ENVIRONMENTAL PRODUCT DECLARATION

AAVA 02 METAL FRAME

EPD Program:	International EPD System (www.environdec.com)
Programme operator:	EPD International AB
Reference GPI:	General Programme Instructions IES v.3.01
Reference PCR:	PCR 2009:02 v3.0 "Seats" CPC Code: 3811
Reference standard:	ISO 14025
Publication date:	2020-12-11
Valid until:	2025-12-10
Revision date:	2024-02-01
Registration number:	S-P-02423

arper

EPD®

THE INTERNATIONAL EPD® SYSTEM

Note: an EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

arper

CONTENTS

The company and the product 3

Environmental information 4

Additional environmental information 11

Contact and other information 11

Bibliography 13

THE COMPANY AND THE PRODUCT

Arper's ecodesign programme aims at the reduction of its products' environmental impact, improve technical performances and fulfil its engagement towards the environment. Arper already obtained for some of its products the EPD certification and continues working on EPD certifications for the most representative collections of Arper.

ARPER

Arper manufactures chairs, tables and furnishing accessories. Arper's approach is relationship oriented, and it translates into a design aimed at aesthetics and usability; from a global, innovative and personalized perspective; in the valorisation of local contexts within the internationalization strategies; in organizational policies always based on transparency and the preservation of a solid and coherent brand identity.
Arper values the importance of environmental sustainability and it is characterized by an increasing commitment in this area: in 2006, ISO 14001 environmental management system was adopted, in 2007, the use of the LCA tool was introduced. Through LCA Arper obtained the EPD (Environmental Product Declaration), an ecolabel that requires the implementation of an LCA study and compliance with a set of pre-established requirements, defined by product category (Product Category Rules). Arper obtained the first EPD certifications for Catifa 46 and Catifa 53 in 2008. In 2018 Arper obtained the EPD process certification.

PRODUCT DESCRIPTION

Designed for indoor use, Aava 02 consists of a stackable seat on a four-leg steel frame, with a polypropylene shell made from post-consumer recycled material mixed with virgin material, available in white, blue, green, red and black, in both chrome and painted versions. Also available in a version in curved multilayer beech wood, painted in three colours: natural oak, black and walnut.

Feet with felt insert for wooden floors are also supplied.

This EPD refers to Aava 02 with a metal base and a white propylene shell in both chrome and painted versions.

The following tables contain the materials used to make the chair and its packaging. The chair can be packed individually or 4 pieces together. The packaging data are taken from 2022 sales figures: 94% of the chairs are packed with 4 pieces per box.

AAVA 02 MATERIALS WITH METAL BASE AND POLYPROPYLENE SHELL, CHROME VERSION							
	Materials	kg	%		Materials	kg	%
Chair	Steel	2.134	30%	Chair	Steel	2.134	39%
	PP	1.688	24%		PP	1.688	31%
	GF	0.442	6%		GF	0.442	8%
	Recycled PP	0.110	2%		Recycled PP	0.110	2%
	Master	0.092	1%		Master	0.092	2%
	Chrome plating	0.060	1%		Chrome plating	0.060	1%
	Iron	0.040	1%		Iron	0.040	1%
	Brass	0.004	< 1%		Brass	0.004	< 1%
Packaging x1	Cardboard	2.340	33%	Packaging x4 (composition compared to 1 chair)	Cardboard	0.783	14%
	PE	0.057	1%		PE	0.067	1%
	Paper	0.035	< 1%		Paper	0.008	< 1%
	Steel	0.021	< 1%		Steel	0.006	< 1%
	PP	0.008	< 1%		PP	0.003	< 1%
	Total	*7.031*	*100*		Total	*5.436*	*100*

AAVA 02 MATERIALS WITH METAL BASE AND POLYPROPYLENE SHELL, PAINTED VERSION							
	Materials	kg	%		Materials	kg	%
Chair	Steel	2.134	30%	Chair	Steel	2.134	39%
	PP	1.688	24%		PP	1.688	31%
	GF	0.442	6%		GF	0.442	8%
	Recycled PP	0.110	2%		Recycled PP	0.110	2%
	Master	0.092	1%		Master	0.092	2%
	Paint	0.110	2%		Paint	0.110	2%
	Iron	0.040	1%		Iron	0.040	1%
	Brass	0.004	< 1%		Brass	0.004	< 1%
Packaging x1	Cardboard	2.340	33%	Packaging x4 (composition compared to 1 chair)	Cardboard	0.783	14%
	PE	0.057	1%		PE	0.067	1%
	Paper	0.035	< 1%		Paper	0.008	< 1%
	Steel	0.021	< 1%		Steel	0.006	< 1%
	PP	0.032	< 1%		PP	0.026	< 1%
	Total	*7.105*	*100*		Total	*5.508*	*100*

ENVIRONMENTAL INFORMATION

DECLARED UNIT

The declared unit is represented by 1 seat with a lifetime of 15 years. Product life time corresponds to the time the seat maintains its function: in absence of statistical data, life time is assumed equal to the default value of 15 years.

