# Trespa Composite Panels

## Product Selection and Description

Based in The Netherlands, Trespa International BV is the world's largest manufacturer of solid composite panels. Trespa entered the U.S. market in 1991, and now produces millions of $ft^2$ of sheet material annually. Trespa North America's products offer an alternative to thin laminate and epoxy-resin products. Each of Trespa's four composite panel lines has been designed for a particular use:

1. Athlon, a panel developed for a wide range of interior applications including durable fittings;
2. Meteon, a panel developed for exterior applications such as such as facade cladding, roof edgings, canopies & street furniture;
3. TopLab*PLUS*, a panel that is highly resistant to chemicals and designed for laboratory work surface areas; and
4. Virtuon, an interior panel system that is impact, moisture, and stain resistant, thus suggested for applications in public areas and areas where cleanliness is very important.

In October 2005, the GREENGUARD Environmental Institute awarded GREENGUARD Indoor Air Quality Certification to Trespa's Athlon, Virtuon, and TopLab*PLUS* panels, which were tested for chemical emissions performance under the GREENGUARD Standard for Low Emitting Products.[1] According to GREENGUARD, these panels can be specified with the confidence that they will not impact the indoor air.[2]

For the BEES system, the functional unit for composite panels, regardless of application, is 0.09 $m^2$ (1 $ft^2$) of panel.

## Flow Diagram

The flow diagram below shows the major elements of the production of these products, as they are currently modeled for BEES.

[1] GREENGUARD Environmental Institute, "Trespa phenolic panels earn GREENGUARD Indoor Air Quality certification," (Atlanta, Georgia, October 2005).

[2] Ibid.

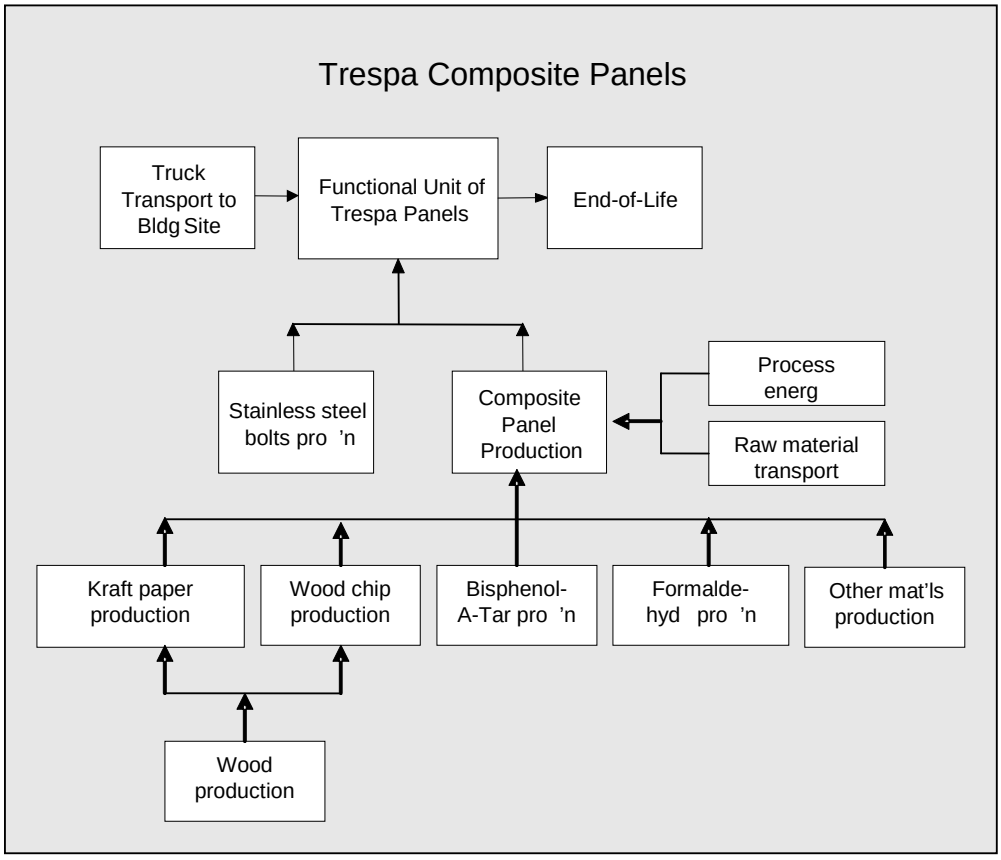


***Figure 1: Trespa Composite Panels System Boundaries***

**Raw Materials**

All Trespa panels are made in the same way – with an interior core material and a layer of decorative facing on both sides. The core and facing materials come from different sources for different applications, so the overall mix of raw material inputs is different for each product as shown in the Table below.

