

C&A Carpet

Product Selection and Description

C&A is a manufacturer of modular tile and six-foot structured back carpeting for the commercial market. As part of Tandus, C&A works with sister brands Monterey and Crossley to provide customized floor covering solutions for its customers. The four C&A products listed below are included in BEES.

Table 1: C&A Products Included in BEES

<i>Product Line</i>	<i>Style</i>
ER3 RS Modular Tile	Habitat (nylon 6,6 with 80 % pre-consumer content)
ER3 RS Cushion Roll Goods	Intersection (nylon 6,6 with 90 % pre-consumer content)
Ethos RS Modular Tile	Topography (nylon 6,6 with 80 % pre-consumer content)
Ethos RS Cushion Roll Goods	Yosemite (nylon 6,6 with 80 % pre-consumer content)

Some of C&A's carpets are available as "climate neutral" products, meaning the greenhouse gases emitted over their life cycles are optionally offset or balanced. The BEES user may choose either the traditional or climate neutral versions of these products when selecting them for analysis.

Flow Diagram

The flow diagrams below show the major elements of the production of these products as they are currently modeled for BEES.

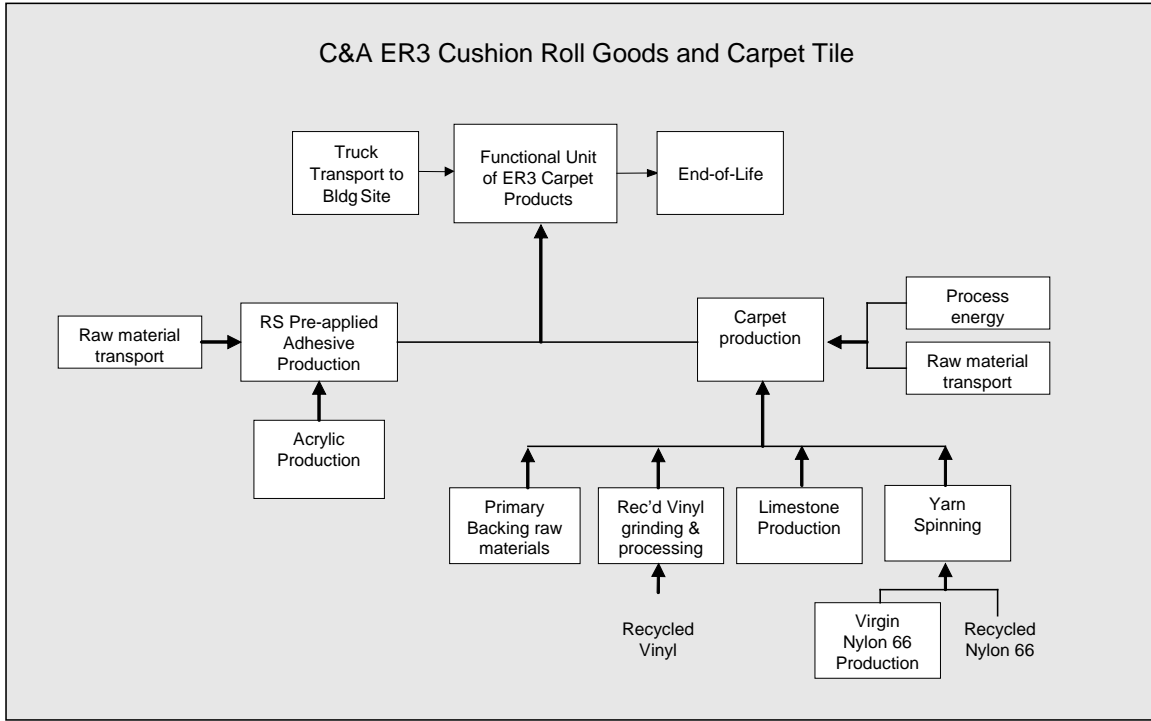


Figure 1: C&A ER3 Flooring Products System Boundaries

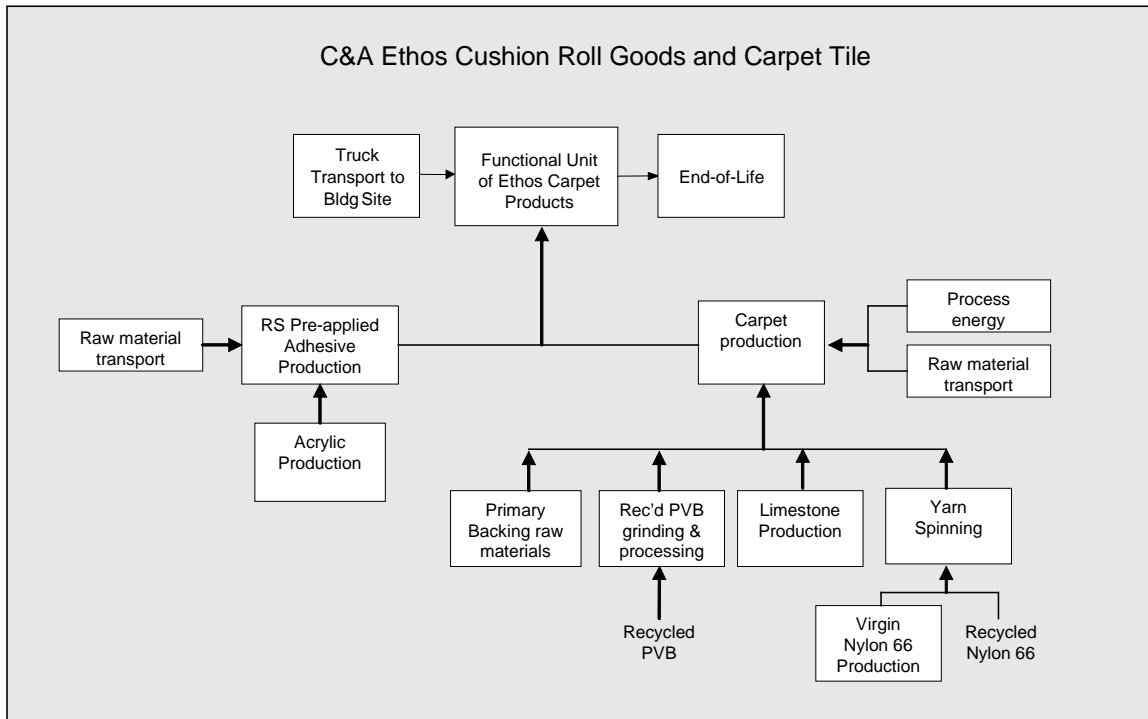


Figure 1: C&A Ethos Flooring Products System Boundaries

Raw Materials

