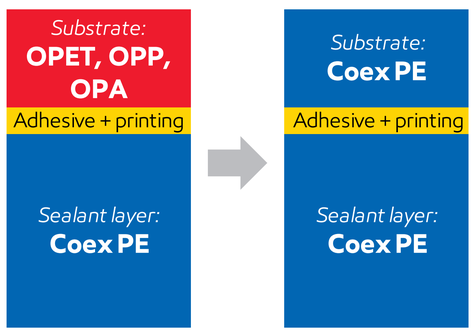
Exceed™ XP Exceed™ Enable™ Vistamaxx™

ExxonMobil

Recyclable packaging with excellent packaging integrity, puncture energy and optics

Energy lives here™

Full PE laminated solution to replace multi-material laminates

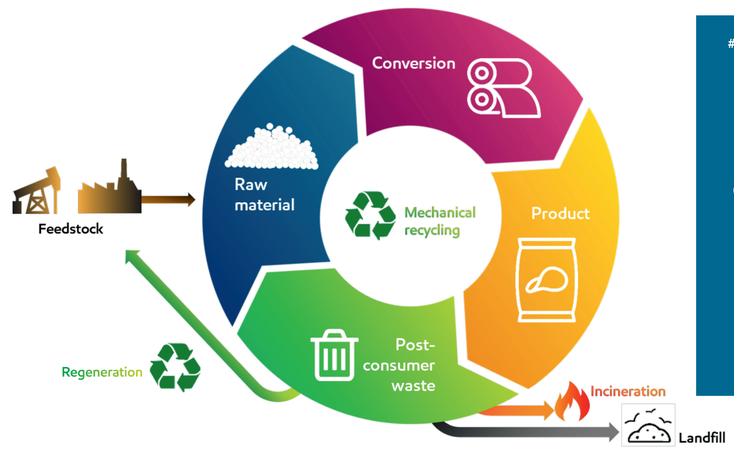


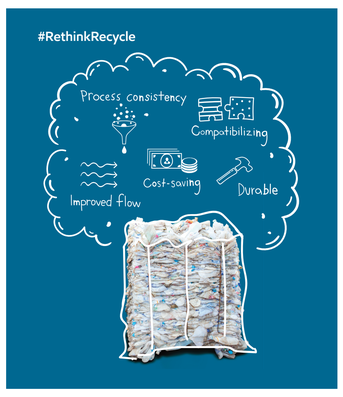
- Improve mechanical recyclability
- Qualified to use How2Recycle® label

Store drop-off program in the U.S.A

Note: Label is applicable in the U.S.A.; for illustrative purposes only.

Packaging that enhances mechanical recycling...



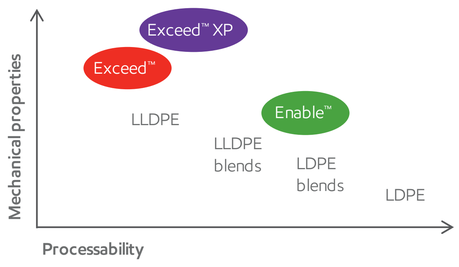


Performance polyethylene product portfolio

Exceed™ XP
when eXtreme Performance matters
Step-out mechanical performance and excellent processability

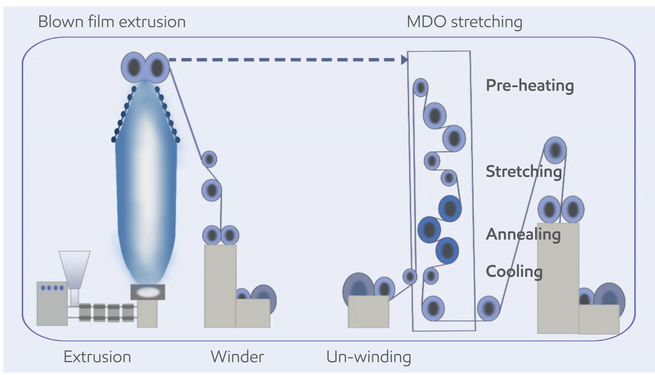
Exceed™
for superior performance
Outstanding mechanical and sealing properties combined with best-in-class optics

