Declaration Owner

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Product

ID Cloud Office Seating

Functional Unit

The functional unit is one table/chair, serving the function of a typical office chair for a 15-year period. The reference unit used in the study is one complete chair.

EPD Number and Period of Validity

SCS-EPD-09367
EPD Valid August 31, 2023 through August 30, 2028

Product Category Rule

Product Category Rule for Seats. Product Category Classification: UN CPC 3811. International EPD® System. 2009:02. Version 3.0.2. April 2022.

Program Operator

SCS Global Services
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Declaration Owner:	Vitra AG
Address:	Klünenfeldstrasse 22, Birsfelden, BL CH-4127, Switzerland
Declaration Number:	SCS-EPD-09367
Declaration Validity Period:	EPD Valid August 31, 2023 through August 30, 2028
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
Product:	ID Cloud Office Seating
LCA Practitioner:	Gerard Mansell, PhD., SCS Global Services
LCA Software:	OpenLCA v1.11 & ecoinvent v3.9
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☒ internal ☐ external
LCA Reviewer:	Tess Garvey, SCS Global Services
Product Category Rule:	Product Category Rule for Seats. Product Category Classification: UN CPC 3811. International EPD® System. 2009:02. Version 3.0.2. April 2022.
PCR Review conducted by:	Thomas Gloria Ph.D., Industrial Ecology Consultants
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040 and 14044.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

ABOUT VITRA

Vitra is a Swiss family-owned company. It not only makes furniture and creates retail environments, but also has its own Campus with buildings by leading international architects. Creating innovative products and concepts with great designers is Vitra's essence. They are developed in Switzerland and installed worldwide by architects, companies and private users to build inspirational spaces for living, working and shopping as well as public areas. With its classics, Vitra represents groundbreaking 20th century design. Today, in combining technical and conceptual expertise with the creativity of contemporary designers, Vitra seeks to continue pushing the boundaries of the design discipline. A family business for eighty years, Vitra believes in lasting relationships with customers, employees and designers, durable products, sustainable growth and the power of good design. The Vitra Campus with buildings by some of the world's leading architects and the Vitra Design Museum with its exhibitions on design and architecture, design archives and a comprehensive furniture collection are all part of Vitra. They inspire visitors, inform the design process and create an atmosphere in which innovation flourishes.

PRODUCT DESCRIPTION

The innovative backrest construction of the office chair ID Cloud by Antonio Citterio provides a new sitting experience: the combination of an ergonomic shell and a breathable membrane adapts to the shape of the back and flexibly follows its movements. This offers users of any height or weight considerable freedom of movement.

Final assembly of Vitra seating products occurs in an ISO 9001 and ISO 14001 certified facility in Weil am Rhein, Germany.

