ExxonMobil

Enhanced shopper and garbage bag film at lower costs

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Challenged by global sustainability trends and cost pressures, manufacturers of shopper and garbage bags are looking for ways to decrease cost without compromising mechanical properties. Vistamaxx™ performance polymers are offering new possibilities to help resolve these challenges.

Key advantages

- Tougher bags due to enhanced dart impact of the film
- Lower costs due to higher filler dosage
- Downgauging opportunities
- Higher dosage of recycled materials for a more sustainable solution

Vistamaxx polymers, when dry blended at low levels into high density polyethylene (HDPE) shopper and garbage film formulations, increase the dart drop impact of these films. This allows reformulation of a lower cost solution. In addition, using a Vistamaxx polymer-based filler masterbatch allows filler dosage to be increased, thereby reducing costs without sacrificing the properties of these films.

Tougher, thinner films

When a small dosage of Vistamaxx polymers is used in HDPE shopper and garbage bag film formulations, it improves the toughness of the films at the same thickness. This provides opportunities to downgauge the films while maintaining the dart drop strength. This can be achieved using Vistamaxx 6102FL at only a 5% dosage level.

Film manufacturers can also use this high dart drop advantage to incorporate higher percentages of recycled material. This helps film manufacturers to lower costs while maintaining the toughness.

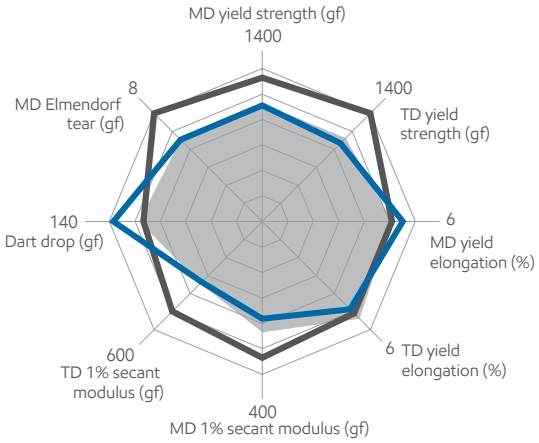
Using a calcium carbonate masterbatch based on Vistamaxx polymers instead of conventional LLDPE resin-based masterbatch enables downgauging potential while delivering similar or even enhanced dart drop impact.

Higher filler loading for lower-cost, tougher films

The use of a Vistamaxx™ performance polymer-based calcium carbonate masterbatch allows for a higher filler loading in shopper and garbage bags film formulations without sacrificing key mechanical properties, thus reducing overall film costs. Furthermore, the HDPE/filler/recycle ratio can be optimized for an enhanced modulus-toughness balance. Even at a lower film thickness, a Vistamaxx polymer-based calcium carbonate masterbatch provides opportunities for a better balance of properties and formulation optimization, leading to stronger films at lower cost.

Figure 1:

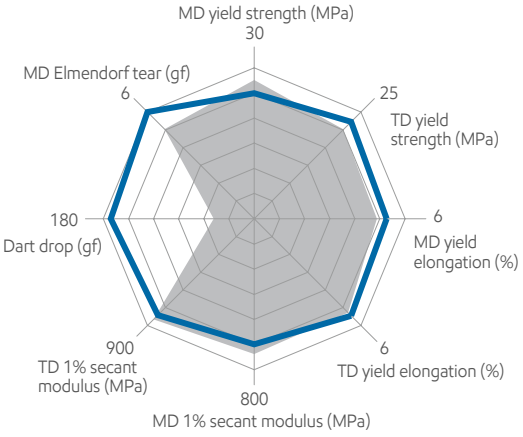
Adding 5% Vistamaxx polymers yields tougher films even at 20 to 25% downgauging. The modulus and strength is commensurate (as shown) with Vistamaxx polymer-free composition of the same thickness.



20 µm, HDPE (85%) + C4-LLDPE (15%)
15 µm, HDPE (85%) + C4-LLDPE (15%)
15 µm, HDPE (85%) + C4-LLDPE (10%) + Vistamaxx 6102 (5%)

Figure 2:

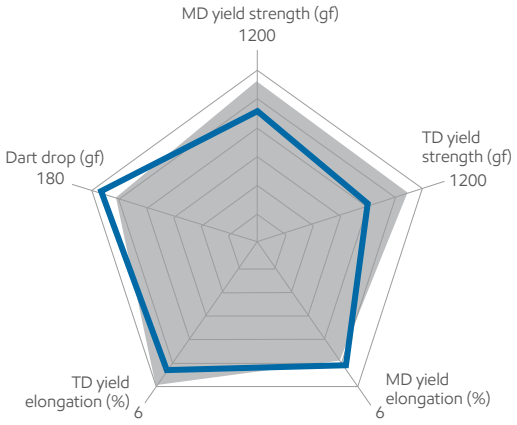
Twice higher calcium carbonate loading when Vistamaxx polymer-based filler masterbatch is used. No sacrifice in strength with more than three times increase in dart drop impact.



15 µm, HDPE (77%) + LLDPE resin-based masterbatch (10%) + C4-LLDPE (13%)
15 µm, HDPE (69%) + Vistamaxx polymer-based filler masterbatch (20%) + C4-LLDPE (11%)

Figure 3:

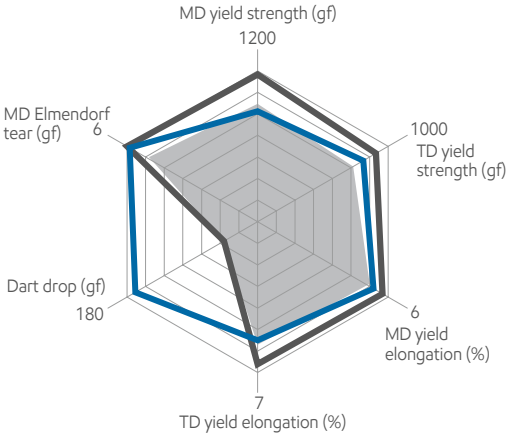
Vistamaxx polymer-based calcium carbonate masterbatch at equivalent loading enhances toughness even at lower film thickness.



20 µm, HDPE (69%) + LLDPE resin-based masterbatch (20%)+ C4-LLDPE (11%)
15 µm, HDPE (69%) + Vistamaxx polymer-based filler masterbatch (20%) + C4-LLDPE (11%)

Figure 4:

Use of Vistamaxx polymer-based calcium carbonate masterbatch allows for formulation optimization.



20 µm, HDPE (61%) + C4-LLDPE (9%) + LLDPE resin-based masterbatch (30%)
15 µm, HDPE (69%) + C4-LLDPE (11%) + LLDPE resin-based masterbatch (20%)
15 µm, HDPE (69%) + C4-LLDPE (11%) + Vistamaxx polymer-based filler masterbatch (20%)

Data developed by or on behalf of ExxonMobil Chemical

Contact us for more information:
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