



GREENBLUE®

# FEATURE: DESIGNTEX

## **Chemical Recycling**

Making Fiber-to-Fiber Recycling  
a Reality for Polyester Textiles



# Designtex: Collaboration Within the Supply Chain to Close the Loop

**D**esigntex (a subsidiary of Steelcase Inc.) is a leading company in the design and manufacturing of textiles and wallcoverings for the built environment. The company has a long and rich history with respect to sustainable design and manufacturing of textiles. In the early 1990s, Designtex partnered with William McDonough and Michael Braungart to create a novel wool and bast fiber fabric called [Climatex®](#) for which all of the chemical inputs were evaluated and selected to be as safe for humans and the environment as possible, and the material could be returned to the soil as agricultural bedding. In the 2000s, Designtex partnered with one of its innovative fabric mills, the Victor Group (now [Duvaltex](#)), and McDonough Braungart Design Chemistry ([MBDC](#)) to create [Eco-Intelligent Polyester®](#), a fabric designed to be a technical nutrient flowing within a cradle-to-cradle system. Eco-Intelligent Polyester® was the first widely-marketed polyester fabric to use an alternative catalyst to replace antimony trioxide, a known chemical of concern in the polymerization of polyester resins.

By the mid-2000s, after years of experimenting with various ways to design optimal fabrics that could be circulated as bi-



LOOP TO LOOP STACK LORES

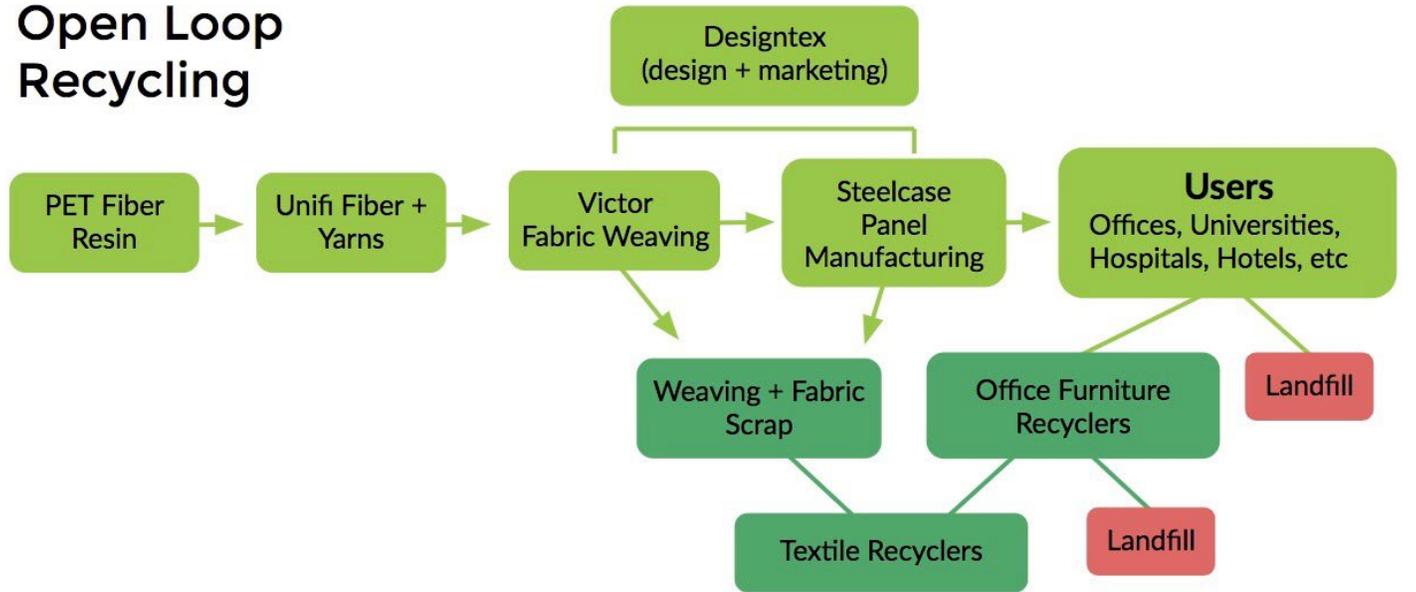
ological or technical nutrients, Designtex realized that an “open loop” infrastructure for collecting and recycling textiles was still very nascent and not developed enough to harvest the value of the products they were designing as nutrients to feed the circular economy. Designtex decided to explore what a “closed loop” process would look like within its supply chain. Because Designtex does not manufacture the products it designs, it was accustomed to collaborating with their suppliers to achieve their sustainability goals. Designtex assembled a group of companies that represented the entire value chain for manufacturing contract textiles for office furniture products. Each of the companies selected for collaboration on the project also had extensive experience with designing and manufacturing sustainable products. The collaboration included [Unifi Manufacturing, Inc.](#) as the fiber producer and recycler, [Victor Textiles](#) as the fabric weaver and

[Steelcase Inc.](#) as the contract office furniture customer.

