

Answering the Stiffness-Toughness Challenge

An exciting option for Designing for Recyclability

Designing for recyclability is bringing numerous challenges to packaging professionals:

- Packaging Formation – stiffness, forming, heat sealing
- Shelf life – barrier properties
- Abuse resistance – transportation/e-commerce challenges, toughness (dart, puncture, tear)
- Consumer appeal – surface aesthetics, stiffness, transparency

These challenges have now met their match. INNATE™ ST 100 Precision Packaging Resins offer a suite of functionalities created to address the industry's sustainability issues. Beyond that, processing advantages and a reliable pipeline of product make this exciting addition to the family of innovative INNATE™ resins a valuable part of your sustainability toolbox.

INNATE™ ST 100 resin can be used 100% without LDPE with no processing issues. In fact, as shown in Figure 1, when used alone, INNATE™ ST 100 demonstrates an improved viscosity profile over competitive resins.

INNATE™ ST 100 resin offers more design freedom and a >85% improvement in dart vs. blends of mLLDPE & HDPE. Just a discreet layer of INNATE™ ST 100 resin is advantageous over a multi-layer mLLDPE/HDPE blend formulation (Figure 2).

And likewise, as shown in Figure 3, INNATE™ ST 100 resin expands structure design boundaries, offering 5x higher impact resistance, similar stiffness vs. conventional mLLDPE.

Further expanding these boundaries, INNATE™ ST 100 offers similar WVTR, with ~50% higher impact resistance (Figure 4).

Figure 1: Improved viscosity profile vs. competitive resins

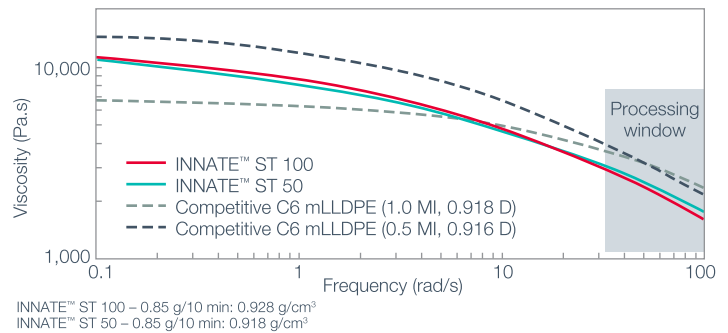


Figure 2: 2 mil films with the same overall 0.928 g/cc density

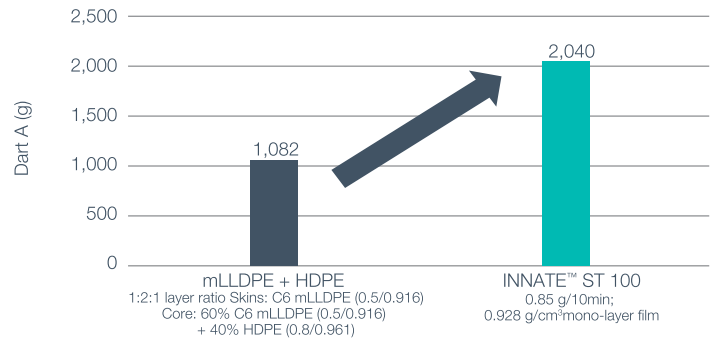


Figure 3: 3-layer coex – 3.5 mil films, 0.945 g/cm³ average density

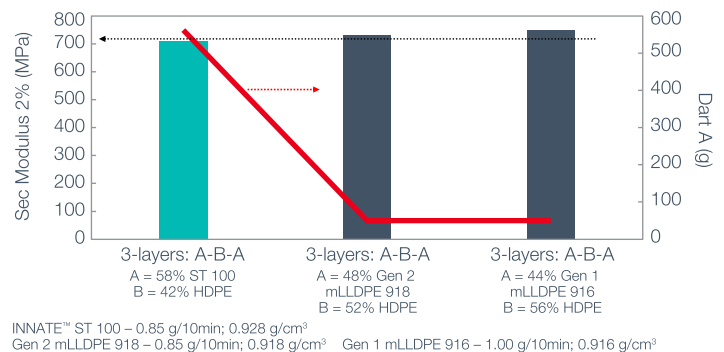
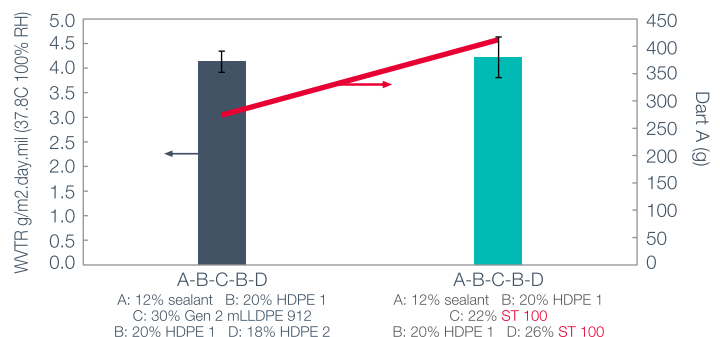