Enable™
for optimum solutions
Excellent bubble stability with HAO properties



MDO (machine direction orientation) Technology

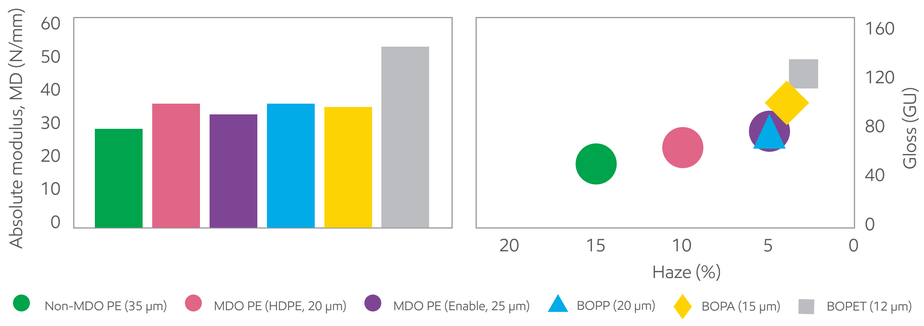
- MDO is a process by which a film is oriented in machine direction. There are typically 4 steps involved:
  - Pre-heating
  - Stretching
  - Annealing
  - Cooling
- Orientation can be made in line with the film making or off-line



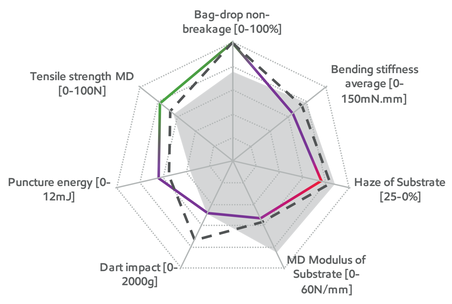
MDO PE substrate vs. other substrates

- MDO PE substrate solution using Enable™ 4002 performance polymers
  - **Excellent optics**
    - Similar haze/gloss properties to BOPP/BOPA
    - Up to 50% haze increase vs. formulation with HDPE in the skin
    - Up to 67% haze increase vs. non-MDO PE substrate
  - **Great modulus**
    - Up to 28% downgauge vs. non-MDO PE substrate
    - Both flexo and rotogravure printability

*MDO PE (Enable) with Enable 4002 in the skin (MDO ratio 4.8) and MDO PE (HDPE) with HDPE in the skin (MDO ratio 6); HDPE (0.961d, 0.7 MI)
**All data from tests performed by or on behalf of ExxonMobil



MDO PE (5L) /PE solution for SUPs



5L MDO PE substrate solution using Enable™ 4002 performance polymers
- Exceptional optics with stretch ratio 4.6
- Excellent MD modulus (similar to BOPA/BOPP)
- Great processability (high bubble stability; Easy separation)

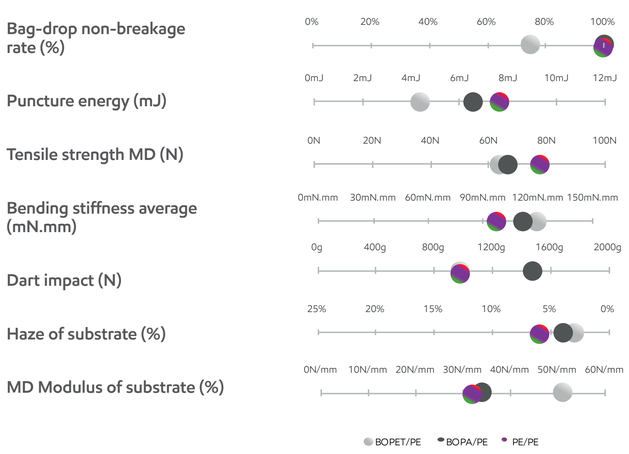
5L MDO PE/ PE solution using Exceed™ XP 8784, Exceed™ 1012 and Enable 4002 performance polymers
- Excellent bag drop performance
- Great puncture energy
- Exceptional tensile strength

