



Exceed™ Stiff+

Exceed™ Flow+

Create tough, hard-to-puncture agricultural silo bags using less material with ExxonMobil Signature Polymers

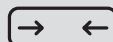
Creating tough, durable agricultural films can be a demanding task. This often requires blending multiple resins at the sacrifice of conversion efficiencies. What if your resin did more? Exceed Stiff+ and Exceed Flow+ PE delivers simplicity without compromise and resin solutions that streamline film conversion while improving durability.



Stiffness



Dart impact



Low creep



MD tear balance

Exceed Stiff+ m 0926.ML resin excels at optimizing the combination of high toughness, low creep, and high needle puncture required in silo bags. The magnitude of the improvement is such that significant downgauging is possible, which enables a reduction in LDPE content and further boosts film performance. If desired, even higher output and bolder downgauging is possible when Exceed Stiff+ m 0926.ML PE is used as a stiff, tough core layer alongside skins made of Exceed Flow+ m 0516 PE, delivering exceptional melt strength.

Beneficial attributes

- Outstanding dart impact and puncture
- High TD creep resistance
- Lower LDPE content and improved toughness, if downgauged

Value

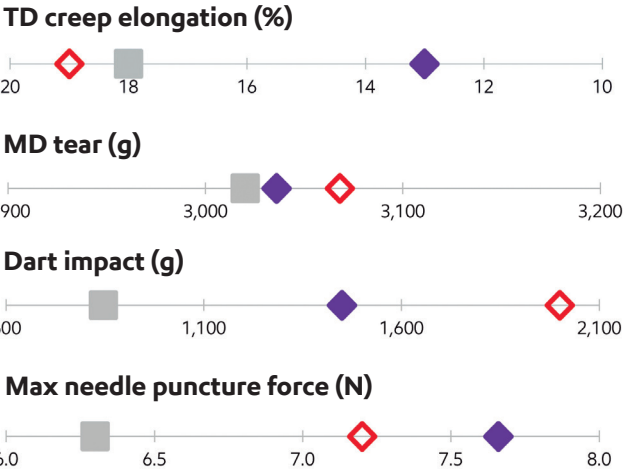
- Opportunity for significant downgauging, if needed
- New avenues to explore for enhanced processing and output

Agricultural silo bags are often coex structures but the formulations used in the skins and core can vary widely. To make things simple, an average level of LLDPE, LDPE and additives was selected. That single formulation ran in every layer of a 3 layer coex line to produce a 'mono coex' film. This was done for a 230µm reference and a lightly downgauged 215µm solution. However, the formulation of the skins and core of the 'bold downgauging' solution are indeed different.

Replacing a blend of 60% C8 LLDPE and 30% LDPE with Exceed™ Stiff+ m 0926.ML metallocene polyethylene and a lower level of LDPE enhances the TD creep, MD tear, dart impact, and needle puncture of a lightly downgauged 215µm alternative solution.

An even bolder 200µm solution was developed by adding Exceed Flow+ m 0516 PE to the skins in order to enhance melt strength and bubble stability which should boost output. These Exceed Stiff+ and Exceed Flow+ performance polyethylene solutions were tested on a small coex line to assess potential improvements in properties. They should be evaluated on large-die, blown film equipment that is typically used by the industry to fully quantify the benefits that are possible.

Grades	Melt index (g/10 min)	Density (g/cm ³)	Slip/anti- block
Exceed Stiff+ m 0926.ML	0.85	0.926	No
Exceed Flow+ m 0516.ML	0.50	0.91	No



	Reference: 230µm	Less aggressive downgauging: 215µm	Bold downgauging, enhanced melt strength: 200µm
Ratio	3 / 4 / 3 monolayer via coex	3 / 4 / 3 monolayer via coex	3 / 4 / 3 coex
Skins	60% C8LLDPE 30% LDPE* Additives	70% Exceed Stiff+ m 0926.ML 20% LDPE* Additives	80% Exceed Flow+ m 0516 10% LDPE* Additives
Core	Represents average formulation of actual 3L coex	Represents average formulation of actual 3L coex	80% Exceed Stiff+ m 0926.ML 10% LDPE* + Additives

* LDPE = 0.922 g/cm3, 0.33 g/10 min MI @ 190°C, 2.16kg

Test item	Test method
MI (Melt Index)	ExxonMobil test method following principles of ASTM D-1238 or supplier datasheet
Density	ExxonMobil test method following principles of ASTM D-4703 and ASTM D-1505 or supplier datasheet
Dart drop impact resistance by free falling dart	ExxonMobil test method following principles of ASTM D-1709
Elmendorf tear strength	ASTM D-1922-15
Needle puncture	ExxonMobil test method following principles of ISO CEN 14477-04
TD creep resistance	ExxonMobil test method

Data from tests performed by or on behalf of ExxonMobil. MAC202007.0106-01 & R2111-005586.

Contact us for more information: exxonmobilchemical.com/pe

ExxonMobil
Signature Polymers

Bring your impossible

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™ S 9243ML	Exceed™ Stiff+ m 0926.ML
Exceed™ XP 6056	Exceed™ Flow+ m 0516
Exceed XP 6056ML	Exceed Flow+ m 0516.ML

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)