



tomorrow's  
performance  
today

## Create strong and durable air tube bags with Exceed™ S performance polyethylene for e-commerce packaging

Air tube bags are commonly used in e-commerce packaging to reduce friction and risks associated with impact and vibration during package transportation. Interest is growing to use less plastic in air tube bags by lowering film gauge, which often brings the risk of sacrificing performance. What if your resin did more to overcome the challenge? Now you can get high performance while using less material, and the exceptional balance of stiffness and toughness offered by Exceed S PE grades.



**Downgauging  
opportunity**



**Excellent burst  
resistance**



**Stiffness**



**Toughness**

Exceed S performance PE resins excel at balancing the combination of stiffness and toughness, and are ideal for use in protective air tube bags. The high stiffness of Exceed S PE resins helps prevent film elongation during the inflation process, contributing to outstanding burst resistance. Utilizing Exceed S 9272 and Exceed S 9243 resins in PE layers also delivers excellent needle puncture resistance and high film toughness. With balanced film stiffness and toughness, a robust, durable and thinner air tube bag can be created to give excellent protection during package shipping and delivery.

### **Beneficial attributes**

- Excellent burst resistance at lower gauge
- High needle puncture resistance
- Smooth tube formation and inflation

### **Value**

- Premium package durability to help reduce failures, which can help to reduce complaints and refunds
- Significant downgauging opportunity and cost-saving potential

A typical air tube bag film has a symmetrical structure, with polyamide (PA) in the core and PE in the skin layers. Two tie layers are also co-extruded as sub-skin layers to bond the PA and PE layers together during film production. In the two tests below, Exceed™ S performance polyethylene demonstrated exceptional combinations of toughness and stiffness, enabling downgauged – but extremely strong – air tube bags.

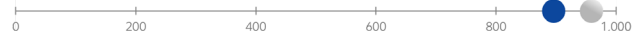
Schematic diagram of typical air tube bag film structure



## PE-only downgauging test

In this test result, the solution comprising Exceed S 9243 PE delivered excellent burst resistance and enhanced film stiffness at 17% downgauging, with film thickness reduced from 60µm to 50µm and PA thickness unchanged. In addition, needle puncture resistance improved up to 31%, providing strong protection to products against vibration, impact and potential damage during transportation.

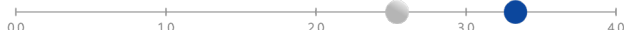
Rupture burst pressure (mbar)



MD force at 1% strain (N)



Needle puncture resistance (N)



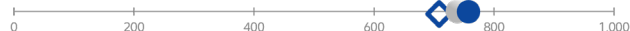
	Reference 1: 60µm	Downgauge solution 1: 50µm
PA gauge*	9µm	9µm
PE layer formula	~20% performance PE-based market reference	Exceed S 9243 Enable™ 4002 C4 LL

R2112-005688

## Combined PE and PA downgauging test

In this test result, the solution comprising Exceed S PE delivered excellent burst resistance and comparable film stiffness and needle puncture performance vs market reference at 10% downgauging. Downgauging of both the PA and PE layers offers the opportunity for material cost savings with comparable mechanical performance.

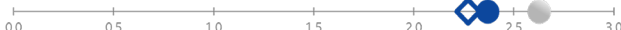
Rupture burst pressure (mbar)



MD force at 1% strain (N)



Needle puncture resistance (N)



	Reference 2: 50µm	Downgauge solution 2: 45µm	Downgauge solution 3: 45µm
PA gauge*	7.5µm	6.75µm	6.75µm
PE layer formula	~50% performance PE-based market reference	Exceed S 9272 Enable 4002	Exceed S 9243 Exceed™ XP 6056

R2201-005980

C4 LL = 0.918 g/cm³, 2.0 g/10 min MI at 190°C, 2.16 kg

\* Calculated based on extrusion amount during film production, with assumption that all layers kept at same density.

Data from tests performed by or on behalf of ExxonMobil.

Grade	Melt index (g/10 min)	Density (g/cm³)
Exceed S 9272	0.80	0.920
Exceed S 9243	0.85	0.926
Exceed XP 6056	0.50	0.916
Enable 4002	0.25	0.938

Test item	Test based on
MI (Melt Index: 190°C @ 2.16 kg)	ASTM D-1238
Density	ASTM D-792/ASTM D-1505
Rupture burst pressure	ExxonMobil test method
Tensile force at 1% strain	ExxonMobil test method
Needle puncture	ExxonMobil test method

## Why ExxonMobil PE? Why today?

tomorrow's  
performance  
today

What some might view as solutions that will only happen in the future, ExxonMobil PE is making possible today – through our innovative and reliable products, collaborative approach, technology leadership and support, and our unmatched global supply and resources. Learn more about how we're helping our customers create solutions with sustainability benefits. Why wait for tomorrow to advance your business today? Contact your ExxonMobil PE representative and begin experiencing tomorrow's performance today in your air tube bag films.

©2022 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 Chemical" and "ExxonMobil" are each used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded.

Contact us for more information:

[exxonmobilchemical.com/pe](https://exxonmobilchemical.com/pe)

E0422-562E15

**ExxonMobil**