ExxonMobil
Signature Polymers

Fact sheet

Exceed™ Stiff+ Exceed™

Increase throughput and durability of heavy duty sack (HDS) film with Exceed™ Stiff+ performance polyethylene

Downgauging opportunity | High output | Bag drop performance | Stiffness

Data and results presented herein apply specifically to the noted application under this fact sheet.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

Creating tougher, thinner heavy duty sacks (HDS) often requires sacrifices in conversion efficiency. What if your resin did more? Exceed Stiff+ resins deliver simplicity as well as high performance, easy processing and an exceptional balance of stiffness and toughness.

Heavy duty sacks made of Exceed Stiff+ PE offer opportunities for downgauging and increased throughput. Exceed Stiff+ resins deliver an outstanding balance of toughness and stiffness that can help create robust, durable packaging at a thinner gauge. In addition, by delivering exceptional processability, Exceed Stiff+ PE grades can reduce the overall melt pressure in the extruder, offering the potential for increased productivity and lower energy consumption. Exceed Stiff+ performance PE resins offer extreme performance for brand owners and easy processing for convertors.

Beneficial attributes

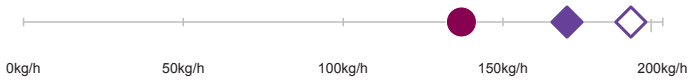
- Impressive balance between toughness and stiffness
- Easy processing without compromising performance

Value

- Downgauging potential to as thin as 105 µm
- Potential for increased production efficiency and cost savings from lower energy consumption
- Outstanding package integrity: creep resistance, bag drop performance

Downgauging is important for those in the HDS industry. However, there are concerns about the effect of downgauging on performance and production output. HDS suppliers are pursuing PE grades that provide improved processability and outstanding mechanical performance. As shown below, when compared to Exceed™ m 1018 metallocene polyethylene, Exceed™ Stiff+ m 0820 and Exceed Stiff+ m 0926 metallocene polyethylene deliver ~15% melt pressure decrease and a 25-40% improvement in maximum output. With new Exceed Stiff+ resins, there are opportunities to improve output by 10-15% for HDS formulations at the same gauge.

Single extruder possible maximum output (65 mm screw)



Melt pressure

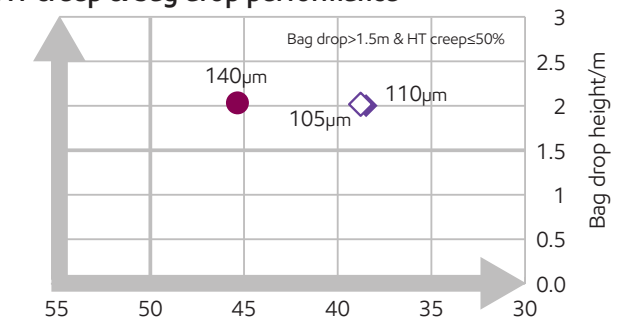
R2108-004591-002
MAC201412.0023

HDS solutions using Exceed Stiff+ resins achieved 21% to 25% downgauge versus market reference, with total film thickness downgauged from 140 µm to 110 µm and 105 µm respectively. The single use of Exceed Stiff+ m 0820 resins or in combination with Exceed Stiff+ m 0926 resins in film formulations, have maintained the robust toughness and enhanced film stiffness even with significant downgauging. More importantly, solutions using Exceed Stiff+ resins also fully passed a 2m bag drop test which assesses the level of protection against falls and collisions in complex transportation environments.

Data from tests performed by or on behalf of ExxonMobil.

- The processing test is conducted on a 65 mm Alpine blown film line with 160 mm die diameter, 1.5 mm die gap and a 2.5:1 blow-up ratio;
- Melt pressure was tested based on 120 kg/hr output;
- Maximum output is defined as the output when the film thickness variation indicator $2\sigma \leq 10\%$.

HT creep & bag drop performance



WOMS 201505.0055-01
R2201-006109
R2112-005880

	Exceed m 1018: 140µm	Exceed Stiff+ m 0820 based: 110µm	Exceed Stiff+ m 0820 & Exceed Stiff+ m 0926 based: 105µm
Ratio	1 / 2 / 1	1 / 2 / 1	1 / 3 / 1
Skins[1]	Exceed m 1018 + LDPE	Exceed Stiff+ m 0820	Exceed Stiff+ m 0820
Core[2]	C4 LLDPE + HDPE	Exceed Stiff+ m 0820 + HDPE	Exceed Stiff+ m 0926 + HDPE

1. Skins contain 1.5% anti-block
2. Core of 5% white masterbatch

Grade	Melt index (g/10 min)	Density (g/cm³)	Slip/ antiblock
Exceed Stiff+ m 0820	0.80	0.920	No
Exceed Stiff+ m 0926	0.85	0.926	No
Exceed m 1018	1.0	0.918	No

Test item	Test based on
MI (Melt Index: 190°C @ 2.16 kg)	ASTM D-1238
Density	ASTM D-4703 / ASTM D-1505
Dart drop impact resistance by free falling dart	ExxonMobil test method
Tensile test	ExxonMobil test method
Hot temperature creep resistance	ExxonMobil test method

ExxonMobil Signature Polymers

Bring your impossible

ExxonMobil Signature Polymers was born from the belief that people fuel progress. From automotive and construction to packaging, agriculture, industrial, and beyond, we leverage the scale and reach of ExxonMobil to deliver the insights and innovations that empower our diverse, global partners to take their businesses to new heights. We continuously work to provide the listen-first, service-driven, game-changing collaboration that unlocks opportunities for our partners and advances and business goals.

What's new: ExxonMobil Signature Polymers

All our polymers are now positioned under a single portfolio brand: ExxonMobil 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
Exceed S 9243	Exceed Stiff+ m 0926
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**