PRODUCT SPECIFICATIONS

Table 1. *Product weights for the Vitra ID Cloud chair.*

Product name	Product mass (kg)
ID Cloud	19.00

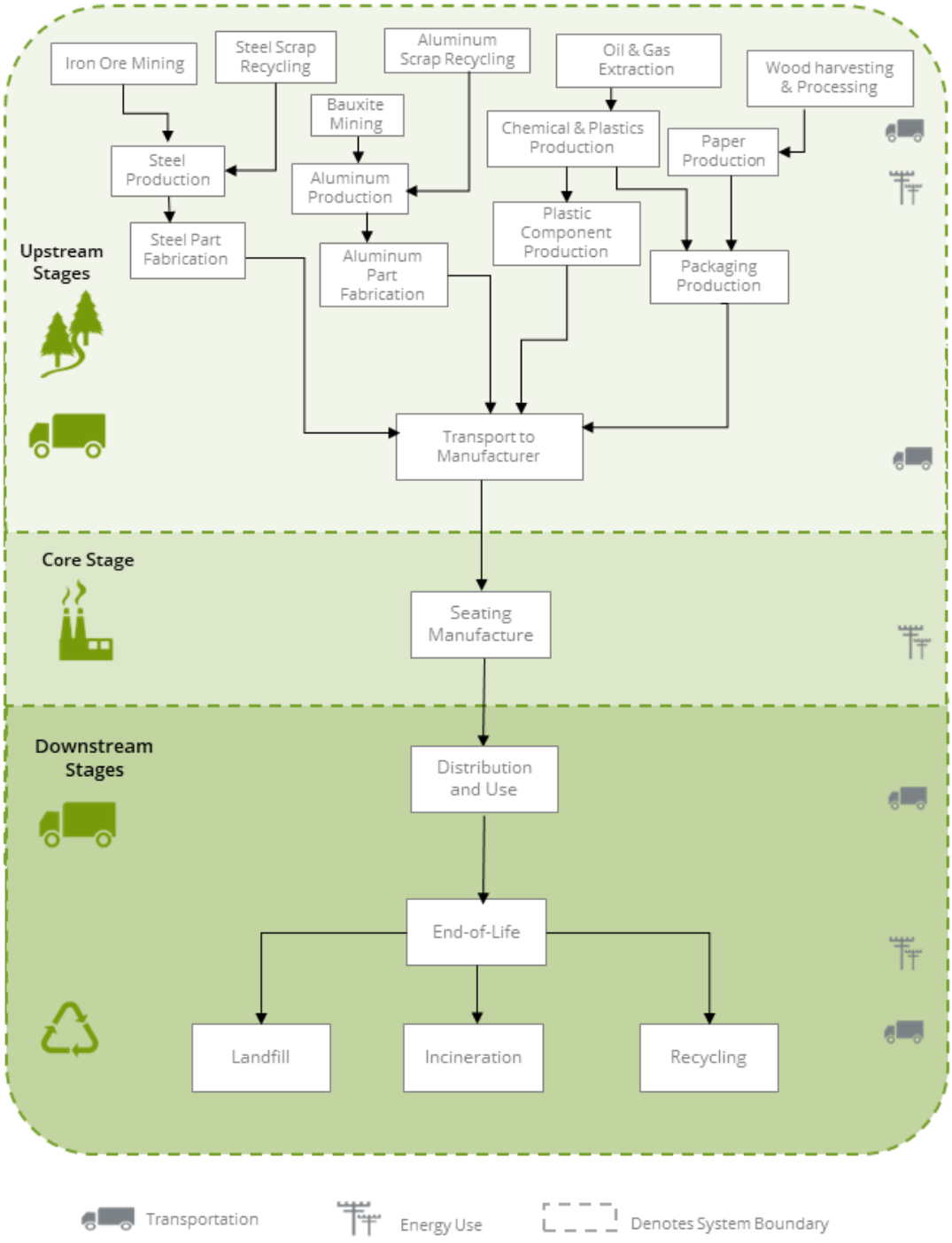
MATERIAL COMPOSITION

Table 2. *Material composition of the Vitra **ID Cloud** chair and packaging. Results are shown on a mass basis (kg/unit) and as a percent of total.*

Material	Mass (kg)	Percent mass
Product		
Steel	3.03	16%
Aluminum	7.45	39%
Plastics	7.80	41%
Fabric	0.716	3.8%
Total Product	**19.0**	**100%**
Packaging		
Plastic film	0.210	100%
Total Packaging	**0.210**	**100%**