The following tables present the constituents by mass percentage of the ER3 and Ethos products.

Table 2: C&A ER3 Flooring Constituents

<i>Constituent</i>	<i>ER3 Tile Mass Fraction</i>	<i>ER3 Cushion Roll Mass Fraction</i>
Nylon 6,6 Yarn	2 %	2 %
Post-industrial nylon 6,6	10 %	17 %
Primary backing	5 %	4 %
Recycled vinyl/Limestone (filler)	72 %	62 %
Other Additives (precoat, etc.)	11 %	15 %
Total:	100 %	100 %

Table 3: C&A Ethos Flooring Constituents

<i>Constituent</i>	<i>Ethos Tile Mass Fraction</i>	<i>Ethos Cushion Roll Mass Fraction</i>
Nylon 6,6 Yarn	3 %	3 %
Post-industrial nylon 6,6	11 %	11 %
Primary backing	4 %	4 %
Recycled PVB/ Limestone (filler)	65 %	65 %
Other Additives (precoat, etc.)	17 %	17 %
Total:	100 %	100 %

Yarn for the ER3 products consists primarily of post-industrial (PI) nylon 6,6. While producing the PI nylon 6,6 is not—and should not—be accounted for, spinning it into yarn plus its transportation to the manufacturing site is taken into account in the model. Data for the production of virgin nylon 6,6 comes from the European plastics industry.¹

The secondary backing for ER3 products is made from recycled post consumer (PC) and PI vinyl backed carpet and waste. As with the PI nylon 6,6, no production data is included, with the exception of data for the material's processing into backing and transportation to the site.

