



GREENBLUE®

FEATURE: STEELCASE

Chemical Recycling

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



Steelcase - Making Circularity a Reality for Office Furniture

Steelcase has been in business for over 105 years and today is a \$3 billion family of brands including [Steelcase](#), [DesignTex](#), [Coalesse](#), [PolyVision](#) and [Turnstone](#). The company has a comprehensive portfolio of workplace and technology products, applications and services aimed at creating great experiences for the world's leading companies. Steelcase is represented by a network of over 800 dealer locations worldwide.

Steelcase has been a leader in sustainability, not only within its own industry, but for the business world in general. As early as 1965, the company was focused on resource and energy efficiency for its operations and continues that legacy. Steelcase exceeded its global environmental footprint reduction goal of 25% in 2012 and is currently positioned to hit its second round of 25% reduction goals in water consumption, waste generation, energy consumption and volatile organic compound (VOC) use by 2020. Other early accomplishments included building the world's first LEED certified manufacturing plant and investing in renewable energy equivalent to [100% of the company's global electricity use](#).

Over the past 20+ years, the company's sustainability strat-



egy evolved and circular product innovation became core to their work. By the mid 2000s, Steelcase introduced the Answer™ system, the first [Cradle to Cradle Certified™](#) (C2C) workstation, as well as the Think™ chair, the first C2C Gold certified product. The company has focused on three [strategic areas](#) in designing products for the circular economy: [materials chemistry](#), [life cycle thinking](#), and [end of use](#). Angela Nahikian, Director of Global Sustainability, explains that those principles allow Steelcase brands to “better design products for circularity by avoiding and eliminating materials of concern, optimizing performance throughout the life cycle and enabling life extension, materials recovery, and end-of-life strategies.”

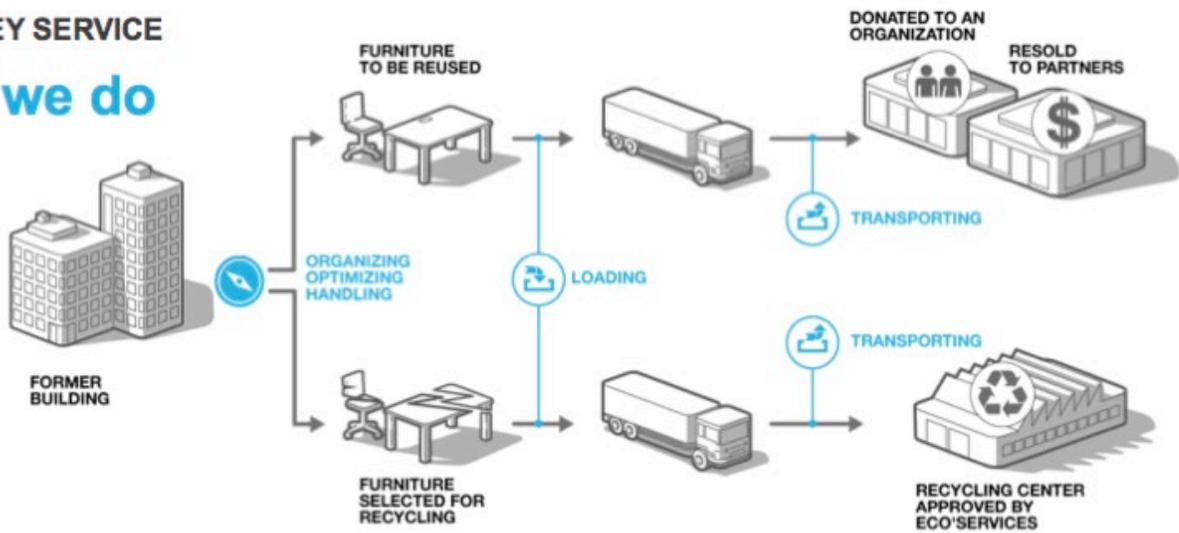
Product circularity is only the

foundation of what Steelcase has been developing to enable a more sustainable, circular economy. Over the past ten years, the company has been piloting and iterating different circular economy-inspired programs and businesses ranging from:

- Managing the inventory for large corporate customers with facilities in multiple global locations.
- Steelcase Event Experiences, a part of its offering to companies in need of short-term, inspiring event or work spaces.
- Workspring, a shared meeting, event and co-working space.
- Smart + Connected Spaces - embedded technology in the workplace to help businesses understand space utilization and efficiency and make

A TURNKEY SERVICE

What we do



Steelcase's Think, an environmentally-friendly, lightweight office chair, consists of up to 28% recycled materials and is up to 95% recyclable

Think has measured and minimized its lifelong impact on both human and environmental health. The newly redesigned Think has fewer parts for easy recycling and even quicker disassembly. Steelcase can help you reuse or recycle the chair at the end of its useful life.

informed decisions about changes

- Offering end-of-use programs that help customers redeploy under-leveraged assets including “[EcoServices](#)” in selected European countries and “[Phase 2](#)” program for all customers in North America - extending the useful life of their products through resale and charitable donations or by ensuring that the product materials are responsibly recycled.

Textiles have been an important part of Steelcase’s sustainability journey. In the early 1990s, a

Steelcase company, Designtex, collaborated with [William McDonough](#) and [Dr. Michael Braungart](#) of [McDonough Braungart Design Chemistry \(MBDC\)](#) to create [Climatex®](#), the first Cradle to Cradle biological nutrient fabric designed to use chemicals that are safe for humans during manufacturing and use phases and safe for the environment when the fabric is returned to soil as a biodegradable gardening mulch.

Steelcase has continued its efforts to optimize the design and manufacturing of textiles. Through its material chemistry research and practice, the com-

pany assesses the chemical inputs of products, including fabrics, to understand any potential human or environmental health impacts. For example, Steelcase has been a big proponent of optimizing PET fabrics by creating a market for [Eco-Intelligent Polyester®](#), a polyester fabric that uses an alternative catalyst to replace antimony trioxide, a chemical of concern commonly used in the polymerization of polyester resins. Steelcase has a particular interest in chemical recycling and the potential to “upcycle” all forms of PET materials into new virgin quality resin – in perpetuity. Today, Steelcase must create duplicate solutions for the market, one based on recycled content and one based on virgin. Certain forms of chemical recycling could eliminate the need to do this by removing the catalyst and producing new monomers for the production of PET. Similar to the “[intelligent materials pooling](#)” concept that [EPEA’s](#) Dr. Michael Braungart advocates, if enough companies demand antimony-free polyester, resin producers can polymerize these monomers using [alternative catalysts](#) (e.g.,

titanium-based) to supply these brands with the optimized polyester they seek.

Steelcase has also focused on closing the loop directly within its own supply chain by using mechanical recycling to convert fabric scraps into new fabrics. Their [Redeem + Retrieve](#) and [New Black](#) fabric lines are made with yarns that come from recycled fabric scraps from one of Steelcase's manufacturing facilities. Chemical recycling could provide Steelcase with greater flexibility for expanding its recycling of PET materials, be they fabrics, printed films, non-wovens or rigid engineering-grade resins. Ideally, Steelcase could derive revenue from the sale of these materials to chemical recyclers, depending on material volume and purity. In fact, Steelcase could potentially leverage its existing material recovery programs for profit by harvesting significant quantities of PET materials from large corporate customers through its product stewardship services or via contracts with third parties, which could then be sold to chemical recyclers.

Steelcase has been preparing for the circular economy since long before the term became common parlance. Steelcase engineers routinely consider design for disassembly and materials recovery (DfD/R) into their product design objectives. Because Steelcase has its own product recovery infrastructure and understands how to design products as "technical nutrients", chemical recycling can help convert end-of-first-use products into valuable PET resin for new Steelcase products.