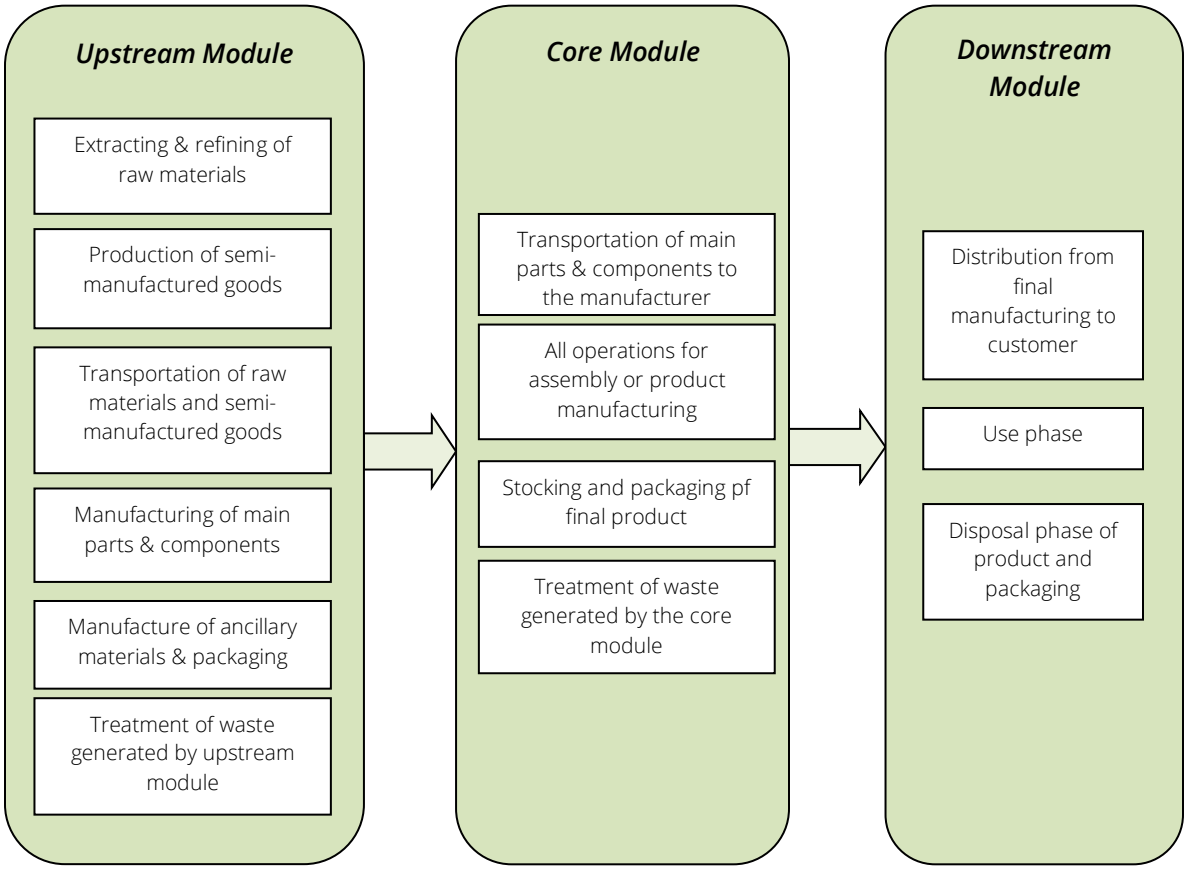
PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagram below is a representation of the most significant contributions to the life cycle of Vitra ID Cloud seating products.



LIFE CYCLE ASSESSMENT STAGES

The system boundary is cradle-to-grave and includes resource extraction and processing, product manufacture and assembly, distribution/transport, use and maintenance, and end-of-life. The diagram below illustrates the life cycle stages included in this EPD.



LIFE CYCLE IMPACT ASSESSMENT

. The impact indicators specified under this EPD include:

- Potential for Global Warming,
- Acidification Potential,
- Eutrophication Potential,
- Ozone Depletion Potential,
- Photochemical Ozone (smog) Creation Potential,
- Ecotoxicity,
- Human Toxicity, and
- Land Use/Land Occupation.

Impact category indicators for acidification, eutrophication, ozone depletion potential and photochemical ozone creation are estimated using the characterization factors [1], as prescribed by the PCR, including from the CML-IA , ReCiPe and USEtox methodologies as well as those defined by EN 15804.

The PCR requires that several parameters be reported in the EPD, including resource use, waste categories and output flows, and other environmental information. The results for these parameters per declared unit are also included below.

Table 3. *Core Life Cycle Impact Assessment Results by life cycle phase for the Vitra **ID Cloud** chair. Results are shown for one chair maintained for 15 years.*