SYSTEM BOUNDARIES

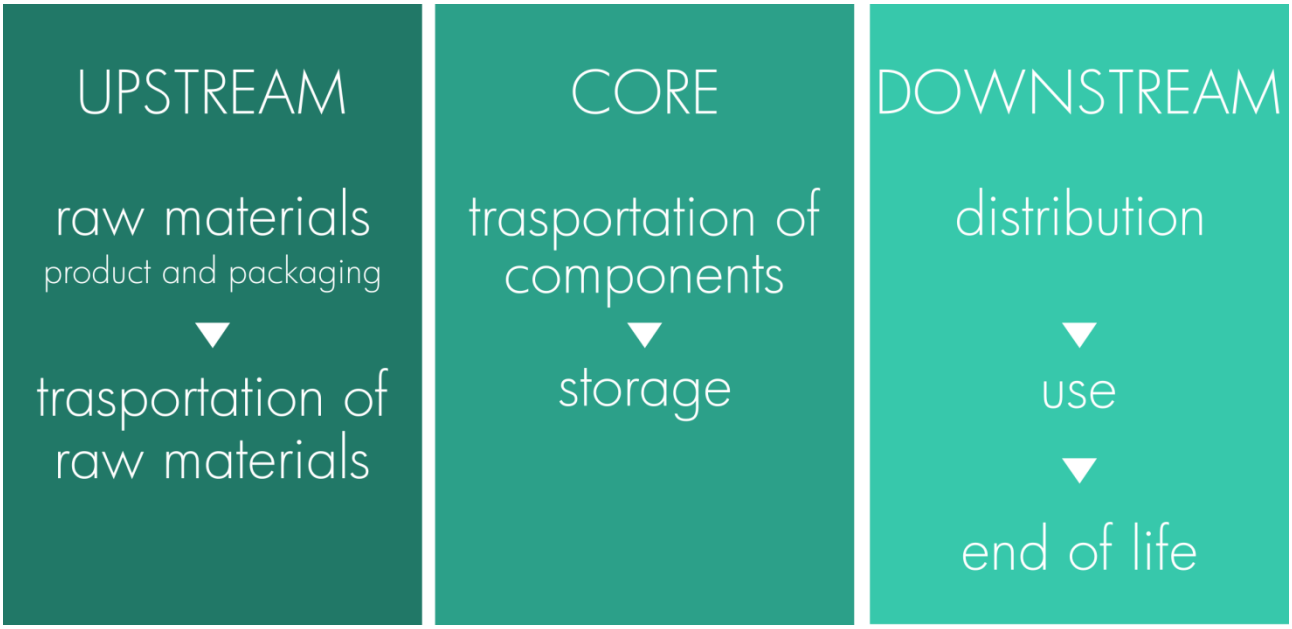
The system boundaries include production of raw materials, production of components and packaging materials, assembly, transport of raw materials and components, storage, distribution, use phase and end of life of the product and its packaging.

Specifically, upstream processes consist of raw materials, their transport, production of the chair components, assembly and packaging.

Core processes include transport to the storehouse and consumption of electricity and water for storage. The production and assembly of the product are not included in the core processes since Arper does not manufacture or assemble its products internally.

Downstream processes include the distribution of the packed product, use phase and end of life stage of both product and packaging.

No cut-off rules were applied.



TIME BOUNDARIES

Primary data originate from Arper and refer to 2022. Secondary data originate from the ecoinvent v3.7 database (allocation, cut-off by classification) published in 2021.

GEOGRAPHICAL BOUNDARIES

Components and packaging materials are produced in Italy. The product is sold both in Italy and abroad. The distribution and end of life scenario consider the sales figures of the reference year.

BOUNDARIES IN THE LIFE CYCLE

The following processes are excluded from the LCA: infrastructure, building of site, production of manufacturing equipment and personnel activities. For those LCA processes that already contained infrastructure, such as processes from the ecoinvent database, infrastructure has not been excluded.

