



Exceed™ Stiff+

Armando Alvarez uses Exceed™ Stiff+ performance PE to help create stiff, tough silo bag films with high integrity



Designed for
recyclability*



Tear
resistance



Puncture
resistance



Easy to
process

Challenge

Create high integrity mono-material silo bags that can be easy to process and can offer recycling* opportunities

Global agricultural market solution leader Armando Alvarez Group (AAG) wanted to create easy-to-process silo bags with a dart impact, tear and puncture resistance that enable increased filling capacity, and a high resistance to bag “slumping”, that can offer recycling* opportunities. The project was handled through AAG’s affiliate based in Spain, SOTRAFA.

AAG notes that silo bags are a growing sector in the agricultural films market, offering a flexible, reliable, and economical storage solution compared to metal storage options. The bags should be designed to help facilitate an environment that can help to extend the preservation of the contents such as silage and grains. “AAG has chosen to pursue a circular economy model that can help to establish growth over time,” said Jose Manuel Petrement, MD, Agricultural Plastics, AAG. “This includes promoting resource conservation and reduced use of raw materials.”

A silo bag is a tube produced mostly out of polyethylene resin, normally of a diameter from 5 to 12 feet, and lengths from 200 to 400 feet, depending on the amount of material to be stored. The external layer of the sack is typically white to help reflect sun-based radiation; the inward layer is dark in shading to help impede sunlight, helping to create a colder preserving atmosphere for the agricultural products stored in them.

Solution

Exceed™ Stiff+ m 0820 enables stiff-tough silo bag films with high integrity

SOTRAFA consulted with ExxonMobil’s polyethylene (PE) business, which is acknowledged for harnessing the power of the value chain to help drive advances in high-performance agricultural films that can provide sustainability benefits.

The new silo bag film formulation replaces SOTRAFA’s existing octene-based LLDPE solution, and includes Exceed Stiff+ m 0820 metallocene PE to help deliver the mechanical properties, including stiffness-toughness balance, and dart impact, tear and puncture resistance, specified by SOTRAFA. The silo bags are made of a mono-material PE solution, with a structure that could be easier to recycle than more complex multi-material offerings.

The system for producing and deploying the silo bag is made up of specifically developed technologies, including the bagging machine, the grain cart with unloading auger (truck), the plastic bag and the unloading equipment.

*Recyclable in the few communities with programs and facilities in place that collect and recycle plastic film.

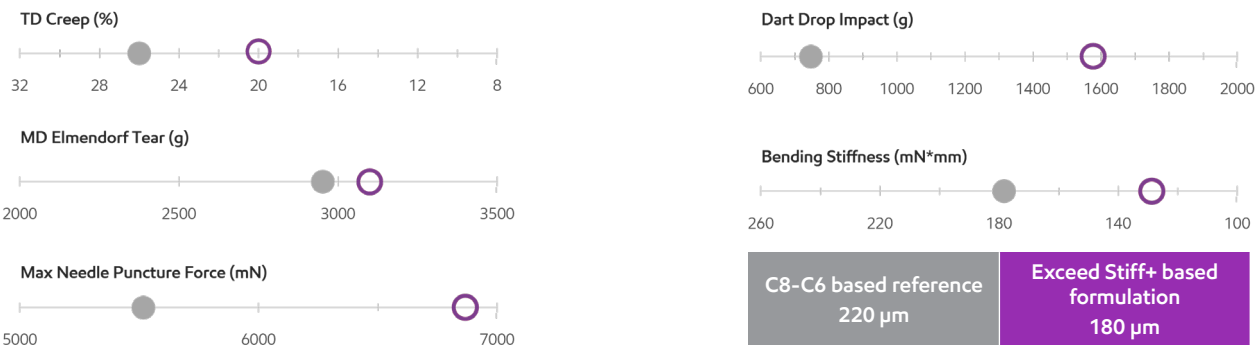
Results

Two premium silo bag brands

“The enhanced film formulation including Exceed™ Stiff+ has led to a first PE co-branding collaboration between ExxonMobil and AAG with the introduction of two premium silo bag brands**,” said Jose Miguel Juarez, Product Manager, Crop Packaging films, AAG. “Both bags allow increased filling capacity, high ‘slumping’ resistance and offer recycling* opportunities. These bags help support AAG’s pursuit of circular plastic economy solutions. We are confident that these added value solutions for our global customers will help grow our business.”

The bags are designed for improved recyclability* by leveraging an all-PE construction. As a bonus, the toughness provided by Exceed Stiff+ performance PE can allow the films to be downgauged, which can lead to reduced raw material consumption, compared to the existing LLDPE solution.

Example based on downgauging to 180µm



Data from tests performed by or on behalf of ExxonMobil (R2302-011496)

Potential benefits

- Exceed Stiff+ m 0820-based solution can provide better TD creep resistance even at reduced gauge
- Exceed Stiff+ m 0820 can significantly improve dart impact, MD Elmendorf tear, and needle puncture while delivering less extensible films
- Exceed Stiff+ m 0820-based solution can exhibit lower bending stiffness at reduced gauge. Lower bending stiffness indicating easier folding.

* Recyclable in the few communities with programs and facilities in place that collect and recycle plastic film.
** armandoalvarez.com

Test	Test method based on
TD creep resistance	ExxonMobil method
Elmendorf tear strength	Based on ASTM D1922
Dart drop impact	ExxonMobil method
Needle puncture	ExxonMobil method
Bending stiffness	ExxonMobil method

Contact us for more information: [exxonmobilchemical.com/pe](https://www.exxonmobilchemical.com/pe)

ExxonMobil

Signature Polymers

Bring your impossible



© 2025 ExxonMobil. ExxonMobil, the ExxonMobil logo, the interlocking “X” device and other product or service names used herein are trademarks of ExxonMobil, unless indicated otherwise. This document may not be distributed, displayed, copied or altered without ExxonMobil’s prior written authorization. To the extent ExxonMobil authorizes distributing, displaying and/or copying of this document, the user may do so only if the document is unaltered and complete, including all of its headers, footers, disclaimers and other information. You may not copy this document to or reproduce it in whole or in part on a website. ExxonMobil does not guarantee the typical (or other) values. Any data included herein is based upon analysis of representative samples and not the actual product shipped. The information in this document relates only to the named product or materials when not in combination with any other product or materials. We based the information on data believed to be reliable on the date compiled, but we do not represent, warrant, or otherwise guarantee, expressly or impliedly, the merchantability, fitness for a particular purpose, freedom from patent infringement, suitability, accuracy, reliability, or completeness of this information or the products, materials or processes described. The user is solely responsible for all determinations regarding any use of material or product and any process in its territories of interest. We expressly disclaim liability for any loss, damage or injury directly or indirectly suffered or incurred as a result of or related to anyone using or relying on any of the information in this document. This document is not an endorsement of any non-ExxonMobil product or process, and we expressly disclaim any contrary implication. The terms “we,” “our,” “ExxonMobil Product Solutions” and “ExxonMobil” are each used for convenience, and may include any one or more of ExxonMobil Product Solutions, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded.

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 9272	Exceed™ Stiff+ m 0820

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)