Impact Category	Unit	Upstream Processes	Core Processes	Downstream Processes	Total
Core Indicators					
Climate change	kg CO_2 eq	134	2.04	9.49	146
	%	92%	1.4%	6.5%	100%
Climate change - Biogenic	kg CO_2 eq	1.38	0.362	0.339	2.08
	%	66%	17%	16%	100%
Climate change - Fossil	kg CO_2 eq	133	1.65	9.15	143
	%	92%	1.1%	6.4%	100%
Climate change - Land use and LU change	kg CO_2 eq	0.128	$2.83x10^{-2}$	$1.66x10^{-3}$	0.158
	%	81%	18%	1%	100%
Acidification	mol H+ eq	0.642	$4.71x10^{-3}$	$2.78x10^{-2}$	0.674
	%	95%	0.7%	4.1%	100%
Eutrophication, freshwater	kg P eq	$3.04x10^{-2}$	$6.35x10^{-4}$	$2.75x10^{-4}$	$3.13x10^{-2}$
	%	97%	2%	0.88%	100%
Eutrophication, marine	kg N eq	0.128	$1.63x10^{-3}$	$1.80x10^{-2}$	0.147
	%	87%	1.1%	12%	100%
Eutrophication, terrestrial	mol N eq	1.28	$9.47x10^{-3}$	0.118	1.41
	%	91%	0.67%	8.4%	100%
Ozone depletion	kg CFC11 eq	$1.65x10^{-5}$	$1.99x10^{-8}$	$9.62x10^{-8}$	$1.66x10^{-5}$
	%	99%	0.12%	0.58%	100%
Photochemical ozone formation	kg NMVOC eq	0.434	$4.56x10^{-3}$	$4.00x10^{-2}$	0.479
	%	91%	0.95%	8.3%	100%
Particulate matter	disease inc.	$6.65x10^{-6}$	$3.71x10^{-8}$	$3.08x10^{-7}$	$7.00x10^{-6}$
	%	95%	0.53%	4.4%	100%

Table 4. *Life Cycle Impact Assessment Results by life cycle phase for the Vitra **ID Cloud** chair. Results are shown for one chair maintained for 15 years.*

Impact Category	Unit	Upstream Processes	Core Processes	Downstream Processes	Total
Other Indicators					
Freshwater ecotoxicity	PAF.m^3.day	$1.47x10^{6}$	34,000	$2.36x10^{6}$	$3.87x10^{6}$
	%	38%	0.88%	61%	100%
Human toxicity, cancer	cases	$3.88x10^{-5}$	$1.02x10^{-7}$	$3.71x10^{-7}$	$3.93x10^{-5}$
	%	99%	0.26%	0.94%	100%
Human toxicity, non-cancer	cases	$2.09x10^{-5}$	$3.29x10^{-7}$	$2.69x10^{-6}$	$2.39x10^{-5}$
	%	87%	1.4%	11%	100%
Land use	species.yr	$1.93x10^{-8}$	$2.41x10^{-10}$	$1.05x10^{-9}$	$2.06x10^{-8}$
	%	94%	1.2%	5.1%	100%
Abiotic Depletion Potential, fossils	MJ	1,650	31.6	81.4	1,760
	%	94%	1.8%	4.6%	100%
Abiotic Depletion Potential, minerals and metals	kg Sb eq	$8.70x10^{-4}$	$3.45x10^{-6}$	$9.11x10^{-6}$	$8.83x10^{-4}$
	%	99%	0.39%	1%	100%
Water Deprivation Potential (WDP)	m^3 depriv.	24.6	0.308	0.424	25.3
	%	97%	1.2%	1.7%	100%

Table 5. *Resource use and waste flows by life cycle phase for the Vitra **ID Cloud** chair. Results are shown for one chair maintained for 15 years.*

Impact Category	Unit	Upstream Processes	Core Processes	Downstream Processes	Total
Resources					
Use of renewable primary energy	MJ	16.0	0.00	0.00	16.0
	%	100%	0%	0%	100%
Use of renewable primary energy resources used as raw materials	MJ	0.00	0.00	0.00	0.00
	%	0%	0%	0%	0%
Total Renewable primary energy	MJ	16.0	0.00	0.00	16.0
	%	100%	0%	0%	100%
Use of non renewable primary energy	MJ	INA	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA
Total Nonrenewable primary energy	MJ	1,650	31.6	81.4	1,760
	%	94%	1.8%	4.6%	100%
Use of secondary materials	MJ	8.59	0.00	0.00	8.59
	%	100%	0%	0%	100%
Use of Renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
Use of Nonrenewable secondary fuels	MJ	0.00	0.00	0.00	0.00
Use of net fresh water	m^3	5.21	$7.77x10^{-2}$	$4.84x10^{-2}$	5.33
	%	98%	1.5%	0.91%	100%
Wastes					
Hazardous waste	kg	$5.81x10^{-3}$	$5.63x10^{-5}$	$5.38x10^{-4}$	$6.40x10^{-3}$
	%	91%	0.88%	8.4%	100%
Non-hazardous waste	kg	12.9	0.476	8.90	22.3
	%	58%	2.1%	40%	100%
Radioactive waste	kg	$1.07x10^{-3}$	$3.35x10^{-5}$	$1.08x10^{-5}$	$1.11x10^{-3}$
	%	96%	3%	0.97%	100%
Components for re-use	kg	0.00	0.00	0.00	0.00
	%	0%	0%	0%	0%
Materials for recycling	kg	0.00	0.00	9.58	9.58
	%	0%	0%	100%	100%
Materials for energy recovery	kg	0.00	0.00	0.00	0.00
Exported energy, electrical	MJ	0.00	0.00	0.00	0.00
Exported energy, thermal	MJ	0.00	0.00	0.00	0.00

