

The Vitra logo is the word "vitra." in a bold, lowercase, sans-serif font.**Declaration Owner**

Vitra AG

Klünenfeldstrasse 22, Birsfelden, BL CH-4127, Switzerland

info@vitra.com | +41.61.377.0000 | www.vitra.com

Product

Aluminum Chair EA107 Office Seating

Functional Unit

One unit of seating to seat one individual, maintained for a 15 year period

EPD Number and Period of Validity

SCS-EPD-05036

EPD Valid July 3, 2018 through July 2, 2023

Product Category Rule

Product Category Rule for Seats. Product Group Classification: UN CPC Code 3811. International EPD® System. 2009:02. Version 2.0. November 2015.

Program Operator

SCS Global Services

2000 Powell Street, Ste. 600, Emeryville, CA 94608


+1.510.452.8000 | www.SCSglobalServices.com



Table of Contents

Product Scope.....	cover
About Vitra	2
Product Description.....	2
Material Composition.....	2
Product Life Cycle Flow Diagram	3
Life Cycle Assessment Stages.....	4
Life Cycle Impact Assessment	4
Supporting Technical Information.....	6
Additional Environmental Information	8
References	9

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.

Disclaimers: This EPD conforms to ISO 14025, 14040, and ISO 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.	
PCR review, was conducted by	The Technical Committee of the International EPD® System. Chair: Massimo Marino Contact via info@environdec.com.
Approved Date: July 3, 2018 – End Date: July 2, 2023	
Independent verification of the declaration and data, according to ISO 14025:2006	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier	 <hr/> Tom Gloria, Ph.D., Industrial Ecology Consultants

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 Aluminium Chairs EA 105-108 are the quintessential solution for meeting venues. They are found in countless finely furnished offices, conference spaces and meeting rooms around the globe. Thanks to their generous proportions and resilient sling seat – a panel of leather, fabric or mesh stretched between two aluminium ribs – the chairs are exceedingly comfortable. And with such a wide selection of upholstery colours, it is easy to find the perfect chair for every interior.

Final assembly of Vitra Aluminum Chair EA107 occurs in an ISO 9001 and ISO 14001 certified facility.

