

: Oriented Polyethylene Films

SealTOUGH™

Stretch the limits of PE films for
the Flexible Packaging market



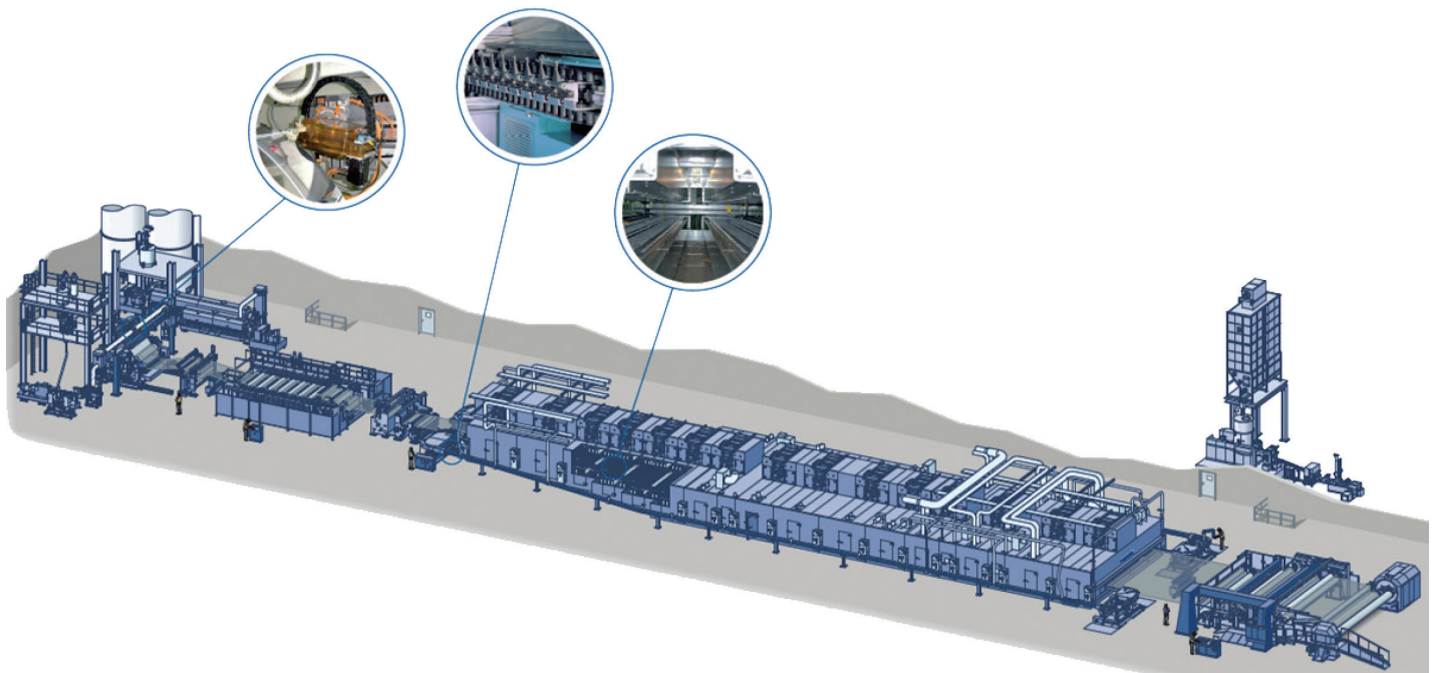
Jindal
Films

An innovative manufacturing technology combined with premier raw materials deliver a unique set of characteristics.

They address the rising challenges of the flexible packaging industry and stretch the limits of your solutions today.

SealTOUGH™ is a new technology by Jindal Films which utilizes our superior bi-orientation process to deliver a unique co-extruded polyethylene film. It is designed for lamination and can be used in mono-web structures. Driven by its unique set of properties, SealTOUGH™ offers you the opportunity for fully recyclable all-PE-material solutions.

SealTOUGH™ is developed to satisfy ever increasing customer demands.



⋮ Packaging performance

SealTOUGH™ helps to improve your packaging performance by downgauging film structures while minimizing product packaging failures and reducing the number of laminate layers.

- Improved mechanical performance enables film structures to be downgauged by up to 45%

- Exceptional flex-crack resistance (according to Gelbo-Flex testing)

⋮ Puncture resistance

SealTOUGH™ boosts the puncture resistance of your laminates both at ambient and low temperature conditions.

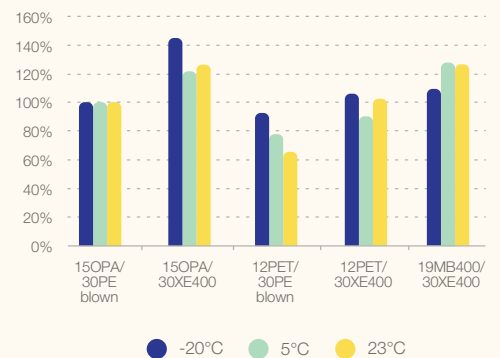
- Replacement of OPA//PE laminates where OPA is used for puncture resistance by OPP or PET//SealTOUGH laminates. These solutions offer similar and even superior puncture resistance and overall packaging performance resulting in significant savings of the overall laminate cost

- Replacement of blown polyethylene films, while achieving significant downgauging

- SealTOUGH is a perfect fit for demanding applications like frozen or chilled foods and dairy products



PUNCTURE ENERGY IN J



Product shelf-life

SealTOUGH™ extends product shelf-life by improving seal integrity, while offering superior low temperature performance allowing to reduce sealing bar temperature settings.

