

Tandus Centiva Commercial Carpet

Product Selection and Description

Based in Dalton, Georgia, Tandus Centiva, a Tarkett company, offers a unique line of Powerbond, Freeform, Modular, Broadloom, Woven and Luxury Vinyl Tile (LVT) flooring products with a true fit-for-purpose approach to enhance spaces for learning, working, healing and living. The six Tandus Centiva products listed below are included in BEES.

Table 1: Tandus Centiva Products Included in BEES

<i>Tandus Centiva Product Line</i>	<i>Mass per Applied Area kg/m² (lb/ft²)</i>	<i>Density in kg/m³ (lb/ft³)</i>
ER3 Modular	4.4 (0.91)	567.0 (35.0)
ethos Modular	3.3 (0.68)	550.8 (34.0)
Powerbond ethos Cushion	3.1 (0.63)	396.9 (24.5)
Powerbond Cushion	2.7 (0.56)	220.3 (13.6)
Flex-Aire Cushion Modular	4.0 (0.83)	322.4 (19.9)
Powerbond Medfloor	2.8 (0.58)	223.6 (13.8)

Tandus Centiva products in BEES are modeled using an average of 0.68 kg/m² (20 oz/yd²) yarn style which represents Tandus Centiva’s annual nylon 6 and nylon 6,6 (solution and yarn dyed) usage. These are available as “carbonfree” or “climate neutral.” For an additional cost to the customer per square unit, the greenhouse gases emitted over the carpets’ life cycles can be optionally offset or balanced.¹ The BEES user may choose either the traditional or climate neutral versions of these products when selecting them for analysis. Essentially, the climate neutral option in BEES sets the Global Warming impact to zero.