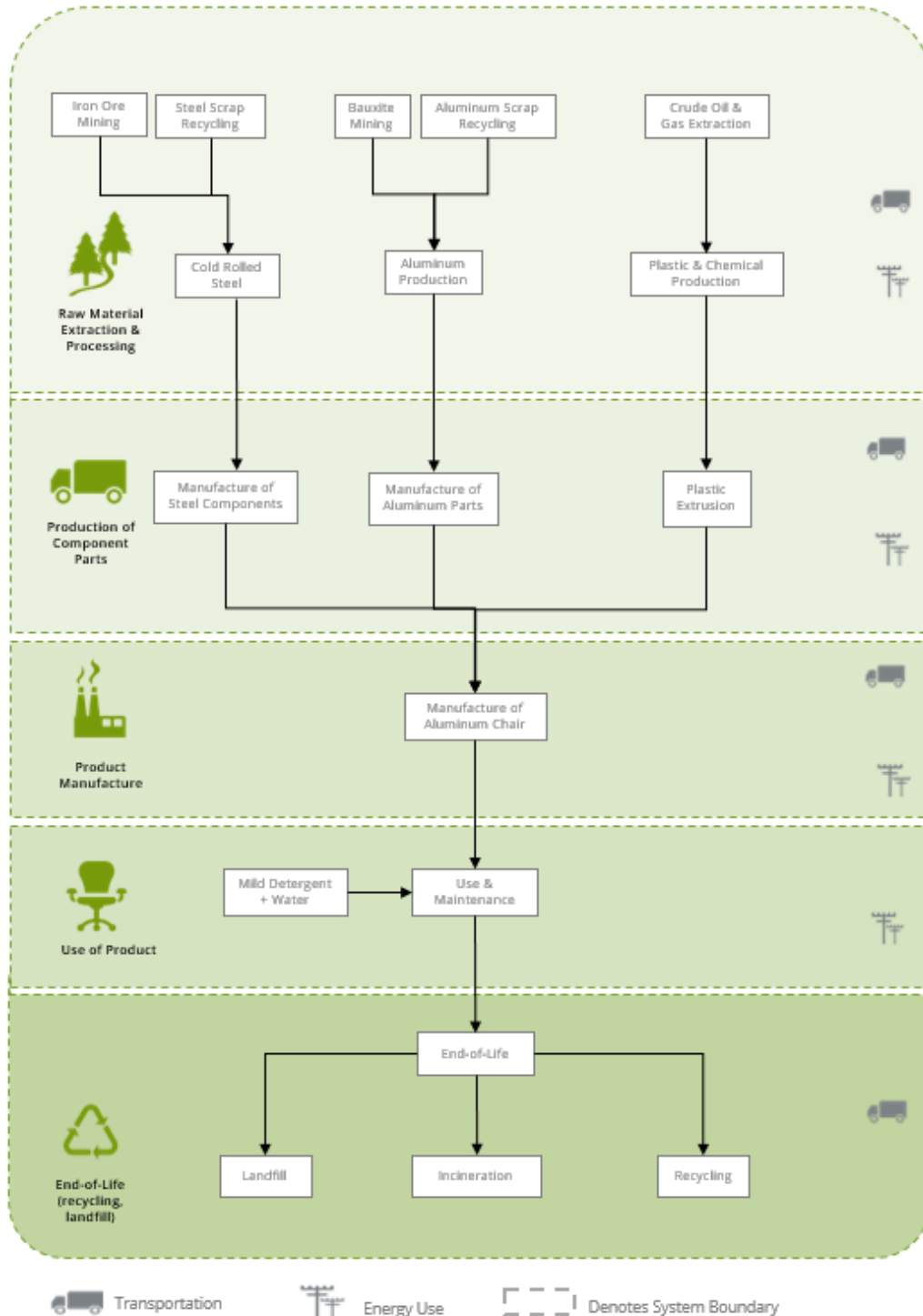
MATERIAL COMPOSITION

Table 1. Material composition of Aluminum Chair EA107 seating product. Results are shown per unit of seating and as a % of total.

Material	Amount (kg/unit of seating)	Amount (%)
PRODUCT		
Aluminum	8.6	72%
Nylon	1.2	10%
Plastic	0.76	6.3%
Steel	1.4	12%
Textile	1.0x10 ⁻³	0.01%
Product Total	12	100%
PACKAGING		
Steel	5.0x10 ⁻³	3.1%
Packaging film	0.16	97%
Packaging Total	0.16	100%

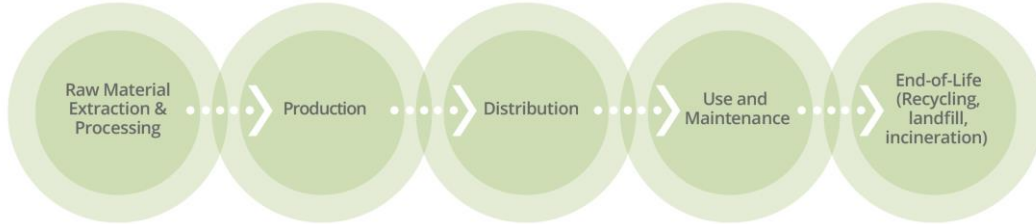
PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagram below is a representation of the most significant contributions to the life cycle of Aluminum Chair EA107 office seating. This includes resource extraction, raw material processing, component manufacturing, transportation, assembly of chair, use and maintenance, and end-of-life.



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

Impact category indicators are calculated using the CML-IA characterization methods. CML-IA impact category indicators include global warming potential (100 years), acidification potential, eutrophication potential, Photochemical Ozone Creation potential, ozone depletion potential, fossil fuel abiotic resource depletion, human toxicity, and ecotoxicity, in accordance with the PCR. In addition, an estimate of the impacts from land use is reported (based on ReCiPe methodology).

Table 2. Life cycle impact assessment results for the Vitra Eames Aluminum Chair. Results are shown for one unit of seating maintained over a 15 year period.

