ENVIRONMENTAL PRODUCT DECLARATION

AAVA

4 wood legs,

natural version with birch and white effect

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CONTENTS

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 interiors, Aava consists of a stackable seat on a four-legged steel frame, with a polypropylene shell available in white, sand, avio, sage, yellow and black, both in chromed and painted versions. Also available in the version in curved plywood, in natural birch effect beech or painted in four colors: oak, white, black and walnut.

Also available in the version with wooden or polypropylene armrests. Feet with felt insert for wooden floors are also supplied.

This EPD refers to Aava 4 wood legs in natural birch and white is analyzed.

Table 1 contains 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 2020 sales figures: 86% of the chairs are packed with 4 pieces per box.

AAVA MATERIALS 4 WOOD LEGS, PAINTED, WHITE							
	Materials	kg	%		Materials	kg	%
Chair	Wood	4.48	38.30	Chair	Wood	4.48	47.98
	Glue	2.71	23.24		Glue	2.71	29.11
	Tint	0.10	0.81		Tint	0.10	1.02
	Plyuretane base	0.43	3.68		Plyuretane base	0.43	4.61
	Finish	0.43	3.68		Finish	0.43	4.61
	PP	0.01	0.07		PP	0.01	0.09
Packaging x1	Cardboard	3.42	29.26	Packaging x4 (composition compared to 1 chair)	Cardboard	1.07	11.47
	PE	0.05	0.43		PE	0.05	0.54
	PP	0.01	0.07		PP	0.02	0.23
	Paper	0.02	0.15		Paper	0.00	0.04
	Steel	0.04	0.32		Steel	0.03	0.31
	Total	11.69	100		Total	9.32	100

AAVA MATERIALS 4 WOOD LEGS, NATURAL VERSION, BIRCH							
	Materials	kg	%		Materials	kg	%
Chair	Wood	4.48	38.61	Chair	Wood	4.48	48.47
	Glue	2.71	23.43		Glue	2.71	29.41
	Polyuretane base	0.43	3.71		Polyuretane base	0.43	4.66
	Finish	0.43	3.71		Finish	0.43	4.66
	PP	0.01	0.07		PP	0.01	0.09
Packaging x1	Cardboard	3.42	29.50	Packaging x4 (composition compared to 1 chair)	Cardboard	1.07	11.59
	PE	0.05	0.43		PE	0.05	0.54
	PP	0.01	0.07		PP	0.02	0.23
	Paper	0.02	0.15		Paper	0.00	0.04
	Steel	0.04	0.32		Steel	0.03	0.31
	Total	11.59	100		Total	9.22	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

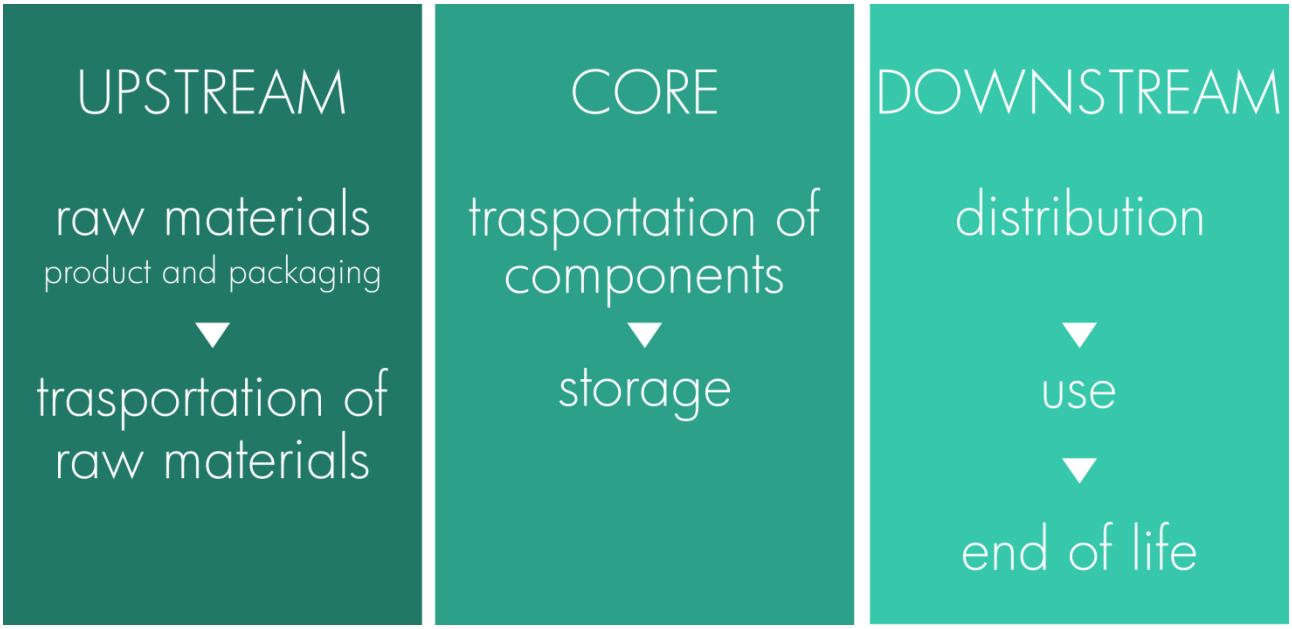
The system boundaries include production of raw materials, production of components and packaging materials, assembly, transport of raw materials and components, storage, distribution, use phase and end of life of the product and its packaging.

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 2020. 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 include 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 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 9.2.

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 wooden chair, the processes involved are the gluing, pressing, contouring, sanding of the wood and the surface treatments applied to the body and legs.

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 make it more representative of the Italian situation, modeling the individual sources on the basis of the supply declared in the invoice. The Italian energy sources originate from the ecoinvent database.