Figure 4: 5-layer coex – 2 mil films, 0.948 g/cm³ average density



Superior performance from INNATE™ ST 100 resin enables the design of high toughness and stiffness barrier films, including the potential for polyamide reduction or elimination depending on application performance targets. Figure 5 illustrates this exciting combination of properties.

It all deserves repeating. So just to review, we've targeted the new combinations of properties required to fulfill Design for Recyclability (D4R) requirements in today's demanding marketplace:

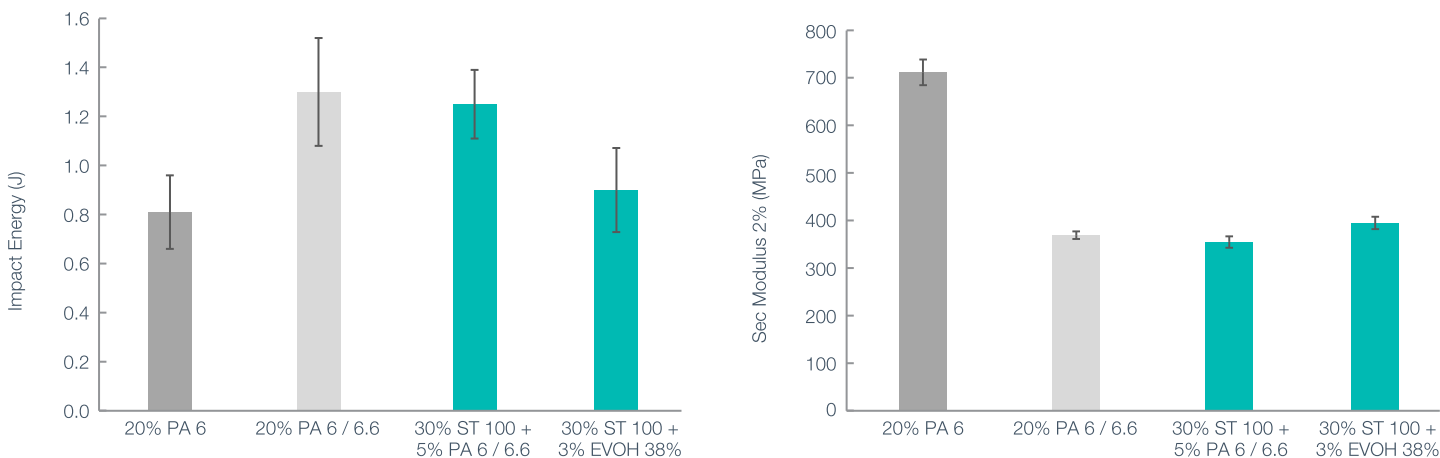
- Stiffness & Toughness
- Barrier & Toughness
- Downgauging & Machinability
- Not-in-kind (NIK) materials replacement

And INNATE™ ST 100 Precision Packaging Resins hit that target, enabling new performance levels for polyethylene packaging:

- Unprecedented Stiffness / Toughness balance
- Dependable barrier protection
- Excellent processability
- Easy fit into different packaging structures to improve performance
- NIK replacement / reduction enabler

There's much more to know. Visit www.dow.com or ask your Dow representative for more information about INNATE™ ST 100 Precision Packaging Resins.

Figure 5: Potential for polyamide reduction or elimination depending on application performance targets



INNATE™ ST 100 – 0.85 g/10min; 0.928 g/cm³



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