	Substrate	Sealant
	Enable 4002 / HDPE / Exceed XP 8656 / HDPE/ Enable 4002* (1/1/2/1/1, MDO 4.6, 25 µm)	Exceed XP 8784 / Exceed XP 8784+ 30% HDPE / Exceed 1012 (1/2/1, 120 µm)
	BOPA (15 µm)	C8-mLLDPE / C8-LLDPE + 25% HDPE / C8-mLLDPE (1/2/1, 120 µm)
	BOPET (12 µm)	

* HDPE could be added to the inner skin for heat resistance in slide 53
** Packaging performance depends on equipment and end-user requirements
*** All data from tests performed by or on behalf of ExxonMobil

C8-LLDPE (0.92d, 1.0MI); C8-mLLDPE (0.916d, 1MI); HDPE (0.961d, 0.7 MI)
In entire package for all solutions unit of density is g/cc and unit for MI is g/10min

MDO PE (5L) /PE solution for SUPs



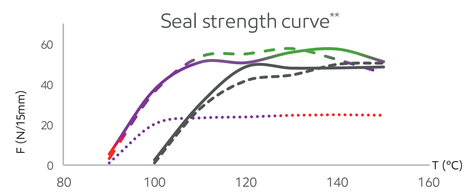
up to 100%
Bag drop non-breakage rate

up to 1.7x
Puncture energy vs. BOPET/PE

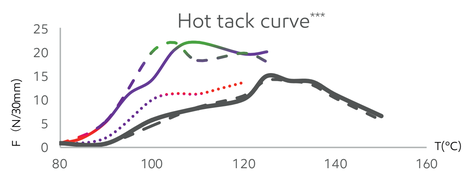
up to 1.2x
Tensile strength vs. BOPET/PE

*All data from tests performed by or on behalf of ExxonMobil

Sealing properties



**Seal strength may be affected by bond strength



***Film shrink and melt observed starting at 125°C for MDO PE/PE and 120°C for non-MDO PE/PE; hot tack test capability limited to below 20N

MDO PE/PE solution using Exceed™ XP, Exceed™ 1012 and Enable™ performance polymers can offer:
- Great seal strength
- Excellent sealing initiation temperature
- High hot tack force
- Narrow sealing widow compared to BOPET/PE or BOPA/PE due to low heat resistance of PE film itself

	Substrate	Sealant
	Enable 4002 / HDPE / Exceed XP 8656 / HDPE / Enable 4002 (1/1/2/1/1, MDO 4.6, 25 µm)	Exceed XP 8784 / Exceed XP 8784+ 30% HDPE/ Exceed 1012 (1/2/1, 60 µm)
	Enable 4002 + 40% HDPE/ Exceed XP 8656 / Enable 4002 + 40% HDPE (1/1/1, MDO 4.3, 25 µm)	Exceed XP 8784 / Exceed XP 8784+ 30% HDPE / Exceed 1012 (1/2/1, 60 µm)
	Exceed 1327 + 40% HDPE / 20% Enable 4009 + 80% HDPE / Exceed 1327 + 40% HDPE (1/2/1, 35 µm)	Exceed XP 8784 / Exceed XP 8784+ 30% HDPE/ Exceed 1012 (1/2/1, 50 µm)
	BOPA (15 µm)	C8-mLLDPE / C8-LLDPE + 25% HDPE / C8-mLLDPE (1/2/1, 60 µm)
	BOPET (12 µm)	

C8-LLDPE (0.92d, 1.0MI); C8-mLLDPE (0.916d, 1MI); HDPE (0.961d, 0.7 MI)
*All data from tests performed by or on behalf of ExxonMobil

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