



B-Free big cube

B-Free range welcomes varied work postures -reading, reclining, or leaning in to a conversation. From focused individual work to a casual meeting, B-Free provides thoughtful, comfortable support.

B-Free big cube

Different shapes and size to follow the movements of the user whether he is connecting, collaborating or concentrating and to offer qualitative support in a wide variety of postures.

The model chosen for analysis is the most representative one (reference N3L C00 040) from the B-Free range. Standard features on this model include:

- Gaja fabric (fabrics on the picture is not related to the analysis)
- L-shape armrest
- adjustable glides

This EPD – Environmental Product Declaration – is valid for the above reference.
Date of critical review: 06/2014

EPD Overview

Final Assembly Location

Final assembly of B-Free big cube is in Sarrebourg, France, by Steelcase, for the EMEA (Europe, Middle East and Africa) market.

Goal and Scope >

The potential environmental impacts of B-Free big cube (incl. packaging) throughout its entire life cycle – including raw materials extraction, production, transport, use, and end of life – were assessed using Life Cycle Assessment (LCA – ISO 14040 / 14044) in June 2014.

Life Cycle Inventory >

- list of materials
- inventory of resources
- inventory of emissions

Life Cycle Impact Assessment >

- environmental impacts

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Goal and Scope

The measurements found during the life cycle assessment help to guide best practice decisions and are the starting point for continuous improvement.

Both method and product may be subject to modifications, and the figures are subject to change without notice.

At Steelcase, our goal is to continuously improve the environmental performance of our products, and to consider each phase of the life cycle. Our findings in one product life cycle assessment may also lead to better decisions or best practices for other product lines.

The potential environmental impacts of B-Free big cube (incl. packaging) throughout its entire life cycle – including raw materials extraction, production, transport, use, and end of life – were assessed using Life Cycle Assessment (LCA – ISO 14040 / 14044) in June 2014.

Materials

This phase includes materials extraction and processing into useable materials. Benefits of recycled materials are considered here.

Production

This phase consists of all manufacturing and assembly taking place at Steelcase or their suppliers and sub-suppliers.

Transport

Upstream and downstream transports are considered, from materials extraction until handling for end-of life.

Use

The use phase is when the finished product is in its intended function – no significant environmental impacts occur.

End of life

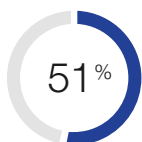
End-of-life product recyclability and local waste management infrastructure are considered. Benefits from recycling are not considered in this phase to avoid double counting.

The functional unit – i.e. the quantified performance of the product for use as a reference unit – used in the Life Cycle Assessment was chosen as “Provision of comfortable seating – with the features stated in the product description – over varying periods of time, 5 days a week over 15 years.”

Environmental declarations may not be effectively comparable if evaluated against other products, or if the LCA methods were completed by different practitioners using different models.

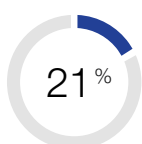
Life Cycle Inventory

B-free big cube materials composition is listed below*.



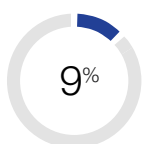
WOOD BASED MATERIALS

	kg	%
OSB	13.5	38.8
Solid wood	3.0	8.7
Hardboard (pressure-molded wood fibers)	1.2	3.5



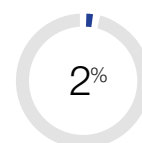
OTHER MATERIALS

	kg	%
Polyurethane foam	5.3	15.3
Wool fabric	1.5	4.2
Recycled polyurethane foam	0.4	1.3
Powder coating	<0.1	<0.1



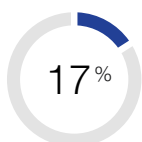
PLASTICS

	kg	%
Polypropylene (PP)	1.5	4.3
Expanded polypropylene (EPP)	1.4	4
Polyethylene terephthalate (PET)	0.2	0.7
Glass-filled nylon (PA-GF)	<0.1	0.2
Polyethylene/polyurethane (PE/PU)	<0.1	0.1
Nylon (PA)	<0.1	<0.1



METALS

	kg	%
Steel	0.9	2.4



PACKAGING

	kg	%
Cardboard	5.4	15.4
Low density polyethylene (LDPE)	0.3	0.8
Expanded polyethylene (EPE)	0.1	0.3

TOTAL WEIGHT – incl. packaging 34.8

*The list of materials does not contain all materials used in the product (adhesives, coatings, residuals, etc.).

RESOURCES

This table inventories the most important energy and water consumption throughout the entire life cycle of B-Free big cube.