***Table 1: Trespa Composite Panel Constituents by Mass Fraction***

| *Constituent* | *Athlon* | *Meteon* | *TopLabPLUS* | *Virtuon* |
|---|---|---|---|---|
| Kraft paper (recycled) | 52 % | 17 % | 17 % | 44 % |
| Wood chips | 0 % | 38 % | 38 % | 0 % |
| Bisphenol-A-Tar | 18 % | 17 % | 17 % | 15 % |
| Formaldehyde | 28 % | 28 % | 28 % | 24 % |
| Other Materials | 2 % | 0 % | 0 % | 18 % |

The kraft paper used in the panels is recycled, so no raw material inputs for this product constituent are modeled, with the exception of its transport to the manufacturing site. Wood chips come from pine. Pine wood chip production is a coproduct of timber production, whose BEES model includes raising pine seedlings, planting, fertilizer, and harvesting. Energy use and other life cycle data for southern pine tree production and harvesting in the Southeastern United States are based on CORRIM data,[3] which is also found in the U.S. LCI Database.

Bisphenol-A-Tar is used as a binder in the panels. Tar is a co-product of Bisphenol A production, so a portion of the production burdens of Bisphenol A are allocated to the production of the tar. Formaldehyde is also used

[3] Bowyer, J., et. al., Phase I Final Report: Life Cycle Environmental Performance of Renewable Building Materials in the Context of Residential Construction. (Seattle, WA: Consortium for Research on Renewable Industrial Materials--CORRIM, Inc./University of Washington, 2004) Found at http://www.corrim.org/reports.

as a binder in the panels, and is assigned the same upstream production data as that for other BEES products with formaldehyde. BEES data for formaldehyde, Bisphenol A, and the other materials in the Trespa products are derived from the contents of the SimaPro database.

**Manufacturing**

***Energy Requirements and Emissions***. Trespa composite panel manufacturing consists of bonding the core panel and the two decorative panels. The manufacturing process requires natural gas, diesel oil, and electricity as energy inputs. To produce one square meter of panel, Trespa uses 2.6 kWh (9.4 MJ) of electricity, 23.4 kWh (84.4 MJ) of natural gas, and 0.17 kWh (0.6 MJ) of diesel oil. All energy data, including electricity, diesel equipment, and natural gas use in boilers are modeled using the U.S. average electric grid from the U.S. LCI Database.

***Transportation***. Data for the transport of raw materials from the supplier to the manufacturer are provided by Trespa, with diesel truck as the mode of transportation. Diesel trucking is modeled based on the U.S. LCI Database.

**Transportation**

Trespa panels are shipped from the production facility in The Netherlands to a U.S. port – a distance that is modeled as 10 000 km (6 214 mi) by sea. The transportation emissions allocated to each of the four Trespa panel products are based on the overall mass of the product, as given in the Table below. Transportation from the U.S. port of entry to the building site, by diesel truck, is modeled as a variable in BEES.

***Table 2: Trespa Composite Panel Density***

| *Product* | *Mass per Applied Area kg/m$^2$ (lb/ft$^2$)* | *Density kg/m$^3$ (lb/ft$^3$)* |
|---|---|---|
| All products (10 mm or 0.39 in thickness) | 14 (2.9) | 1 400 (87.40) |

Diesel trucking and transportation via ocean freighter are modeled based on the U.S. LCI Database.

**Installation and Use**

Trespa panels are installed using stainless steel bolts. On average, 0.025 kg (0.055 lb) of stainless steel bolts are required to install 1 m$^2$ (11 ft$^2$) of composite panel. Approximately 3 % of the panel is lost as waste during the installation process due to scrap from cutting the panels to fit the installation area.

**End of Life**

Trespa panels are assumed to have a lifetime of 50 years. After year 50, the panels are removed and about 50 % of the waste is reused in other products, while the remaining 50 % is sent to a landfill.

**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.

GREENGUARD Environmental Institute, "Trespa phenolic panels earn GREENGUARD Indoor Air Quality certification," (Atlanta, Georgia, October 2005).

Bowyer, J., et. al., Phase I Final Report: Life Cycle Environmental Performance of Renewable Building Materials in the Context of Residential Construction. (Seattle, WA: Consortium for Research on Renewable Industrial Materials--CORRIM, Inc./University of Washington, 2004) Found at http://www.corrim.org/reports.