ExxonMobil

Help producers protect their liquid products using eXtreme Performance packaging

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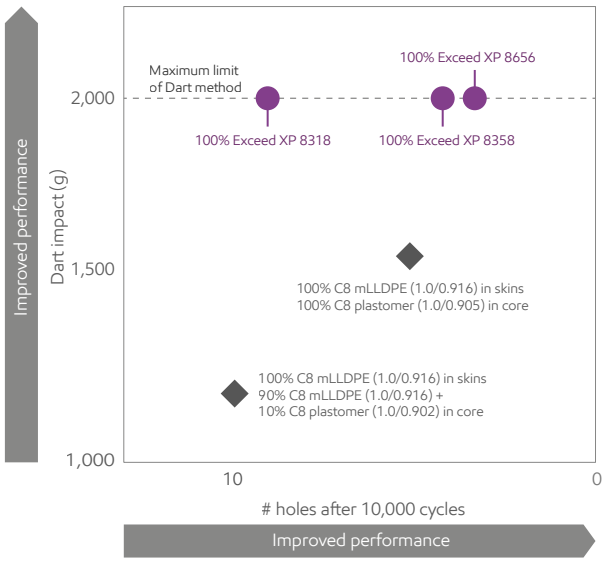
Exceed™ XP performance polymers offer a new benchmark for liquid packaging film solutions that require eXtreme Performance. This new solution enables converters to fabricate extremely damage-resistant film to protect and preserve liquid products with high integrity packaging — from production to utilization.

Delivered attributes	Derived benefits & potential value
▪ Exceptional flex-crack resistance ▪ Extreme toughness	▪ 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

Flex-crack resistance and dart impact performance

Figure 1:

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



High integrity packaging

Exceed XP peformance 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 XP 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.

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When eXtreme Performance matters, Exceed™ XP delivers outstanding benefits for applications such as:

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

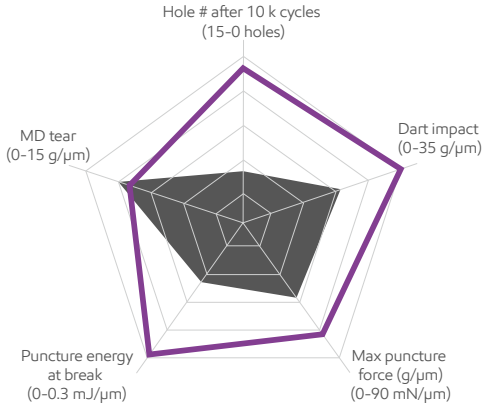
Cost optimization

Exceed XP 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.

Exceed™ 2012 performance polymer

Exceed 2012 performance PE polymer delivers flexible food and liquid packaging films with excellent sealing performance and outstanding extrudability and enables converters to fabricate films that deliver excellent performance: exceptional toughness, very high dart impact and sealability including low seal initiation.

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



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Data from tests performed by or on behalf of ExxonMobil

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

	Exceed XP-based film 1/3/1 – 50 µm	Reference C8 mLLDPE film 1/3/1 – 50 µm
Skins	Exceed XP 8656 C4 LLDPE (1.0/0.918)	C8 mLLDPE (1.0/0.916)
Core	Exceed XP 8656 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)

Grades	Melt index (g/10 min)	Density (g/cm³)	Melt flow ratio (I_{21}/I_2)	Distinguishing features for eXtreme Performance
Exceed XP 8656	0.5	0.916	28-30	▪ Exceptional flex-crack and dart resistance ▪ Excellent bubble stability
Exceed XP 8358	0.5	0.918	28-30	▪ Outstanding flex-crack and dart resistance ▪ Excellent bubble stability ▪ Higher heat resistance
Exceed XP 8318	1.0	0.918	28-30	▪ Excellent flex-crack and dart resistance ▪ Excellent film extrudability ▪ Higher heat resistance
Exceed 2012MA	2.0	0.912	-	▪ Excellent sealing performance and extrudability

Notes: Exceed XP 8656 is also available with slip and anti-block.
Test methods based on: Melt index and Melt flow ratio - ASTM D1238; Density - ExxonMobil method; TNPP-free[1]

[1] Tris(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.

Exceed™ XP performance polymers — when eXtreme Performance matters.

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