguishing features for high performance
Exceed Tough+ m 0516	0.5	0.916	28-30	<ul style="list-style-type: none"> ▪ Exceptional flex-crack and dart resistance ▪ Excellent bubble stability
Exceed Tough+ m 0518	0.5	0.918	28-30	<ul style="list-style-type: none"> ▪ Outstanding flex-crack and dart resistance ▪ Excellent bubble stability ▪ Higher heat resistance
Exceed Tough+ m 1019	1.0	0.918	28-30	<ul style="list-style-type: none"> ▪ Excellent flex-crack and dart resistance ▪ Excellent film extrudability ▪ Higher heat resistance

Notes: Exceed Tough+ m 0516 is also available with slip and anti-block.

1Tris(nonylphenol)phosphite (TNPP) CAS# 26523-78-4 is not intentionally used by ExxonMobil in this product. Although this product is not routinely tested for its presence, based on product composition knowledge this substance is not expected to be present. However, the fact that this substance is not intentionally used by ExxonMobil in this product does not exclude that trace levels of this substance may be present as a result of the specific characteristics of the raw materials and/or of the manufacturing process.

Figure 2: Selected properties for an Exceed Tough+ - based film versus a commercial mLLDPE reference film. Tests demonstrated exceptional flex-crack resistance and toughness.



WOMS 201507.0405

Table 1: Formulations for Exceed Tough+ -formulated liquid packaging film versus the commercial mLLDPE reference film in Figure 2.

	Exceed Tough+ - based film 1/3/1 - 50 μm	Reference C8 mLLDPE film 1/3/1 - 50 μm
Skins	Exceed Tough+ m 0516 C4 LLDPE (1.0/0.918)	C8 mLLDPE (1.0/0.916)
Core	Exceed Tough+ m 0516 C4 LLDPE (1.0/0.918)	C8 mLLDPE (1.0/0.916) C8 plastomer (1.0/0.902)

Test methods based on: Holes after flexion - ExxonMobil method (Gelbo Flex Tester); Elmendorf tear strength - ASTM D1922; Dart impact (method A) - ASTM D1709; and Puncture - CEN 14471 (needle diameter = 0.8 mm)

ExxonMobil
Signature Polymers

Bring your impossible

ExxonMobil Signature Polymers was born from the belief that people fuel progress. From automotive and construction to packaging, agriculture, industrial, and beyond, we leverage the scale and reach of ExxonMobil to deliver the insights and innovations that empower our diverse, global partners to take their businesses to new heights. We continuously work to provide the listen-first, service-driven, game-changing collaboration that unlocks opportunities for our partners and advances and business goals.



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What's new: ExxonMobil Signature Polymers

All our polymers are now positioned under a single portfolio brand: ExxonMobil 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 8358	Exceed™ Tough+ m 0518
Exceed XP 8656	Exceed Tough+ m 0516
Exceed XP 8318	Exceed Tough+ m 1019

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](https://www.exxonmobilchemical.com/sptransform)