INA = Indicator Not Assessed

ADDITIONAL ENVIRONMENTAL INFORMATION

Vitra seating products are GREENGUARD GOLD Indoor Air Quality Certified

SUPPORTING TECHNICAL INFORMATION

Unit processes were developed with OpenLCA v1.11 software, drawing upon data from multiple sources. Primary data were provided by Vitra for their manufacturing processes. The primary sources of secondary LCI data are from the Ecoinvent Database.

Table 6. *Data sources used for the LCA study.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Steel			
Steel - BOF	steel production, converter, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	EI v3.9	2022
Steel - EAF	steel production, electric, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	EI v3.9	2022
Steel fabrication	metal working, average for steel product manufacturing | metal working, average for steel product manufacturing | Cutoff, S/RoW	EI v3.9	2022
Plastics			
PUR, ABS, POM, Polycarbonate, PE, PP, PS, Nylon, PET	nylon 6 production | nylon 6 | Cutoff, S/RoW; glass fibre production | glass fibre | Cutoff, S/RoW	EI v3.9	2022
	nylon 6-6 production | nylon 6-6 | Cutoff, S/RoW	EI v3.9	2022
	acrylonitrile-butadiene-styrene copolymer production | acrylonitrile-butadiene-styrene copolymer | Cutoff, S/RoW	EI v3.9	2022
	polyethylene production, low density, granulate | polyethylene, low density, granulate | Cutoff, S/RoW	EI v3.9	2022
	polystyrene production, general purpose | polystyrene, general purpose | Cutoff, S/RoW	EI v3.9	2022
	market for polyurethane, flexible foam | polyurethane, flexible foam | Cutoff, S/RoW	EI v3.9	2022
	Polyoxymethylene (POM) PlasticsEurope/EU-27	EI v3.9	2022
	polypropylene production, granulate | polypropylene, granulate | Cutoff, S/RoW	EI v3.9	2022
	polycarbonate production | polycarbonate | Cutoff, S/RoW	EI v3.9	2022
	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW	EI v3.9	2022
	polypropylene production, granulate | polypropylene, granulate | Cutoff, S/RoW	EI v3.9	2022
	injection moulding | injection moulding | Cutoff, S/RoW	EI v3.9	2022
Aluminum			
Recycled Aluminum	aluminium, recycled, 95% post-consumer | aluminium, recycled | Cutoff, S/GLO	EI v3.9	2022
Aluminum fabrication	metal working, average for aluminium product manufacturing | metal working, average for aluminium product manufacturing | Cutoff, S/RoW	EI v3.9	2022
Other			
	Nylon fabric; nylon 6 production | nylon 6 | Cutoff, S/RoW; market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/DE	EI v3.9	2022
	PET fabric; polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW; market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/DE	EI v3.9	2022
PACKAGING			
Plastics	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.9	2022
TRANSPORT			
Road transport	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.9	2022
Ship transport	transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, S/GLO	EI v3.9	2022
Air transport	transport, freight, aircraft, all distances to generic market for transport, freight, aircraft, unspecified | transport, freight, aircraft, unspecified | Cutoff, S/GLO	EI v3.9	2022
RESOURCES			
Grid electricity	market for electricity, medium voltage, hydro only | electricity, medium voltage | Cutoff, U - LCI/DE	EI v3.9	2022
Heat – natural gas	heat production, natural gas, at industrial furnace >100kW | heat, district or industrial, natural gas | Cutoff, S/RoW	EI v3.9	2022