The secondary backing for Ethos products is made from PC polyvinyl butyral (PVB) film recovered from windshield and safety glass recycling facilities. The transportation and processing of the PVB are accounted for in the model.

Data for materials in the primary backing and for other additives comes from the U.S. LCI Database and elements of the SimaPro database, which includes both North American and European data from the late 1990s and 2000s. Data for the limestone comes from the U.S. LCI Database.

Manufacturing

Energy Requirements. The manufacturing process for C&A's products consists of tufting the nylon yarn, applying the precoat compound, and joining the secondary backing. The energy to produce ER3 tile and the two Ethos products is comprised of 30 % electricity and 70 % natural gas. The ER3 cushion rolls require more energy to produce due to yarn dyeing processes; energy sources include electricity (27 %), natural gas (59 %), fuel oil (12 %), and biodiesel (2 %). The production and use of these energy sources come from the U.S. LCI Database, and biodiesel production data comes from a National Renewable Energy Laboratory (NREL) LCA study on biodiesel use in an urban bus.²

¹ Boustead, I. (Association of Plastics Manufacturers of Europe, March 2005). Found at: www.plasticseurope.org.

² Sheehan, J. et al., NREL/SR-580-24089 (Washington, DC: US Department of Agriculture and US Department of Energy, May 1998).

Transportation. Transportation distances for shipment of the raw materials from the suppliers to the manufacturing plant are provided by C&A. Most of the materials are transported exclusively by diesel truck, while some are transported by both diesel truck and rail. All forms of transportation are included in the model, and all data is based on the U.S. LCI Database.

Waste. Any waste generated during the manufacturing process is recycled back into other carpet products.

Transportation

The distance for transport by diesel truck from the C&A manufacturing plant in Dalton, Georgia to the building site is modeled as a variable in BEES. Transportation emissions allocated to each product depends on its overall mass, as given in the following Table.

Table 4: C&A Products' Mass and Density

<i>Product</i>	<i>Mass per Applied Area in kg/m² (lb/ft²)</i>	<i>Density in kg/m³ (lb/ft³)</i>
ER3 Modular Tile	4.4 (0.90)	674.4 (42.1)
ER3 Cushion Roll Goods	3.7 (0.76)	586.3 (36.6)
Ethos Modular Tile	3.9 (0.80)	619.9 (38.7)
Ethos Cushion Roll Goods	3.1 (0.63)	488.6 (30.5)

Installation

C&A products are produced with RS pre-applied adhesive, which provides a “peel and stick” installation system. It simplifies installation, reduces VOC and odors associated with the use of wet adhesives, and does not require an air-out period. According to C&A, carpet waste of less than 3 % is generated during installation. Scraps are typically kept at the building site for future repairs.

Use

C&A’s roll products are replaced after 25 years. The modular tile products are replaced after 15 years. As with all BEES products, life cycle environmental burdens from these replacements are included in the inventory data.

End of Life

All C&A products are 100 % recyclable in their in-house closed-loop recycling process.

References

Life Cycle Data

National Renewable Energy Laboratory (NREL): *U.S. Life-Cycle Inventory Database*. 2005. Golden, CO.

Found at: <http://www.nrel.gov/lci/database>.

PRé Consultants: *SimaPro 6.0 LCA Software*. 2005. The Netherlands.

Boustead, I., *Eco-profiles of the European Plastics Industry: POLYAMIDE 66 (NYLON 66)* (Association of Plastics Manufacturers of Europe, March 2005). Found at: www.plasticseurope.org.

Sheehan, J. et al., *Life Cycle Inventory of Biodiesel and Petroleum Diesel for Use in an Urban Bus*, NREL/SR-580-24089 (Washington, DC: U.S. Department of Agriculture and U.S. Department of Energy, May 1998).

Industry Contacts

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