



Exceed™

Exceed™ Tough+

Exceed™ Flow

Exxtra™ Seal

Tough, soft, and clear greenhouse films designed to increase crop production



Toughness



Softness



Optical properties



High melt strength

Challenge

Create greenhouse films that are tough, soft and offer high light transmission

Responding to ongoing requests from end-users, Shandong Shouzheng, a leading manufacturer of high-quality agricultural films based in China, wanted to improve the mechanical properties of its greenhouse films. The company's goal was to make greenhouse films that are tougher, softer and with higher light transmission rates than films currently available on the market.

"As the world's population grows, so does demand for food. The pressure for more effective agricultural practices including enhanced greenhouse, silage and mulch films has never been greater," said Mr. Li Zhaoqin, Development Engineer, Shandong Shouzheng Agricultural Film Manufacturing Co., Ltd. "To meet this growing demand for food, farmers need more durable greenhouse films that last longer in varying seasonal climates to help them protect their crops and potentially increase productivity."

Solution

Tough, soft and clear greenhouse films using Exceed™ Tough+ m 0211 and Exceed Tough+ m 0512

Combining their expertise in agricultural film manufacturing and polymer technology, Shandong Shouzheng and ExxonMobil collaborated to develop greenhouse film solutions with higher integrity that would meet farmers' needs.

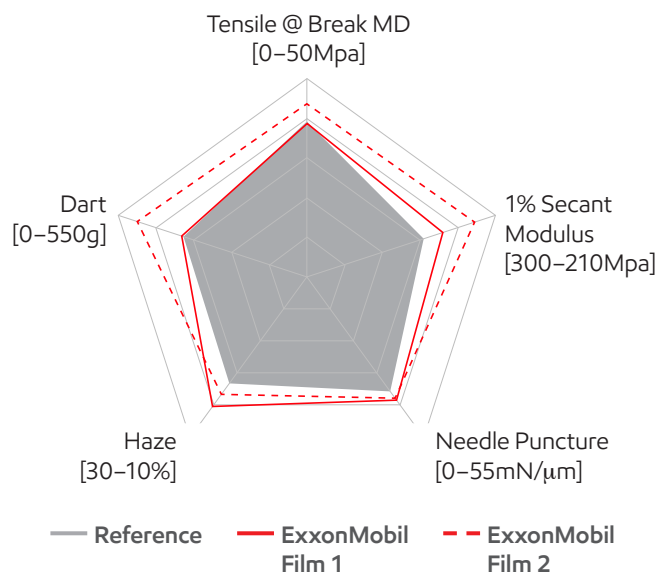
Greenhouse film solutions including very low density Exceed Tough+ m 0211 and Exceed Tough+ m 0512 metallocene PE were developed and tested. The tests demonstrated that the films deliver levels of dart, puncture, and tensile performance for extreme toughness, while also being super soft and clear. In addition, the film width was extended from 7.8m to 9m during on-site trial. The high melt strength of Exceed Tough+ helped sustain a stable bubble.

Attributes

- Improved softness and toughness (puncture, dart, and tensile)
- Low haze for high clarity
- High melt strength for bubble stability

Derived benefits / value

- Film softness for easier handling
- Better film integrity, reduced risk of failure/breakage
- Longer and better growing conditions for potentially higher crop yields



Data from tests performed by or on behalf of ExxonMobil.

5-layer 75-micron greenhouse film solutions based on Exceed™ Tough+ m 0211 and Exceed Tough+ m 0512 offer significant benefits compared to a 75-micron market reference alternative, as can be seen in the chart below:

Layer*	Reference Film (7.8m, 75μm)	ExxonMobil Film 1 (7.8m, 75μm)	ExxonMobil Film 2 (7.8m, 75μm)
A	Exceed™ Flow m 1020 + Exxtra™ Seal m 2012	Exceed Flow m 1020 + Exxtra Seal m 2012	Exceed Tough+ m 0512
B	Exceed Flow m 1020 + Exceed™ m 1018 + LLDPE + LDPE	Exceed Tough+ m 0211 + LLDPE + LDPE	Exceed Tough+ m 0211 + LLDPE + LDPE
C/D/E	LLDPE + LDPE	LLDPE + LDPE	LLDPE + LDPE

*Master batch was added in 5 layers

Results

High integrity greenhouse films reduce the risk of premature breakage, extending the growing season

These tough, soft, and clear greenhouse films offer higher integrity than market reference films, potentially extending the growing season by helping to reduce the risk of failure and premature breakage during installation and in-service. The low haze delivers high clarity films for high light transmission rates that can increase crop productivity rates. The high melt strength of low density Exceed Tough+ offers bubble stability for easy processability. Plus, the softness of the film can eliminate the use of plastomers for a simpler, single resin formulation.

“The fabrication of agricultural films with better toughness, as well as softness and high clarity, is now possible due to the use of Exceed Tough+ m 0211 and Exceed Tough+ m 0512,” said Zhaoqin. “Greenhouse films based on these grades deliver the appearance and tactile quality that farmers have been asking for, helping to better protect crops and potentially increase production. With the introduction of these high-quality films, combined with our outstanding customer service, we expect our sales to grow domestically and overseas.”

Contact us for more information: exxonmobilchemical.com/pe

ExxonMobil
Signature Polymers

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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 7021	Exceed™ Tough+ m 0211
Exceed XP 7052	Exceed Tough+ m 0512
Enable™ 2010	Exceed™ Flow m 1020
Exceed™ 2012	Exxtra™ Seal m 2012
Exceed 1018	Exceed m 1018

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)