



Exceed™ Stiff+

Nivea, Green Worms and Vardhaman Polypacks collaborated with ExxonMobil Signature Polymers to create a high-performance collation shrink film with post-consumer recycled content



Incorporation of PCR content



Excellent MD-TD shrinkage



Snug fit packaging

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

Material efficiency remains a key priority for industries worldwide, with many companies seeking innovative and cost-effective solutions for product design.

Nivea, a multinational skincare brand owner under German parent company Beiersdorf, has set a Net Zero target for 2045. To align with this goal, Nivea's Indian manufacturing facility aimed to integrate post-consumer recycled (PCR) polyethylene (PE) content into the collation shrink packaging for their fast-moving consumer goods (FMCG) skincare products.

To help Nivea meet their needs, stakeholders across the value chain — Nivea (Brand Owner), Green Worms (post-consumer recycled content producer), Vardhaman Polypacks (Convertor) and ExxonMobil Signature Polymers — collaborated to develop a new high performance collation shrink film that contained PCR PE content.

- Green Worms is a leading waste management company specializing in the collection of dry ocean-bound plastic (OBP) waste across Kerala, Tamil Nadu, and the Andaman region. They recently expanded into flexible plastic waste recycling, producing PCR pellets from Category-II plastic waste (e.g. milk pouches, trash liners, general liners, collation shrink etc.) in their state-of-the-art recycling facility.

- Vardhaman Polypacks is a Daman-based converter that has been a long-term supplier of collation shrink films to Nivea. In this project, they partnered with ExxonMobil Signature Polymers to create a shrink film with PCR content incorporated that maintained high mechanical performance and shrinkage.

Solution

The team set a target to incorporate a PCR content dosage of 20% or more into the collation shrink film used to pack Nivea products such as body lotion bottles and tubs, ranging from 200 grams to 2 kg pack weight. Leveraging the technical expertise of the ExxonMobil Signature Polymers team and Vardhaman Polypacks' film conversion abilities — and using high quality PCR granules produced from flexible waste (Category-II) by Green Worms — the team created a high-performance film solution that contained PCR content using high performance Exceed™ Stiff+ m 0238.



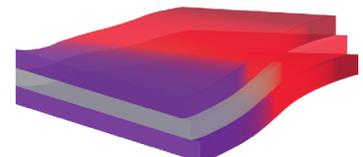
Reference film: 50 µm

- LDPE
- C4LLDPE



ExxonMobil solution: 50 µm (with 22% PCR)

- Exceed™ Stiff+ m 0238
- LDPE
- C4LLDPE
- PCR content*



*Post-consumer recycled plastics with Melt Index (190°C, 2.16Kg) range of 0.6-0.8 g/10min and Density (23°C) range of 0.900-0.929 g/cm³.

Results

The resultant collation shrink film produced from a 1/1/1 layer ratio line achieved a 22% PCR content dosage.

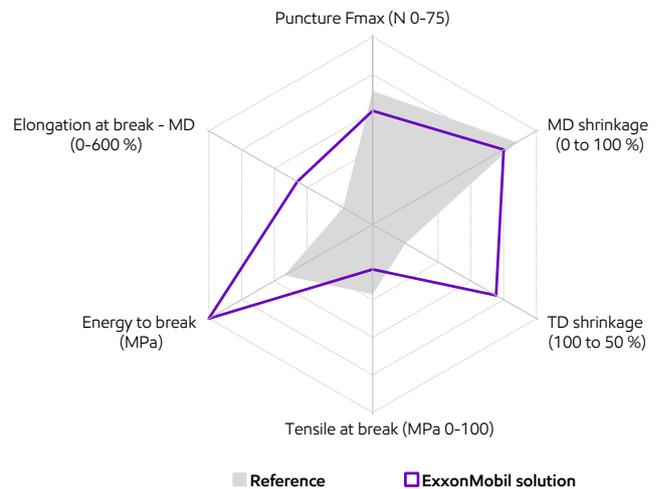
The ExxonMobil Signature Polymers solution delivered the following performance:

- Superior machine direction and transverse direction (MD-TD) shrinkage balance, i.e. uniform shrinking in both directions, compared to the reference film where the TD shrinkage was very high.
- Improved tensile properties (elongation and energy to break) compared to the incumbent virgin film.
- Maintained excellent puncture performance and tensile strength despite the incorporation of PCR content acquired from a range of varying flexible waste sources in the new film solution.

It is established that PCR content incorporation can lead to gel formations in the resulting film which would affect mechanical performance. However, during validation, it is observed that the ExxonMobil Signature Polymers collation shrink film solution maintained good packaging integrity post shrinking in the tunnel.

Conclusion

This four-party collaboration demonstrated how value-chain partnerships can help deliver scalable film solutions with sustainability benefits such as incorporation of PCR content without compromising on quality. Such partnership can help deliver more environmentally conscious packaging and help companies reach their goal of reducing use of virgin plastics.



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Bring your impossible

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