ExxonMobil
Signature Polymers

Case Study

Exceed™ Tough+ Exxtra™ Seal

Sustainable heavy duty sack films containing 50% post-consumer recycled content maintain performance

Uses recycled material | Film integrity | Bag drop performance | Easy processability

Challenge

Contribute to a more circular economy by developing heavy duty sack (HDS) films containing PCR content, while maintaining mechanical properties and thickness

The Selene Group, a leading polyethylene (PE) film converter and recycler based in Italy, wanted to develop heavy duty sack films (Selene NextBag™) containing 50% post-consumer recycled (PCR) PE (Selene Premium Recycle Polymer) content in response to brand owner commitments, consumer feedback and regulatory changes.

"As a converting and recycling company, we can help the value chain respond to evolving sustainability needs by including PCR material in our solutions," said Luca Massari, R&D Manager, Selene. "We need to ensure that the heavy duty sacks fulfill their primary function of protecting and transporting products effectively, maintaining the mechanical properties and thickness of the film. Plus, the end user's machine settings, such as sealing bars temperature and output, should not need to change, so that it's an easy solution to adopt."

Pallets with Selene NextBag HDS which contain 50% PCR PE passed acceleration tests at ESTL, according to EUMOS40509.

Selene

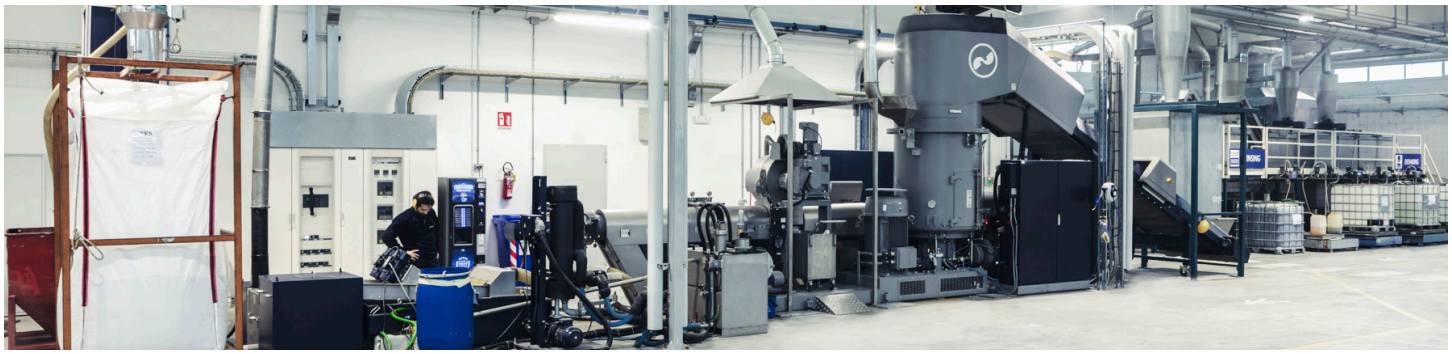
Solution

Include 50% PCR PE with Exceed™ Tough+ and Exxtra™ Seal performance PE polymers for high integrity heavy duty sacks

ExxonMobil and Selene worked together to test formulations for heavy duty sack films based on 50% high-quality PCR PE combined with Exceed Tough+ and Exxtra Seal performance PE polymers which help boost performance in recycled solutions. The PCR PE is sourced from a logistics center where resin bags are opened and then emptied to fill bulk trucks. The waste bags are sorted, washed, de-inked, and re-pelletized by Selene into a premium recycled product. A thorough risk assessment of the final resin bag material is conducted by Selene to confirm product safety for the intended use.

The inclusion of Exceed Tough+ m 1019 in the formulation delivers excellent toughness to the heavy duty sack films, compensating for possible degradation in the properties of the PCR PE during the recycling process. The inclusion of Exxtra Seal m 1012 increases bag drop resistance and enhances sealing performance.

"Compliance to fulfill regulatory obligations and safety assurance for the intended use are key focus areas," said Klaus Urbano, Sales Director, Selene. "We undertake a rigorous process to ensure the PCR PE is a consistent high quality. Recycling material traceability and adequacy are confirmed by the appropriate documentation."



The recycling line at the Santa-Margherita plant, Italy where bags are sorted, washed, de-inked, and re-pelletized into a premium recycled product.

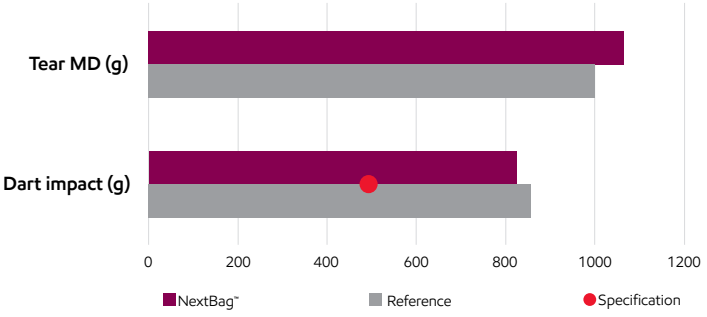
Results

High-integrity heavy duty sacks containing 50% PCR PE that are easy to process

NextBag™ by Selene incorporate Exxtra Seal and Exceed Tough+ performance PE polymers and deliver:

- A sustainable solution that incorporates 50% PCR PE.
- Mechanical properties in line with industry standards for high integrity sacks.
- Bag drop performance that outperforms reference virgin PE formulations.
- Creep resistance and pallet stability: pallets passed acceleration tests according to EUMOS40509.
- No forseeable operational changes to the end-user's bagging machine settings (sealing bars temperature, output).

"The solution fulfills demand for a sustainable approach to flexible film applications by introducing post-consumer recycled (PCR) content," said Marco Rubertà, Technical Director, Selene. "The use of recycled plastic in other flexible packaging films is gaining traction in Europe and we are experiencing considerable interest from the value chain."



The dart impact and tear MD properties of the HDS which contain 50% PCR PE (NextBag) and Exceed Tough+ m 1019 are similar to the virgin reference at the same thickness (125mic).

Data from tests performed by or on behalf of ExxonMobil.

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™ XP 8318	Exceed™ Tough+ m 1019
Exceed™ 1012	Exxtra™ Seal m 1012

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**