Flow Diagrams

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

¹ This is done through the Carbonfund.org

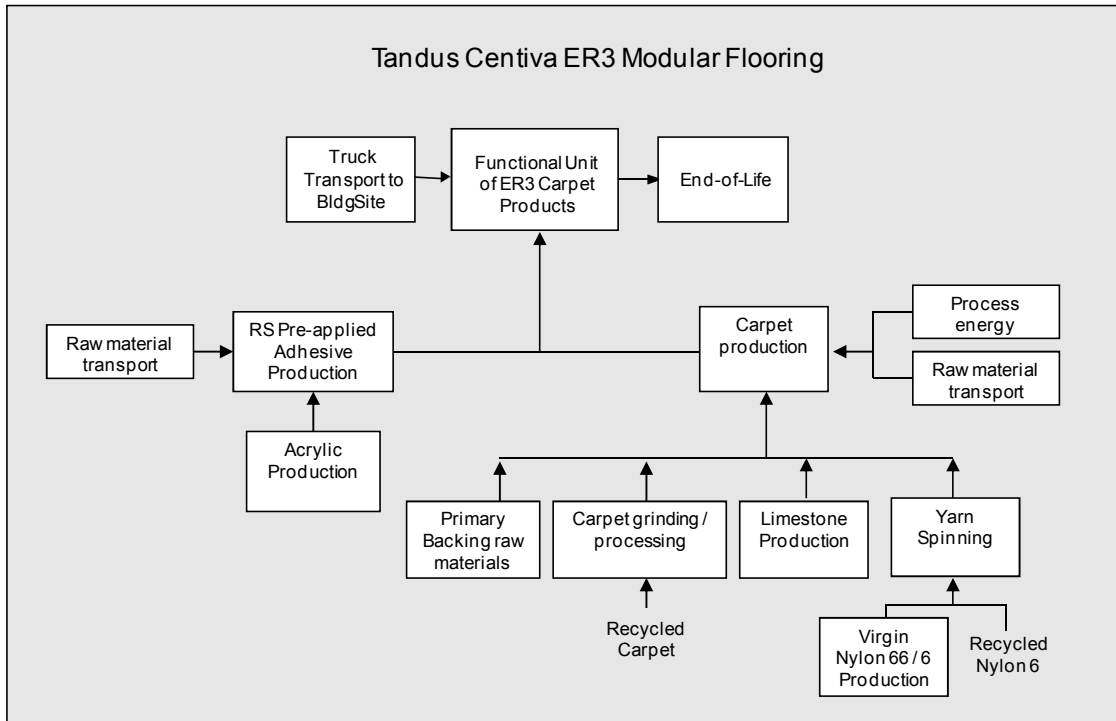


Figure 1: Tandus Centiva ER3 Modular Flooring System Boundaries

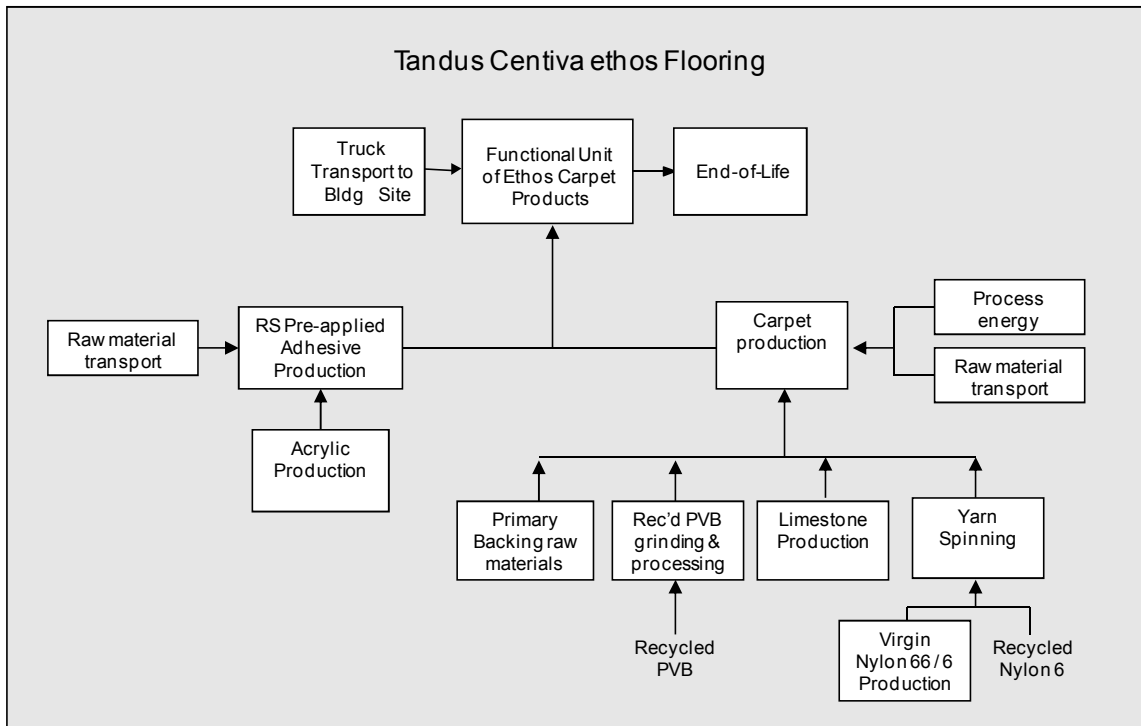


Figure 2: Tandus Centiva ethos Flooring System Boundaries

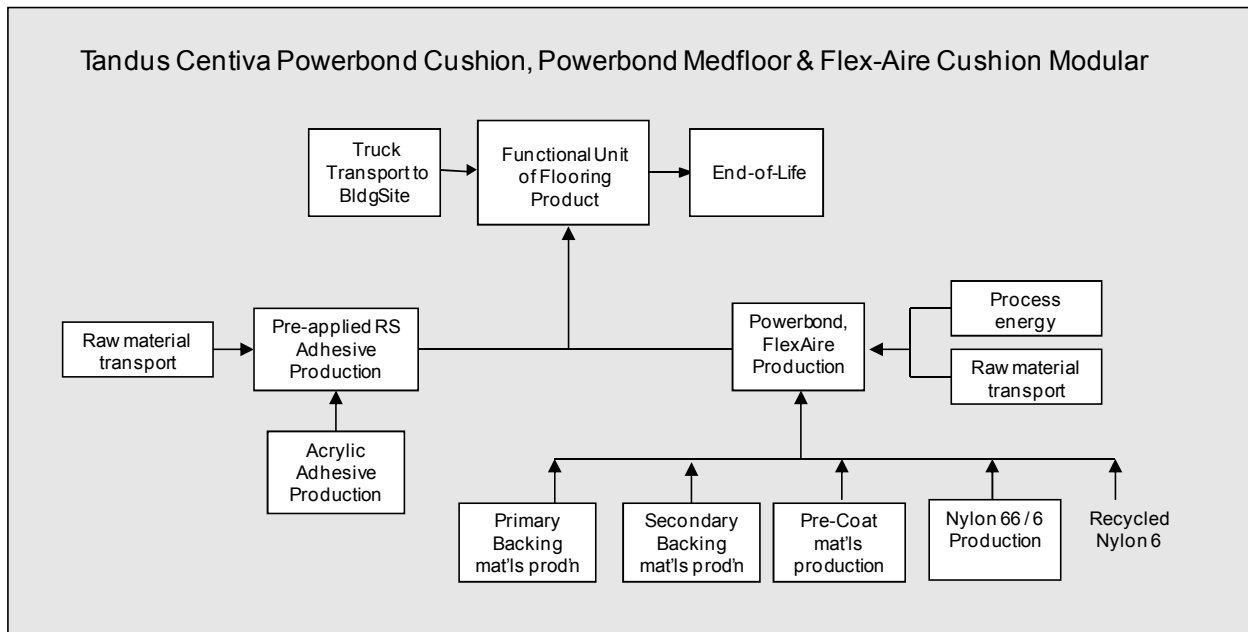


Figure 3: Tandus Centiva Powerbond Cushion RS, Powerbond Medfloor RS and Flex-Aire Cushion Modular RS System Boundaries

Raw Materials

The following tables present the constituents by mass percentage of the Tandus Centiva products.

Table 2: Tandus Centiva ER3 Modular RS Flooring Constituents

Constituent	ER3 Modular Mass Fraction
Nylon 6,6 Yarn	8.1 %
Nylon 6 Yarn	6.3 %
Pre consumer nylon 6	0.7 %
Primary backing	2.5 %
Recycled carpet, vinyl, and limestone (filler)	63.6 %
Other Additives (precoat, RS adhesive, stabilization fabrics, etc.)	18.8 %
Total:	100 %

Table 3: Tandus Centiva ethos Flooring Constituents

Constituent	ethos Modular Mass Fraction	Powerbond ethos Cushion RS Mass Fraction
Nylon 6,6 Yarn	10.9 %	10.6 %
Nylon 6 Yarn	8.5 %	9.9 %
Pre consumer nylon 6	1.0 %	1.0 %
Primary backing	3.3 %	3.6 %
Recycled polyvinyl butyral (PVB)/Limestone (filler)	51.4 %	46.1 %
Other Additives (precoat, RS adhesive, stabilization fabrics, etc.)	24.9 %	28.8 %
Total:	100 %	100 %

Tandus Centiva products were modeled based on an average product style representative of the product line. Yarn for Tandus Centiva’s products was modeled based on the company’s annual usage of nylon 6 and nylon 6,6. Both of these data sets come from EcoInvent, whose data are based on those from Eco-profiles of the European plastics industry (PlasticsEurope). The nylon 6 was modeled with an average of 10% preconsumer content.

The primary backing used is a polyester nonwoven material typical of that utilized in commercial floor coverings. Data for polyester come from the U.S. LCI Database, and these are based on North American industry data. The secondary backing for ER3 products is made from recycled pre- and postconsumer (PC) vinyl backed carpet. No production data are included for vinyl backed carpet, with the exception of data for the materials’ transportation to the site and processing into backing. The secondary backing for ethos products is made from postconsumer 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 limestone come from the U.S. LCI database, and data for other additives come from the U.S. LCI Database and EcoInvent.