ALLOCATION RULES

As regards end-of-life allocation, the "cut-off" approach was adopted. Raw materials and production processes are included for virgin resources. No allocation is made for materials subject to recycling. The recycling process is included for input of recycled resources. Outputs subject to recycling are regarded as inputs to the next life cycle. For the energy and water consumption of the storehouse, volume allocation has been applied.

CO2 EMISSIONS

The carbon footprint calculation uses the 100-year global warming potential (GWP100). The carbon footprint includes greenhouse gas emissions and removals from fossil fuels, biogenic sources and direct land use change. The emissions are distinguished for the different sources.

DATA QUALITY

The LCA of Aava 02 is based on primary data for the fundamental aspects of the study, such as the weight of the packaging components and materials. Primary data have been collected from Arper's suppliers, while generic data originate from the ecoinvent database v3.7.

The LCA calculation has been performed using the LCA software SimaPro 9.5.

The use of proxy data does not exceed the limit of 10% of the impact of the impact categories. All material inputs of the production process have been considered.

The methodology described in the manual about data collection and process EPD has been used for data collection and LCA calculations.

Primary material data was obtained from the supplier for the main components of the chair. The components for which primary data have been made available belong to the shell, the frame and the feet.

The electricity consumption by the suppliers has been adapted in order to make it more representative of the Italian situation. The energy mix from the ecoinvent v3.7 database was modeled on the basis of the individual sources declared in the national residual mix. In the case of the chair with polypropylene shell and metal frame, the processes involved are the injection molding of the shell, the cutting and folding of the leg bridge and the tray, the welding and painting of the frame.

Primary data provided by the company in charge of the storage of packaged bodies and structures were used for the storage of the product. For energy consumption in the storage phase, the energy mix from the ecoinvent v3.7 database has been modified to align it with the Italian residual mix.

In the distribution phase, sales data were used, considering a road transport (ecoinvent database process: Transport, freight, lorry 16-32 metric ton, EURO4 {RER}) and the distance between Arper's headquarters and the capital city of the exporting country. In the case of transport by ship, land transport (truck 16-32 t EURO4) is assumed to cover the distance from the port to the nearest Arper's facility and then transport by ship to the main port of the assessed foreign country. In addition, a local transport of 300 km by road (truck 16-32 t EURO4) is evaluated.

The use phase consists of a consumption of 0.1 L of hot water and 0.8 g of soap. For soap, a solution with 5% alkylbenzene sulfonate is considered, while a consumption of 5.58 MJ of thermal energy is assumed to heat water.

For the transport of the product and packaging at the end of its life, a road transport (truck 16-32 t EURO4) of 100 km is assumed. For the end of life scenario, average national data (OECD data for non-European countries and Eurostat data for European countries) have been used for the countries in which the product is sold.

ASSESSMENT OF THE ENVIRONMENTAL IMPACT

The method defined by PCR 2009:02 v3.0 - Seats is used to evaluate the environmental performance of the products. The environmental indicators indicated by the PCR 2009:02 v3.0 consist of:

- Impact categories: global warming potential (total, excluding biogenic carbon), global warming potential (fossil fuels), global warming potential (biogenic carbon), global warming potential (land use), acidification potential, eutrophication potential, photochemical oxidant formation potential, abiotic depletion potential, abiotic depletion potential (fossil fuels), water scarcity footprint;
- Resource use indicators: consumption of resources (renewable and non-renewable) and fresh water;
- Waste indicators: hazardous waste, non-hazardous waste and radioactive waste;
- Other indicators: human toxicity (carcinogenic effects), human toxicity (non-carcinogenic effects), land use.

The impact categories originate from the following LCIA methods: CML baseline, CML non-baseline, USEtox 1.04 recommended + interim, Recipe H/A 2016 and AWARE.

The following tables provide the indicators of the environmental impact of the life cycle of 1 Aava 02 chair with PP shell and metal frame, white, in the painted and chromed version. The indicators are divided into the contribution of the upstream, core and downstream phases.