RENEWABLE ENERGY

	MJ
Biomass	490
Hydropower	38
Geothermal	4

NON-RENEWABLE ENERGY

	MJ
Oil	800
Gas	660
Coal	350

WATER

	m ³
Water withdrawal	5.3

EMISSIONS

This table inventories the most important emissions to air, soil and water throughout the entire life cycle of B-Free big cube.

EMISSIONS TO AIR

	kg
CO ₂ – Carbon dioxide (fossil)	97
CO ₂ – Carbon dioxide (biogenic)	26
CH ₄ – Methane (biogenic)	0.71
CH ₄ – Methane (fossil)	0.38
NO _x – Nitrogen oxides	0.29
NH ₃ – Ammonia	0.25

EMISSIONS TO SOIL

	kg
K – Potassium	0.170
P – Phosphorus	0.066
Oils	0.025

EMISSIONS TO WATER

	kg
Cl ⁻ – Chloride	4.1
Na ⁺ – Sodium, ion	2.1
COD, Chemical oxygen demand	2.1

Life Cycle Impact Assessment

Based on the Life Cycle Inventory, the environmental impacts of B-Free big cube are assessed with the following impact categories:

Impact categories (selected by Steelcase)

- **Global warming** [kg CO₂-eq.]
Is due to emissions of greenhouse gases, causing the rise of the global temperature.
- **Respiratory inorganics** [kg PM2.5*-eq.]
Are due to small particles or dust that causes respiratory problems for humans with asthma or respiratory diseases.
*Particulate matter smaller than 2.5 micrometres in diameter.
- **Carcinogens** [kg C₂H₃Cl-eq.]
Describe substances or agents which may contribute to cancer.
- **Terrestrial ecotoxicity** [kg TEG* soil]
Measures the ecotoxicological factor for terrestrial ecosystems.
*Triethylene glycol
- **Non-renewable energy** [MJ primary]
Describes finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to extract.

Distribution of the environmental impacts for the respective life cycle stages:

The figures in this table are rounded up because the potential uncertainties don't justify the use of more than two significant digits.

Impact category	Unit	Total	Materials	Production	Transport	Use	End of life
Global warming	[kg CO ₂ -eq.]	110	58	14	28	No significant environmental impacts occur.	6.6
Respiratory inorganics	[kg PM2.5-eq.]	0.11	0.063	0.023	0.017		0.0084
Carcinogens	[kg C ₂ H ₃ Cl-eq.]	3.9	3.4	0.091	0.26		0.11
Terrestrial ecotoxicity	[kg TEG soil]	2300	740	330	790		460
Non-renewable energy	[MJ primary]	2100	1300	270	280		210

Product Environmental Information (PEP)

For more information

Our Product Environmental Profile (PEP) – an environmental declaration according to the objective of ISO 14021 – can be found on [Steelcase.com](https://www.steelcase.com)

The PEP provides precise, accurate, verifiable and relevant information on the sustainability aspects of B-Free big cube, including:

- Life cycle performance
- Materials
- Recycled materials and recyclability
- Certificates
- LEED contribution

Verification Process and References

The LCA study of B-Free big cube (reference: N3L T00 460) was carried out by Steelcase, according to ISO 14040 / 14044 and based on previous collaboration with the Technical University of Denmark (DTU) and Quantis. It was then critically reviewed by Michael Hauschild from the Department of Management Engineering of the DTU.

The independent verification of this EPD was carried out by the Department of Management Engineering of the DTU in accordance with ISO 14025.

Disclaimer: In the absence of a relevant Product Category Rule (PCR), Steelcase developed a set of specific rules, requirements and guidelines to perform life cycle assessments and Type III environmental declarations, according to the objectives of ISO 14025.

References

Related ISO standards:

- ISO 14025 Environmental labels and declarations – Type III environmental declarations
- ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines

LCIA method and LCI database:

- ILCD HANDBOOK, European Commission, Joint Research Centre, Institute for Environment and Sustainability. ILCD Handbook: General Guide for Life Cycle Assessment – Detailed Guidance. European Union, March 2010, 394p.
- IMPACT 2002+ V2.10 method: JOLLIET, O., MARGNI, M., CHARLES, R., HUMBERT, S., PAYET, J., REBITZER, G. et ROSENBAUM, R. (2003). IMPACT 2002+: A New Life Cycle Impact Assessment Methodology. International Journal of Life Cycle Assessment 8(6) p.324-330.
- Eco-Invent v2.2 LCI database: Swiss Centre for Life Cycle Inventories, Duebendorf, CH - www.ecoinvent.ch

End-of-life scenario:

- Mainly based on Eurostat data for the European market
http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/wastemanagement/waste_treatment

Contact

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