

Can high performance be **fully recyclable**?

The future of sustainable packaging

DOW

®



The search for **sustainability**

Sustainability. It's a big word, seeking a big impact.
And brand owners are looking for packaging that will help
to make that impact.



Fewer materials used. Less weight. Lower costs.
For decades, flexible plastic packaging has met all aspects of sustainability. Except for one: many plastic packages with multi-material lamination film are not recyclable.

Polyethylene film has been a workhorse in flexible packaging, but it has limitations:

- It's **hazy** – clouding your printed material.
- It's **soft** – making it easy to leave indentations.
- It's **less tough** – leaving your products more vulnerable to impact.
- It's **highly tear resistant** – making packaging difficult to open.
- It's **not readily recyclable in multi-material lamination film** – creating plastic waste in the environment.

It was clear that something new was needed. And we wanted to help find it.

Introducing INNATE™ TF
Polyethylene Resins for Tenter Frame Biaxial Orientation

Through research and collaboration, we reached our goal to develop a recyclable orientation film. INNATE™ TF Polyethylene Resins for Tenter Frame Biaxial Orientation (1.7g/10 min MI; 0.926 g/cm³ density) feature a unique molecular architecture that makes it possible.

Polyethylene film, redefined

Polyethylene films created using INNATE™ TF Polyethylene Resins for Tenter Frame Biaxial Orientation demonstrate outstanding properties. Compared to traditional PE products, films made with INNATE™ TF resins:

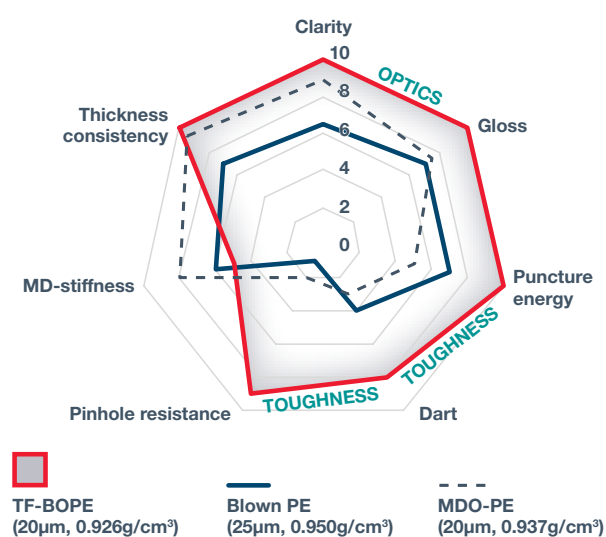
- **Achieve up to 80% less haze**
- **Have two times (2x) the impact strength and tensile modulus**
- **Show three times (3x) the puncture resistance and tensile strength**
- **Have excellent flex crack resistance, even under low temperature**



Sustainability. Recyclability.
Consumer convenience.
What brand owners want.
What we want.

Let's find the answers.

Figure 1: TF-BOPE film vs. other PE films



Design for recyclability. What customers want.

INNATE™ TF resins – and mono-material flexible packaging structures made with them – are 100% recyclable in existing PE recycle streams.

When people hear the word “sustainability,” most think of protecting the environment. So do we. It’s why we’ve invested around the world developing ways to do just that. We’ve introduced “design for recyclability,” a developmental process in which all aspects of a package lifecycle are addressed to create an efficient and recyclable or reusable product.

It’s why we’re so excited about products like INNATE™ TF Polyethylene Resins for Tenter Frame Biaxial Orientation. The environmental advantages of using INNATE™ TF resins make them an excellent option for promoting sustainability initiatives. That’s because INNATE™ TF resins – and flexible packaging structures made with them – are 100% recyclable in existing PE recycle streams.

The resins can be used alone, in multi-layer structures with other PE layers, even as laminates. Adding to their sustainability claims, they offer significant material reduction and downgauging opportunities while providing superior properties.

New possibilities for your brands

Expanding packaging performance. Reducing film use. Finding line efficiencies. As shown in Figure 2, INNATE™ TF polyethylene resins provide ways to enable all of these enhancements:

Polymer substitution – INNATE™ TF resins have excellent mechanical properties that can reduce lamination thickness by replacing polymers such as BOPA, BOPP, or BOPET in abuse layers for packaging. Material replacement can also offer easy handling and cost optimization.

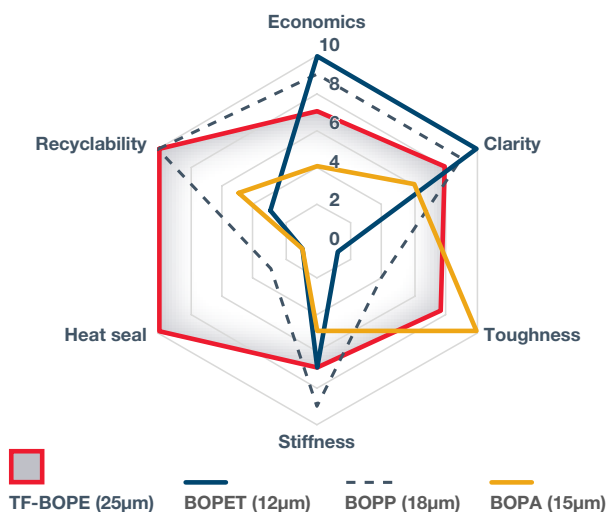
Convenience of use – Alone, or in laminations (e.g., BOPET//BOPE), INNATE™ TF resins create films that are easy to tear, an important requirement for packaging products that also increases customer convenience in use.

A fully recyclable structure – With excellent optical performance and printability to ensure clear logos, images and readability for dazzling shelf appearance, TF-BOPE film can be used directly as the printed layer of the packaging. By combining it with other PE functional layers (e.g., BOPE//PE), INNATE™ TF resins can achieve packaging with an all-PE structure, making it more convenient for recycling and increasing the sustainability quotient.

Imagine the potential

Then call us. Let’s talk, and explore how INNATE™ TF Polyethylene Resins for Tenter Frame Biaxial Orientation – and our entire diverse portfolio of resins – can advance your future projects.

Figure 2: TF-BOPE film vs. other films



TF is the future of **sustainable packaging**

What can it do for the future of your applications?

Let's explore the possibilities together.



The potential of INNATE™ TF Polyethylene Resins for Tenter Frame Biaxial Orientation was made real via testing and collaboration at Pack Studios. And the doors are open to you, too. The global developmental resources of Pack Studios can further your packaging and sustainable packaging pursuits. Here, designing for recyclability is made easier with industry-scale fabrication equipment, filling lines, and physical and analytical testing capabilities to innovate, prototype, test, and accelerate new products to market.

**Greatly accelerating
speed to market,
giving you a valuable
competitive edge.**



The logo for Innate TF features the word "Innate" in a white sans-serif font, with a stylized blue and green wave graphic integrated into the letter "i". To the right of "Innate" is the text "TF" in a larger, bold, white sans-serif font.

polyethylene resins for tenter frame
biaxial orientation by



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