The pilot program for the closed loop process was based upon two primary sources of scrap fabrics - fiber and fabric wastes from Victor weaving mills and cut and sew fabric scraps from a Steelcase system panel manufacturing facility. Waste fabrics were collected and sent to Unifi, which processed the fabric waste in its state-of-the-art [Repreve®](#) Recycling Center in North Carolina. The Center was built to recycle post-industrial and post-consumer sources of polyester waste. In the recycling process, fabric scraps are pulled apart to separate them into fibers, which are then melted into a viscous polymer. This form of mechanical recycling does not remove colorants, so the resulting color of the recycled PET is usually dark grey or blackish. Unifi then mixes black pigmented PET chips into the fiber melt bath that is extruded to create a color-consistent black solution-dyed yarn. These first quality yarns are then sold back to Victor Textiles, which uses them as fill yarns to weave fabrics according to the design specifications of Designtex and the performance requirements of Steelcase.

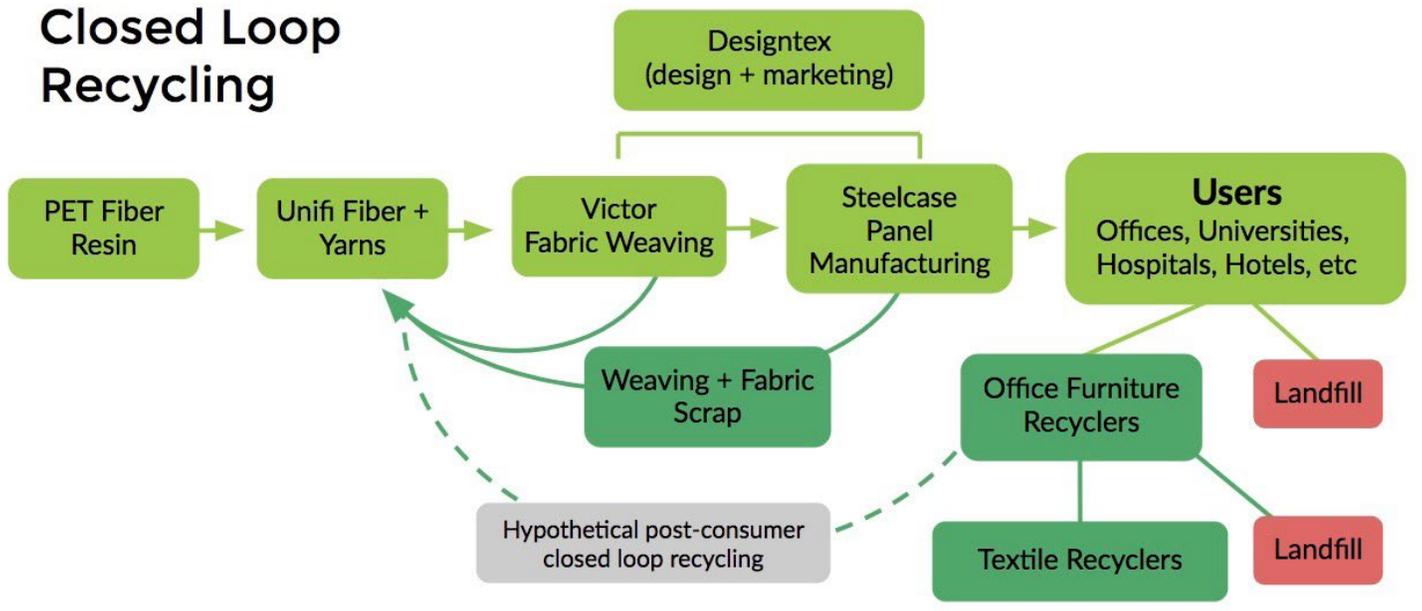
In 2013, Designtex introduced

## Open Loop Recycling



Current routes for PET fabric scraps from weaving and panel manufacturing operations go to textile recyclers who make products typically destined for markets that “export” these materials outside of the contract textile value chain or send them to landfill or incineration. The majority of post-consumer textile waste is not recycled.

## Closed Loop Recycling



Supply chain partners - Designtex, Steelcase, Victor and Unifi worked together to collect polyester weaving and panel fabric scraps, retaining their value within their supply chain to manufacture new fabrics. Significantly greater volumes of PET fabric waste could be captured if A) Steelcase sells fabric scrap to Unifi from its product as service platforms - [Eco-Services and Phase 2](#); B) Office furniture recyclers increase collection of post-consumer fabric waste for sale to Unifi; C) Institutional and corporate customers can contract with third parties to recycle decommissioned furniture with contractual obligations to recycle textiles.

“Loop to Loop”, the first upholstery fabric made with waste fiber yarn, demonstrating that it was technically and economically feasible to mechanically recycle waste fabric-to-fiber yarns. Designtex, Steelcase and Victor

now offer a variety of fabrics based upon this platform.

The Loop to Loop platform is based on Unifi’s proprietary recycling technology [Repreve®](#), which produces first quality PET

yarns from recycled feedstock without requiring any additional virgin resin. In addition to supplying Victor with Loop to Loop yarn, Unifi also has its own line of branded products, “[Repreve® Textile Takeback](#)” yarns. 