

DuPont™ Delrin® Renewable Attributed Drives Productivity and Sustainability for High-speed Filling Lines



Project

DuPont™ Delrin® Renewable Attributed homopolymer with advanced slip technology played a key role in the development of a breakthrough conveyor material for bottling and other filling operations that avoids the need for traditional external lubricants. The Regina e-F.A.S.T. (ecological friction abating sliding thermoplastic) material was developed by DuPont in close collaboration with Regina Chain, a global leader in conveyor chains, belts, and components.

Bottlers have sought to move to dry-running conveyors to enable the line to operate smoothly without the need for external lubricants that attract dust requiring periodic wash off. This causes interruptions to the lines that result in additional labor, materials, and water – also generating wastewater needing proper disposal.

Regina turned to DuPont, its supplier of more than 20 years, for materials expertise, technical resources, and a strong focus on sustainable solutions. The goal was to develop an innovative, dry-running conveyor material for bottle-filling customers that would enable high-speed production, allow bottles to move smoothly, and extend the useful life of the conveyor creating a more sustainable operation.

Challenges

Dry running requires a material with slip properties that can ensure a low coefficient of friction (COF) that remains constant over time. Conveyors made with conventional acetal and polybutylene terephthalate (PBT) resins often require application of external lubricants to maintain a low COF over extended periods of demanding processing.

The new technology had to provide low, stable COF without migrating to the surface of the conveyor where it could cause dust collection – a similar issue inherent to the use of lubricants. High slip performance would allow the elimination of external lubricants and reduce chain pull, helping to cut the amount of energy required to operate the conveyor.

Although dry running minimizes or eliminates line cleaning due to dust, periodic sanitizing is still required. Operators needed a way to

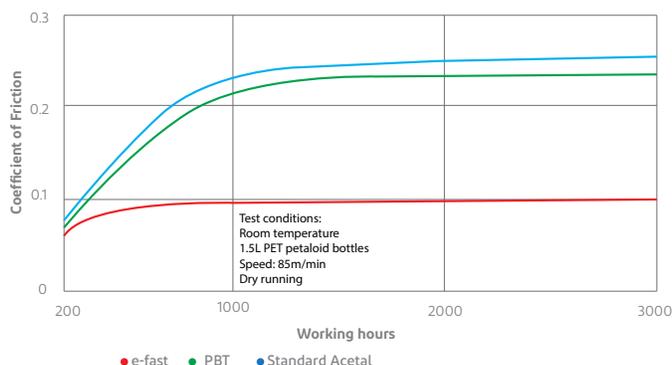
identify when the line needed sanitizing to support overall processing, safety, cleanliness, and efficiency.

Solution

Working closely throughout design, development, testing, and prototyping, DuPont and Regina collaboratively created the Regina e-F.A.S.T. material – a new, custom-colored grade of DuPont™ Delrin® Renewable Attributed homopolymer with advanced slip technology.

DuPont performed in-house tribology work and conducted extensive testing at both Regina's facility in Latina, Italy, and its customers' sites. The team also developed a conveyor line prototype at the DuPont European Technical Center in Meyrin, Switzerland, to simulate real-world conditions.

The new Regina e-F.A.S.T. material offers significantly lower COF – a reduction of up to 40 percent compared to standard acetal and PBT. This critical property remains stable over time, enabling the full dry running of the conveyor. In addition, Delrin® Renewable Attributed demonstrates a world-class environmental impact profile that helps customers achieve a lower carbon footprint and supports their sustainability goals.



Source: DuPont

With the elimination of external lubricants, line cleaning is only required for sanitation. DuPont customized its Delrin® Renewable Attributed grade for e-F.A.S.T. material with a distinctive bright yellow color to help Regina’s customers quickly identify the need for sanitizing.

The product’s exceptionally low COF also reduces chain pull, helping to decrease the amount of energy needed to run the line. Testing has shown that Regina’s conveyor chains and belts made with this material can reduce energy consumption on a high-speed bottling line by up to 40 percent. In addition, lower stress on conveyor chains also helps extend their useful life by up to 40 percent while also lengthening time between line maintenance cycles.

Finally, the surface slip performance of this unique material allows bottles to move smoothly along the conveyor line, reducing wear and tear, thus helping to preserve the bottles’ clarity, haptic properties, and shelf appeal.



By optimizing part design, Delrin® Renewable Attributed enables environmental and cost savings compared to high MW copolymer alternatives.



Potentially
-12%
Part Weight



CO₂e per Part
Reduction



Potentially
-13%
Hold Pressure
Time



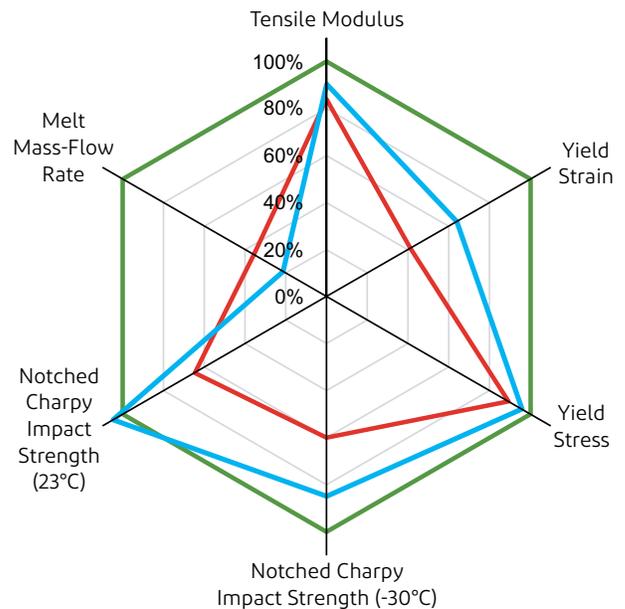
Cost
Reduction

DuPont™ Delrin® Renewable Attributed

Delrin® Renewable Attributed is a high performance homopolymer that outperforms low friction acetal copolymers, enables sustainable design, optimizes resource efficiency, and creates reliable parts made to last.

The product is produced using 100% bio-feedstock from waste in accordance with mass balance principles. The DuPont manufacturing site and supply chain are accredited through the globally recognized International Sustainability and Carbon Certification (ISCC) certification system.

Delrin® Renewable Attributed delivers superior performance compared to competitive low friction copolymers. With higher tensile properties (+16%) and improved sliding performance (+45%) achieved on a significantly better flow, the product enables the design of parts with excellent wear/friction performance, durability, and ultra-low COF.



— Delrin® RA300CPE — Typical HMW Copolymer
— Typical UHMW Copolymer

HMW = High Molecular Weight
UHMW = Ultra High Molecular Weight

Source: DuPont

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Mobility and Materials

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