Aava 02 white chromed, environmental indicators	Unit	Total	Upstream	Core	Downstream
Global warming potential (GWP100a)_total	kg CO2 eq	1.81E+01	1.39E+01	5.16E-01	3.73E+00
Global warming potential (GWP100a)_fossil	kg CO2 eq	1.79E+01	1.39E+01	5.08E-01	3.55E+00
Global warming potential (GWP100a)_ biogenic	kg CO2 eq	1.88E-01	-6.26E-04	8.40E-03	1.80E-01
Global warming potential (GWP100a)_land use	kg CO2 eq	1.34E-02	1.29E-02	5.70E-05	5.01E-04
Acidification potential	kg SO2 eq	6.55E-02	5.48E-02	1.69E-03	9.03E-03
Eutrophication potential	kg PO43-	2.43E-02	2.11E-02	3.56E-04	2.88E-03
Photochemical oxidant formation potential	kg NMVOC eq	5.70E-02	4.60E-02	1.34E-03	9.73E-03
Abiotic depletion potential	kg Sb eq	1.91E-04	1.85E-04	1.05E-06	4.78E-06
Abiotic depletion potential (fossil fuels)	MJ	2.86E+02	2.55E+02	7.17E+00	2.41E+01
Water scarcity footprint	m3	6.37E+00	6.10E+00	2.02E-01	6.60E-02
Renewable resources, energy	MJ	4.92E+00	4.32E+00	3.14E-01	2.86E-01
Renewable resources, materials	MJ	1.52E+01	1.52E+01	0.00E+00	0.00E+00
Renewable resources, total	MJ	2.01E+01	1.95E+01	3.14E-01	2.86E-01
Non-renewable resources, energy	MJ	2.18E+02	1.86E+02	7.49E+00	2.46E+01
Non-renewable resources, materials	MJ	9.06E+01	9.06E+01	0.00E+00	0.00E+00
Non-renewable resources, total	MJ	3.09E+02	2.77E+02	7.49E+00	2.46E+01
Water use*	m3	1.63E-01	1.55E-01	4.92E-03	2.75E-03
Hazardous waste	kg	1.82E-01	4.06E-02	2.62E-04	1.41E-01
Non-hazardous waste	kg	4.77E+00	2.77E+00	1.33E-01	1.87E+00
Radioactive waste	kg	5.79E-04	4.31E-04	1.70E-05	1.30E-04
Human toxicity, cancer	cases	2.96E-05	2.94E-05	2.01E-08	1.72E-07
Human toxicity, non-cancer	cases	3.69E-06	3.25E-06	3.95E-08	4.03E-07
Freshwater ecotoxicity	PAF.m3.day	2.79E+05	2.19E+05	1.69E+03	5.86E+04
Land use	species.yr	5.67E-09	5.13E-09	9.97E-11	4.46E-10

* The total amount of water includes all direct and indirect consumption of fresh water in the system studied. Cooling water is omitted in this calculation

Aava 02 white painted, environmental indicators	Unit	Total	Upstream	Core	Downstream
Global warming potential (GWP100a)_total	kg CO2 eq	1.72E+01	1.29E+01	5.20E-01	3.79E+00
Global warming potential (GWP100a)_fossil	kg CO2 eq	1.70E+01	1.29E+01	5.12E-01	3.61E+00
Global warming potential (GWP100a)_ biogenic	kg CO2 eq	1.85E-01	-3.80E-03	8.41E-03	1.80E-01
Global warming potential (GWP100a)_land use	kg CO2 eq	1.15E-02	1.09E-02	5.81E-05	5.07E-04
Acidification potential	kg SO2 eq	6.28E-02	5.19E-02	1.71E-03	9.16E-03
Eutrophication potential	kg PO43-	2.25E-02	1.92E-02	3.60E-04	2.93E-03
Photochemical oxidant formation potential	kg NMVOC eq	5.49E-02	4.37E-02	1.36E-03	9.87E-03
Abiotic depletion potential	kg Sb eq	1.74E-04	1.68E-04	1.06E-06	4.85E-06
Abiotic depletion potential (fossil fuels)	MJ	2.79E+02	2.47E+02	7.23E+00	2.44E+01
Water scarcity footprint	m3	6.40E+00	6.13E+00	2.02E-01	6.67E-02
Renewable resources, energy	MJ	3.53E+00	2.92E+00	3.15E-01	2.89E-01
Renewable resources, materials	MJ	1.52E+01	1.52E+01	0.00E+00	0.00E+00
Renewable resources, total	MJ	1.87E+01	1.81E+01	3.15E-01	2.89E-01
Non-renewable resources, energy	MJ	2.08E+02	1.76E+02	7.55E+00	2.48E+01
Non-renewable resources, materials	MJ	9.20E+01	9.20E+01	0.00E+00	0.00E+00
Non-renewable resources, total	MJ	3.00E+02	2.68E+02	7.55E+00	2.48E+01
Water use*	m3	1.60E-01	1.52E-01	4.93E-03	2.78E-03
Hazardous waste	kg	1.79E-01	3.47E-02	2.66E-04	1.44E-01
Non-hazardous waste	kg	4.67E+00	2.64E+00	1.38E-01	1.89E+00
Radioactive waste	kg	5.49E-04	3.99E-04	1.74E-05	1.32E-04
Human toxicity, cancer	cases	2.19E-05	2.17E-05	2.04E-08	1.75E-07
Human toxicity, non-cancer	cases	3.46E-06	3.01E-06	4.00E-08	4.10E-07
Freshwater ecotoxicity	PAF.m3.day	2.59E+05	1.97E+05	1.70E+03	5.98E+04
Land use	species.yr	5.52E-09	4.97E-09	1.02E-10	4.52E-10