Impact category	Unit	Total	Raw Material Extraction & Processing (Upstream Module)	Production (Core Module)	Distribution, Use & End-of-Life (Downstream Module)
LCIA Results - CML					
Global warming (GWP100a)	kg CO ₂ eq	80	74	3.3	3.2
	%	100%	92%	4.1%	3.9%
Acidification potential	kg SO ₂ eq	0.40	0.38	7.2x10 ⁻³	6.8x10 ⁻³
	%	100%	96%	1.8%	1.7%
Eutrophication potential	kg PO ₄ ³⁻ eq	0.11	0.11	2.7x10 ⁻³	5.2x10 ⁻³
	%	100%	93%	2.3%	4.6%
Photochemical oxidation	kg C ₂ H ₄ eq	2.3x10 ⁻²	2.2x10 ⁻²	5.3x10 ⁻⁴	4.8x10 ⁻⁴
	%	100%	96%	2.3%	2.0%
Ozone layer depletion (ODP)	kg CFC-11 eq	3.2x10 ⁻⁵	3.1x10 ⁻⁵	3.0x10 ⁻⁷	2.2x10 ⁻⁷
	%	100%	98%	0.96%	0.69%
Abiotic depletion potential (elements)	kg Sb eq	3.4x10 ⁻⁴	3.3x10 ⁻⁴	9.4x10 ⁻⁷	2.9x10 ⁻⁶
	%	100%	99%	0.28%	0.85%
Abiotic depletion (fossil fuels)	MJ	830	770	37	14
	%	100%	94%	4.5%	1.7%
LCIA Results - Other					
Ecotoxicity	CTUe	1,900	1,500	28	440
	%	100%	76%	1.5%	23%
Human toxicity, cancer	CTUh	3.6x10 ⁻⁹	3.1x10 ⁻⁹	2.0x10 ⁻¹¹	5.4x10 ⁻¹⁰
	%	100%	85%	0.55%	15%
Human toxicity, non-cancer	CTUh	1.7x10 ⁻⁹	1.6x10 ⁻⁹	2.2x10 ⁻¹²	7.5x10 ⁻¹¹
	%	100%	95%	0.13%	4.5%
Land occupation	species.yr	7.2x10 ⁻⁸	6.1x10 ⁻⁸	1.7x10 ⁻⁹	8.9x10 ⁻⁹
	%	100%	85%	2.4%	12%

Resource Use

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 presented below

Table 3. Life cycle impact assessment results for the Vitra Eames Aluminum Chair. Results are shown for one unit of seating maintained over a 15 year period.

Impact category	Unit	Total	Raw Material Extraction & Processing (Upstream Module)	Production (Core Module)	Distribution, Use & End-of-Life (Downstream Module)
Resources					
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ eq. %	96 100%	74 77%	18 19%	3.7 3.9%
Use of renewable primary energy resources used as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ eq. %	96 100%	74 77%	18 19%	3.7 3.9%
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ eq.	INA	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ eq.	INA	INA	INA	INA
Total use of nonrenewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ eq. %	890 100%	840 94%	39 4.3%	16 1.8%
Use of secondary materials	kg %	8.8 100%	8.8 100%	- 0.00%	- 0.00%
Use of renewable secondary fuels	MJ eq.	Negligible	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	MJ eq.	Negligible	Negligible	Negligible	Negligible
Net use of fresh water	m ³ %	3.8 96	3.7 74	3.1x10 ⁻² 18	8.4x10 ⁻² 3.7
Wastes					
Hazardous waste disposed	kg %	7.3 84%	0.76 11%	2.8 5.3%	7.3 84%
Radioactive Waste disposed	kg %	2.8x10 ⁻³ 67%	9.5x10 ⁻⁶ 7.0%	2.1x10 ⁻⁵ 26%	2.8x10 ⁻³ 67%
Nonhazardous waste disposed	kg %	1.4x10 ⁻³ 99%	1.7x10 ⁻⁴ 0.34%	8.6x10 ⁻⁵ 0.75%	1.4x10 ⁻³ 99%
Components for re-use	kg	0	0	0	0
Materials for recycling	kg	Negligible	Negligible	Negligible	Negligible
Materials for energy recovery	kg	Negligible	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible	Negligible

INA = Indicator Not Assessed

SUPPORTING TECHNICAL INFORMATION

Unit processes are developed with SimaPro 8.3 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 Ecoinvent Database.

Table 4. Data sources used for the LCA study.