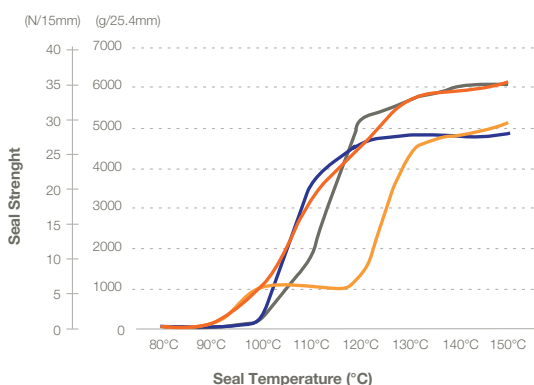
- A combination of a high performance & a low seal initiation temperature layer to save energy
- High seal strength at low sealing temperatures offers a broad operating window
- Lap sealability to, amongst others, Jindal Films Bicolor™ 19MB440 generates savings by reducing packaging material use and improving packaging performance
- Optionally providing barrier performance for water vapor, oxygen, aroma and mineral oils to protect and preserve food products

Processability

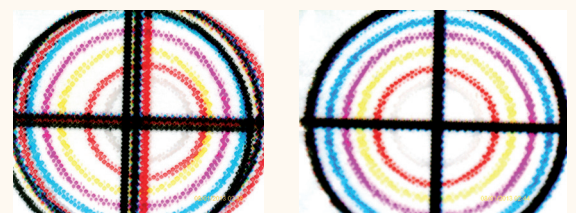
SealTOUGH™ provides excellent processability- compared to blown PE - for all your converting steps – printing, coating and lamination.

- Narrow distribution of film thickness over width and length
- Improved modulus & reduced elongation in machine direction
- Controlled slip properties
- Outstanding printability
- Better color registration than PE blown or cast films
- Outstanding printing performance even using rotogravure technology with significant line speed optimization compared to blown PE films
- Color registration performance close to BOPP films

SEAL STRENGTH PROFILE (HPS)



- PET or OPP//SealTOUGH upper limit (typically high thickness XE)
- PET or OPP//SealTOUGH lower limit (typically low thickness XE)
- 12PET//30LLDPE (80% C8)
- 12PET//30LLDPE (metallocene C6 rich)



High quality PE Film

SealTOUGH™18XE400

Printing test performed at BOBST

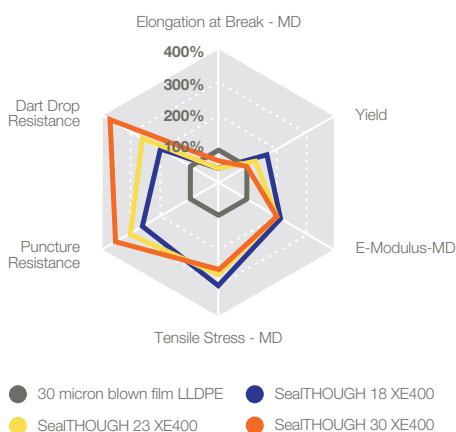
⋮ Mechanical performance

SealTOUGH™ offers superior mechanical performance compared to blown PE films.

Due to Jindal Films' bi-orientation process the mechanical properties are significantly improved.

- E-modulus, stress at break, puncture resistance and dart drop outperform the properties of blown LLDPE films guaranteeing outstanding protection of packaged goods
- High stiffness and tensile strength improve processability on converting lines
- Low haze level of SealTOUGH™ improves product visibility on the shelf.

MECHANICAL PROPERTIES



⋮ Easy-to-open packaging

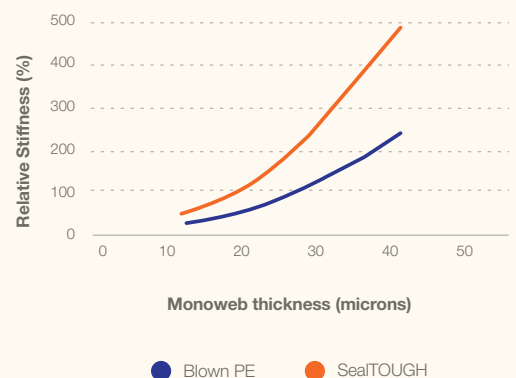
SealTOUGH™ enables easy-to-open packaging through low tear propagation force (e.g. from a notch).

Optimized tear propagation force reduces the amount of energy needed to open the packaging bag

⋮ Monoweb

- Premium-quality feel of your packaging by doubling the stiffness using SealTOUGH™ at the same thickness as blown PE film
- SealTOUGH™ provides the opportunity to lower up to 25% of the film thickness without affecting stiffness
- Even higher downgauging rates in the final packaging are technically possible but have an impact on stiffness

STIFFNESS



∴ **Committed to the
packaging industry**

**HEAVYWEIGHT PERFORMANCE.
LIGHTWEIGHT PACKAGE.**



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Films

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