* The total amount of water includes all direct and indirect consumption of fresh water in the system studied. Cooling water is omitted in this calculation

ADDITIONAL ENVIRONMENTAL INFORMATION

The Aava 02 chair with polypropylene shell and metal frame is GREENGUARD GOLD certified.

CONTACT AND OTHER INFORMATION

ARPER CONTACT INFORMATION

The Life Cycle Assessment (LCA) and Environmental Product Declaraion (EPD) have been produced by Arper in collaboration with 2B Srl (www.to-be.it). The company references are:

Arper SpA

Attn. Michela Possagno

Via Lombardia 16, 31050 Monastier di Treviso (TV), Italia

e-mail: michelapossagno@arper.com

web-site: www.arper.com

CERTIFICATION AND CERTIFICATION BODY INFORMATION

Registration N°: S-P-02423

Publishing date: 2020-12-11

Document valid until: 2025-12-10

Revision date: 2024-02-01

Reference year: 2022

Geographic area validity: Global

PCR 2009:02, version 3.0 (UN CPC 3811, Seats), PCR review conducted by Leo Breedveld, available on the website of the International EPD Consortium (IEC): www.environdec.com

Quality audit for the declaration and the information in compliance with ISO 14025:2006

■ EPD process certification □ EPD verification

Third party verifier: CSQA Certificazioni Srl, Via San Gaetano n. 74, 36016 Thiene (VI)

Phone: 0446-313011, Fax: 0446313070, www.csqa.it.

Accredited by: Accredia (004H)

Procedure for follow-up of data during EPD validity involves third party verifier:

■ Yes □ No

OTHER INFORMATION

This Environmental Product Declaration is developed under the EPD® International System. This document is available on the website of the Swedish Environmental Management Council (www.environdec.com).

EPDs belonging to the same product category may not be comparable. Comparisons between EPDs shall be done carefully, special attention shall be given to system boundaries and data sources.

DIFFERENCES FROM PREVIOUS VERSIONS

In comparison to the previous version of this EPD, SimaPro software has been updated to version 9.5. Company impacts (energy consumption and waste treatment), distribution statistics, end-of-life scenarios based on sales statistics were updated to the new reference year (2022). The product was renamed from Aava to Aava 02 and five new colours were added to the list. The republication was necessary because the body materials have changed compared to the previous version.

BIBLIOGRAPHY

- 2B srl, 2023. LCA project Aava 02 (www.to-be.it).
- Arper Spa, 2B Srl, Manuale descrittivo della procedura EPD Arper v1.5, january 2024.
- Arper Spa, 2B Srl, Raccolta dei dati LCA/EPD v1.5, january 2024.
- ecoinvent, 2021: Swiss Centre for Life Cycle Assessment, supplier of the ecoinvent v3.7 database (www.ecoinvent.ch).
- Ioelovich, M. et al, 2018. Energy Potential of natural, synthetic polymers and waste materials – review.
- ISO 14025:2006. Environmental labels and declarations, type 3 environmental declarations, principles and procedures (www.iso.org).
- ISO 14040/14044:2021. ISO series on Life Cycle Assessment (Valutazione del ciclo di vita), UNI EN ISO 14040:2021 e 14044:2021 (www.iso.org).
- Eurostat Database, 2021 (https://ec.europa.eu/eurostat/en/).
- OECD Database, 2021 (www.oecd.org).
- An Econometric Analysis of Global Waste Paper Recovery and Utilization, 2003 (www.researchgate.net).
- PCR 2009:02 v3.0 – Seats. Product Category Rules (PCR) for preparing an environmental product declaration (EPD) for other furniture, the Swedish Environmental Management Council (www.environdec.com).
- PRé Consultants, Olanda. Software SimaPro, version 9.5 (www.pre-sustainability.nl).
- General Programme Instructions for Environmental Product Declaration EPD, Version 3.01, 2019-09-18. Swedish Environmental Management Council (www.environdec.com).