Table 4: Tandus Centiva Powerbond Cushion RS, Flex-Aire Cushion Modular RS, and Powerbond Medfloor Constituents

Constituent	Powerbond Cushion RS Mass Fraction	Flex-Aire Cushion Modular RS Mass Fraction	Powerbond Medfloor RS Mass Fraction
Nylon 6,6 Yarn	12.8 %	8.9 %	12.8 %
Nylon 6 Yarn	10.0 %	6.9 %	10.0 %
Pre consumer nylon 6	1.1 %	0.7 %	1.1 %
Primary backing	4.0 %	2.7 %	3.9 %
Secondary backing	43.8 %	60.8 %	44.6 %
Other Additives (precoat, RS adhesive, stabiliz. fabrics, etc.)	28.3 %	20.0 %	27.6 %
Total:	100 %	100 %	100%

Powerbond Cushion and Powerbond Medfloor are hybrid resilient sheet flooring products with a heterogeneous construction of nylon and closed cell cushion. The cushion and nylon are fused together with heat and pressure in the Powerbond process creating a floor covering that is integral and inseparable. Flex-Aire Cushion Modular is produced in the same manner except that an intermediate vinyl coating layer along with a nonwoven fiberglass sheet is applied between the precoat and secondary backing. Data for nylon 6,6 and nylon 6 are described above, and the primary backing, similar to other products, is a polyester nonwoven material. The secondary backing is a moisture-impermeable, closed cell vinyl cushion that enhances acoustical and thermal insulation properties as well as ergonomics. Data for vinyl come from the U.S. LCI Database.

Manufacturing

Energy and Water Requirements. The manufacturing process for Tandus Centiva's products consists of tufting the nylon yarn, applying the precoat compound, adhering the secondary backing, and applying RS adhesive. The BEES products have been modeled using an overall facility average of electricity, natural gas used in ovens, and water usage (which includes water for yarn dyeing). This amounts to 9.7 MJ/m² (2.25 kWh/yd²) electricity, 16.22 MJ/m² (0.129 therm/yd²) natural gas, and 13.6 l/m² (3.0 gal/yd²) water. Although some carbon offsets and Renewable Energy Credits (RECs) are purchased annually, these were not taken into account in the model. The data for the production and use of energy and water come from the U.S. LCI Database.

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

Waste. Waste to landfill accounts for 0.020 kg/m² (0.036 lb/yd²). Product-specific waste generated during manufacturing is recycled back into new carpet products as part of Tandus Centiva's in-house third party certified recycling process.

Transportation

The distance for transport by diesel truck from the Tandus Centiva manufacturing plant in Dalton, Georgia to installation is modeled based on the weighted average transportation distance for Tandus Centiva's North American customers: 1 222 mi (1 966 km). Transportation emissions allocated to each product depend on the overall mass, as given in Table 1.

Installation

Most Tandus Centiva products are produced with Revolutionary System (RS) pre-applied adhesive, which provides a "peel and stick" installation system. It eliminates the need for wet adhesive, simplifies installation and reduces VOC emissions and odors. According to Tandus Centiva, two percent waste is generated during installation of modular and Powerbond products. This was incorporated into the production and manufacturing aspects of the model. Scraps are typically kept at the building site for future repairs.

Use

Tandus Centiva's Powerbond products are assumed to be replaced after 25 years, and modular products at 15-year intervals. As with all BEES products, life cycle environmental burdens from these replacements are included in the inventory data.

End of Life

Tandus Centiva products are 100 % recyclable in Tandus Centiva's in-house closed-loop recycling process. Tandus Centiva annually recycles over 10 million pounds of postconsumer carpet, a rate of 12.8%. This was taken into account in the end-of-life stage.

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.

EcoInvent Centre: *EcoInvent data v2.0* (Dübendorf: Swiss Centre for Life Cycle Inventories, 2007). Found at: www.ecoinvent.org.

Franklin Associates, a Division of ERG, for the Plastics Division of the American Chemistry Council: *Cradle-to-Gate Life Cycle Inventory of Nine Plastic Resins and Four Polyurethane Precursors* (Prairie Village, KS, 2010).

Industry Contacts

Lynn Preston, Tandus Centiva (January 2015)