Component	Material Dataset	Processing Dataset	Data Source	Publication Date
Product Materials				
Aluminum (95% Post-recycled)	Aluminium scrap, post-consumer {GLO} market for Alloc Rec; Aluminium, primary, ingot {RoW} market for Alloc Rec;	Metal working, average for aluminium product manufacturing {GLO} market for Alloc Rec	EI v3.3	2016
Felt/Satin	Textile, woven cotton {GLO} market for Alloc Rec	Included in dataset	EI v3.3	2016
Polyamides	Nylon 6 {GLO} market for Alloc Rec; Nylon 6-6 {GLO} market for Alloc Rec; Nylon 6, glass-filled {GLO} market for Alloc Rec; Nylon 6-6, glass-filled {GLO} market for Alloc Rec	Injection moulding {GLO} market for Alloc Rec	EI v3.3	2016
Polypropylene	Polypropylene, granulate {GLO} market for Alloc Rec	Injection moulding {GLO} market for Alloc Rec	EI v3.3	2016
PTFE	Tetrafluoroethylene {GLO} market for Alloc Rec	Injection moulding {GLO} market for Alloc Rec	EI v3.3	2016
PVC	Polyvinylchloride, bulk polymerised {GLO} market for Alloc Rec	Injection moulding {GLO} market for Alloc Rec	EI v3.3	2016
Steel	Steel, low-alloyed {GLO} market for Alloc Rec	Metal working, average for steel product manufacturing {GLO} market for Alloc Rec	EI v3.3	2016
Manufacturing				
Electricity	Electricity, medium voltage {DE} market for Alloc Rec	n/a	EI v3.3; SCS	2016
Natural Gas	Natural gas, high pressure {DE} market for Alloc Rec	n/a	EI v3.3	2016
Combustion	Light fuel oil {Europe without Switzerland} market for Alloc Rec	n/a	EI v3.3	2016
Packaging				
Steel	Steel, low-alloyed {GLO} market for Alloc Rec	Negligible	EI v3.3	2016
Polyethylene	Packaging film, low density polyethylene {RER} production Alloc Rec	Included in dataset	EI v3.3	2016
Transportation				
Road transport	Transport, freight, lorry 16-32 metric ton, EURO4 {GLO} market for Alloc Rec	n/a	EI v3.3	2016
Rail transport	Transport, freight train {Europe without Switzerland} market for Alloc Rec	n/a	EI v3.3	2016
Ship transport	Transport, freight, sea, transoceanic ship {GLO} market for Alloc Rec	n/a	EI v3.3	2016

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 annualized production for 2017 and engineering estimates.
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 seating 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.
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 v3.3 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 contained in the regional ecoinvent datasets.
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 facility 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 v3.3 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the seating 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 product includes 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 boundary of the life cycle assessment for Vitra Eames Aluminum Chair was cradle-to-grave. A description of the system boundaries for this study is as follows:

- **Upstream - Raw Material Extraction and Processing** – 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 and packaging, 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 the manufacturing facility (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 Weil am Rhein, Germany facility.
- **Downstream**
 - *Distribution, Storage and Use stage* – This stage includes the delivery of the products to the point of use (downstream transportation), storage and maintenance of the seating 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 1%. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

ADDITIONAL ENVIRONMENTAL INFORMATION



Vitra Aluminum Chair EA107 is GREENGUARD
Indoor Air Quality Certified

REFERENCES

1. Ecoinvent Centre (2016) Ecoinvent data from v3.3. Swiss Center for Life Cycle Inventories, Dübendorf, 2016, <http://www.ecoinvent.org>
2. CML-IA Characterization Factors. Institute of Environmental Sciences. Leiden University. Netherlands.
3. EN 1728:2012. Furniture. Seating. Test methods for the determination of strength and durability. CEN European Committee for Standardization.
4. EN 16139:2013 Furniture. Strength, durability and safety. Requirements for non-domestic seating. CEN European Committee for Standardization.
5. ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures
6. ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and framework
7. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines
8. Product Category Rule for Seats. Product Group Classification: UN CPC Code 3811. International EPD® System. 2009:02. Version 2.0. November 2015.
9. SCS Global Services. Life Cycle Assessment of the Vitra Eames Aluminum Chair. July 2018. Final Report. Prepared for Vitra.
10. SCS Type III Environmental Declaration Program: Program Operator Manual v9.0. January 2018. SCS Global Services.



vitra.

For more information contact:

Vitra AG

Klünenfeldstrasse 22, Birsfelden, BL CH-4127, Switzerland
info@vitra.com | +41.61.377.0000 | www.vitra.com



SCS Global Services

2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA
Main +1.510.452.8000 | fax +1.510.452.8001