

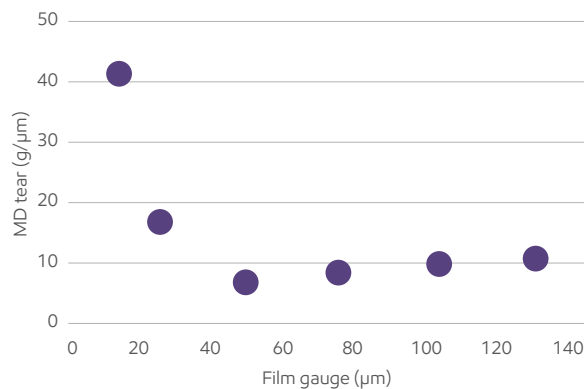
# Help farmers protect their harvests using eXtreme Performance agricultural film

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Exceed™ XP performance polymers offer a new benchmark for thinner agricultural blown film solutions that require eXtreme Performance. This new solution enables converters to fabricate high integrity agricultural films that are extremely damage-resistant that protect and preserve harvests and other farm produce.

Delivered attributes	Derived benefits and potential value
<ul style="list-style-type: none"> <li>• Extreme toughness</li> <li>• Outstanding MD tear strength</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced risk of waste and spoilage</li> <li>• Enhanced durability of thin films, for which high MD tear is particularly important</li> <li>• Cost effective solutions with linear blends which are synergistic for MD tear</li> </ul>
<ul style="list-style-type: none"> <li>• High melt strength</li> </ul>	<ul style="list-style-type: none"> <li>• High output without the need for LDPE resin, which is detrimental to MD tear resistance/toughness</li> </ul>



**Figure 1:** Exceed XP 8656 demonstrates extreme MD tear resistance in blown films when processed with high machine orientation – low blow-up ratio (BUR), high outputs, low frost line height (FLH) and wider die gap. This attribute is specifically demonstrated in thin films, which is a unique feature versus conventional polyethylene grades.

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**Table 1:** Processing conditions

Die gap	1.5 mm
Die diameter	160 mm
BUR	2.5
Output	135 kg/h
Frost-line height	760 mm
Melt temperature	223 °C

Test methods based on: Elmendorf tear strength - ASTM D1922

when  
eXtreme  
Performance  
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## Agricultural film integrity

Exceed™ XP performance polymers allow converters to fabricate films with high MD tear strength and toughness to reduce the risk of waste and spoilage. The extreme toughness performance of these polymers helps prevent damage in the field and during handling to maintain film integrity in applications such as silage stretch wrap and mulch.

## Innovation opportunities

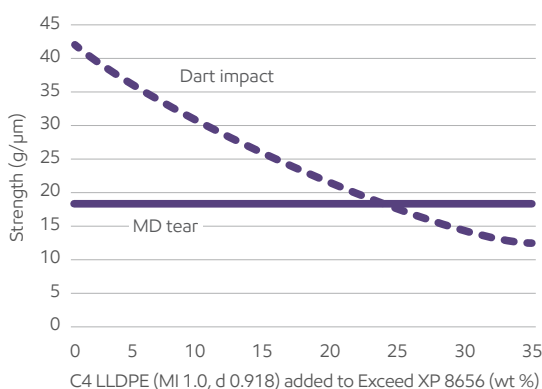
Exceed XP enables converters to create new-to-the-world or improve current blown agricultural films. Additionally, using grades with 0.5 MI, they can leverage processing conditions and high machine orientation for exceptional MD tear strength.

## Cost optimization

Converters are able to optimize film formulations and leverage processability to deliver cost-effective solutions. Exceed XP with a 0.5 melt index (MI), has a high melt strength with exceptional mechanical properties which enables maximum output with extreme performance. Exceed XP-based film formulations may also be tailored with linear blends to optimize performance and cost.

Figure 2:

Using linear blends with thin, Exceed XP films (25 micron, monolayer) there is potential to optimize dart, MD tear performance and cost.



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Table 2:

Processing conditions for a thin Exceed XP-based film formulation with varying C4 LLDPE levels

Die gap	1.5 mm
Die diameter	160 mm
BUR	2.5
Output	135 kg/h
Frost-line height	710 mm
Melt temperature	223 - 229 °C

Test methods based on: Elmendorf tear strength - ASTM D1922; Dart impact - ASTM D1709

Grades	Melt index (g/10 min)	Density (g/cm <sup>3</sup> )	Melt flow ratio (I <sub>21</sub> /I <sub>2</sub> )	Distinguishing features for eXtreme Performance
Exceed XP 8656	0.5	0.916	28-30	<ul style="list-style-type: none"> <li>Exceptional tear and toughness</li> <li>Excellent bubble stability</li> </ul>
Exceed XP 8358	0.5	0.918	28-30	<ul style="list-style-type: none"> <li>Exceptional tear, toughness and holding force</li> <li>Excellent bubble stability</li> </ul>
Exceed XP 8318	1.0	0.918	28-30	<ul style="list-style-type: none"> <li>Excellent tear, toughness and holding force</li> <li>Excellent film extrudability</li> </ul>

Notes: Exceed XP 8656 is also available with slip and antiblock.

Test methods based on: Melt index and Melt flow ratio - ASTM D1238; Density - ExxonMobil method



**Exceed™ XP performance polymers – when eXtreme Performance matters.**

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