Data Quality

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (typically 2016). All of the secondary data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2022.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data for hydroelectricity. Surrogate data used in the assessment are representative of European or global operations. Data representative of global operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative datasets are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Secondary data for operations are typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded. In total, these missing data represent less than 5% of the mass or energy flows.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.9 data where available. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at Vitra's Weil am Rhein, Germany facilities represent an annual average and are considered of medium to high quality due to the length of time over which these data are collected for the existing production processes. For secondary LCI datasets, Ecoinvent v3.9 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations was not available and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

Allocation

Resource use at the Weil am Rhein, Germany facility (e.g., water and energy) was allocated to the product based on the product mass as a fraction of the total facility production volume.

The seating products include recycled materials, which are allocated using the recycled content allocation method (also known as the 100-0 cut off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end of life, materials which are recycled leave the system boundaries with no additional burden.

Impacts from transportation were allocated based on the mass of material and distance transported.

System Boundaries

The system boundaries of the life cycle assessment was cradle-to-grave. A description of the system boundaries for this EPD are as follows:

- **Raw Material Extraction and Processing stage –** This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. This includes the extraction of all raw materials, including the transport to the manufacturing site. Resource use and emissions associated with both the extraction of the raw materials used in the products, as well as those associated with the processing of raw materials and product component manufacturing are included. Impacts associated with the transport of the processed raw materials to manufacturing facilities (upstream transport) are also included in this stage.
- **Core - Production stage –** This stage includes all the relevant manufacturing processes and flows, excluding production of capital goods, infrastructure, production of manufacturing equipment, and personnel-related activities. This stage includes the impacts from energy use and emissions associated with the processes occurring at the Vitra facility, as well as the production of the product consumer packaging materials.
- **Downstream –**
    - **Distribution, Storage and Use stage –** This stage includes the delivery of the products to the point of use (downstream transportation), storage of the product and maintenance of the product for a period of 15 years.
    - **Disposal stage –** The end-of-life stage includes transport of the product to material reclamation or waste treatment facilities. Emissions from disposal of product components in a landfill or from incineration are included. Packaging disposal is also included in this phase.

Cut-off criteria

According to the PCR, cumulative omitted mass or energy flows within the product boundary shall not exceed 5%. In the present study, except as noted, all known materials and processes were included in the life cycle inventory

REFERENCES

1. https://www.environdec.com/resources/indicators
2. SCS Global Services. Life Cycle Assessment of Life Cycle Assessment of Vitra Office Seating and Tables. April 2023. Draft Report. Prepared for Vitra.
3. Product Category Rule for Seats. Product Category Classification: UN CPC 3811. International EPD® System. 2009:02. Version 3.0.2. April 2022.
4. EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and ISO procedures
6. 14040: 2006 Environmental Management – Life cycle assessment – Principles and framework
7. ISO 14044: 2006/AMD 1:2017/ AMD 2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines.
8. CML 4.1 baseline, from Institute of Environmental Sciences Faculty of Science University of Leiden, Netherlands.
9. Rosenbaum (2008). Rosenbaum, R.K., Bachmann, T.M., Gold, L.S. et al. USEtox - the UNEP-SETAC toxicity model: recommended characterisation factors for human toxicity and freshwater ecotoxicity in life cycle impact assessment. Int J Life Cycle Assess (2008) 13: 532. doi:10.1007/s11367-008-0038-4. USEtox version 2.02.
10. ReCiPe Mid/Endpoint method, version 1.13 November 2016. https://sites.google.com/site/lciarecipe/characterisation-and-normalisation-factors
11. Ecoinvent Centre (2022) Ecoinvent data from v3.9. Swiss Center for Life Cycle Inventories, Dubendorf, 2022, http://www.ecoinvent.org
12. SCS Type III Environmental Declaration Program: Program Operator Manual. V11.0 November 2021. SCS Global Services
13. European Commission. EU Construction & Demolition Waste Management Protocol. 2016. Available online: http://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en
14. Eurostat, Recovery and recycling rates for packaging. 2015. http://ec.europa.eu/eurostat/web/environment/waste/main-tables

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