



MDO film solution with high stiffness and optics combined with moderate stretch ratio



Easy processing



High stiffness



Optical properties

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

Challenge:

Development of an easy processing mono-material PE film formulation that has the potential to replace non-PE substrates

Multi-material laminates are widely used to meet packaging film functionality requirements. One of the challenges when replacing these laminates with mono-material PE structures is the meeting of stiffness and optics requirements. Machine-direction orientation (MDO) processing can be used to help improve optical properties and stiffness of PE substrates by stretching the film in the machine direction.

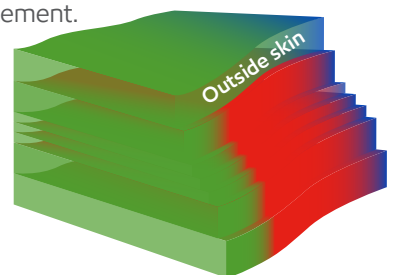
Failure of the film during the MDO stretching process is a risk that converters are interested in addressing. The risk of MDO film failure during the stretching process can be reduced by a lower stretch ratio, but needs to be balanced with the requirement for high stiffness and high optics.

Reifenhäuser and ExxonMobil collaborated to develop an MDO film solution with an outstanding balance between high stiffness, high optics and a moderate MDO stretch ratio.

Solution:

A seven-layer MDO structure as illustrated below with a stretch ratio of 5.8 was developed by Reifenhäuser and ExxonMobil

The moderate stretch ratio can help to reduce the risk of MDO film failure during production and offers possibilities for additional property enhancement. The simplicity of the structure can reduce material handling in the production phase and can be used as a platform to help develop solutions to match specific requirements.



■ Enable™ 4009 performance polyethylene offers:

- Enhanced bubble stability
- Improved stiffness

■ ExxonMobil™ HDPE7165 polyethylene offers:

- Outstanding stiffness
- Excellent gel performance
- Improved gauge profile

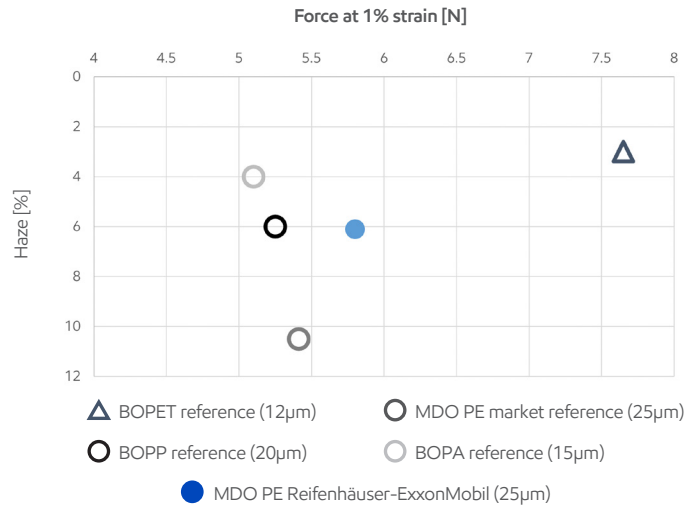
■ Exceed™ S 9272 performance polyethylene offers:

- Improved processing
- Stable process throughout longer production
- Extreme toughness

Results:

The mechanical and optical properties of the developed MDO structure reached the performance levels of the BOPP and BOPA references.

In addition to excellent film properties, the combination of ExxonMobil's latest generation of performance materials and Reifenhäuser's high-end MDO processing also enabled film rolls of very high winding quality, which can help facilitate downstream processes like printing. The variation of the circumference was measured to be below 1mm across a roll width of 2m, as demonstrated in the photo below.



Test item

Tensile properties film at room temperature in MD
Total haze
Gloss
Circumference

Test method

ExxonMobil test method
Based on ASTM D1003-21 B
ExxonMobil test method
Reifenhäuser 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. Why wait for tomorrow to advance your business today? Contact your ExxonMobil PE representative and begin experiencing tomorrow's performance today in flexible packaging.

©2024 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 Company, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded.

Contact us for more information:
exxonmobilchemical.com/pe