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 (Rapporto Rifiuti Urbani 2020 ISPRA, OECD , Eurostat data and RSU China) have been used for the countries in which the product is sold.

ENVIRONMENTAL IMPACT INDICATORS

The following tables provide the indicators of the environmental impact of the life cycle of 1 Aava 4 wood legs, in the natural and white birch version.

Environmental indicators consist of 10 impact categories (global warming potential total/fossil/biogenic/land use, acidification potential, eutrophication potential, photochemical oxidant formation potential, abiotic depletion potential, abiotic depletion potential for fossil fuels and water scarcity footprint), material and energy resources (renewable and non renewable), human toxicity, ecotoxicity and land use, consumption of water and waste. The indicators are divided into the contribution of the upstream, core and downstream phases.

TABLE 1: AAVA 4 WOOD LEGS, WHITE, PAINTED, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming potential (GWP100a)_total	kg CO_2 eq	7,1	-0,8	0,3	7,7
Global warming potential (GWP100a)_fossil	kg CO_2 eq	18,2	13,5	0,3	4,4
Global warming potential (GWP100a)_ biogenic	kg CO_2 eq	-11,190	-14,403	0,005	3,208
Global warming potential (GWP100a)_land use	kg CO_2 eq	2,67E-02	2,52E-02	4,72E-05	1,44E-03
Acidification potential	kg SO_2 eq	0,0918	0,0561	0,0009	0,0349
Eutrophication potential	kg PO_4^{3-}	0,0357	0,0191	0,0002	0,0164
Photochemical oxidant formation potential	kg NMVOC eq	0,0982	0,0633	0,0009	0,0340
Abiotic depletion potential	kg Sb eq	1,80E-04	1,69E-04	6,35E-07	1,07E-05
Abiotic depletion potential (fossil fuels)	MJ	345,3	288,1	3,7	53,5
Water scarcity footprint	m^3 eq	13,01	12,77	0,09	0,15
Renewable resources, energy	MJ	82,7	81,9	0,2	0,7
Renewable resources, materials	MJ	107,24	107,24	0	0
Renewable resources, total	MJ	190,0	189,2	0,2	0,7
Non renewable resources, energy	MJ	362,0	303,6	3,9	54,5
Non renewable resources, materials	MJ	2,77	2,77	0	0
Non renewable resources, total	MJ	364,8	306,3	3,9	54,5
Water use	m^3	0,370	0,360	0,002	0,007
Hazardous waste	kg	0,0541	0,0366	0,0001	0,0173
Non hazardous waste	kg	8,8	2,3	0,1	6,4
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	2,34E-06	1,59E-06	1,37E-08	7,38E-07
Human toxicity, non-cancer	cases	3,11E-06	1,95E-06	2,34E-08	1,14E-06
Freshwater ecotoxicity	PAF.m^3.day	190107	176398	751	12958
Land use	species.yr	7,31E-08	7,20E-08	5,20E-11	1,07E-09

TABLE 2: AAVA 4 LEGS WOOD, BIRCH, NATURAL, ENVIRONMNETAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming potential (GWP100a)_total	kg CO_2 eq	6,9	-0,9	0,2	7,6
Global warming potential (GWP100a)_fossil	kg CO_2 eq	18,0	13,5	0,2	4,3
Global warming potential (GWP100a)_ biogenic	kg CO_2 eq	-11,190	-14,403	0,005	3,208
Global warming potential (GWP100a)_land use	kg CO_2 eq	2,67E-02	2,52E-02	2,55E-05	1,42E-03
Acidification potential	kg SO_2 eq	0,0910	0,0559	0,0006	0,0345
Eutrophication potential	kg PO_4^{3-}	0,0354	0,0190	0,0001	0,0162
Photochemical oxidant formation potential	kg NMVOC eq	0,0973	0,0631	0,0006	0,0336
Abiotic depletion potential	kg Sb eq	1,79E-04	1,69E-04	3,67E-07	1,05E-05
Abiotic depletion potential (fossil fuels)	MJ	342,9	287,0	2,9	53,0
Water scarcity footprint	m^3 eq	12,97	12,74	0,09	0,15
Renewable resources, energy	MJ	82,7	81,9	0,1	0,6
Renewable resources, materials	MJ	107,24	107,24	0	0
Renewable resources, total	MJ	189,9	189,1	0,1	0,6
Non renewable resources, energy	MJ	359,6	302,4	3,1	54,0
Non renewable resources, materials	MJ	2,77	2,77	0	0
Non renewable resources, total	MJ	362,4	305,2	3,1	54,0
Water use	m^3	0,369	0,359	0,002	0,007
Hazardous waste	kg	0,0537	0,0365	0,0001	0,0170
Non hazardous waste	kg	8,78	2,33	0,08	6,37
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	2,29E-06	1,58E-06	9,14E-09	6,92E-07
Human toxicity, non-cancer	cases	3,03E-06	1,95E-06	1,70E-08	1,07E-06
Freshwater ecotoxicity	PAF.m^3.day	189365	176051	527	12786
Land use	species.yr	7,31E-08	7,20E-08	4,71E-11	1,06E-09

ADDITIONAL ENVIRONMENTAL INFORMATION

The Aava 4 legs wood chair is GREENGUARD GOLD and FSC certified.

Aava 4 legs wood is certified GECA, licence number: ARP-2017, Licensee since: 02 July 2009, Licence expiry date: 07 February 2023.

CONTACT AND OTHER INFORMATION

ARPER CONTACT INFORMATION

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

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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, versions of ecoinvent database and SimaPro software were respectively updated to 3.7 and 9.2. Outdated processes were replaced and company impacts (energy consumption and waste treatment), distribution statistics, end-of-life scenarios based on sales statistics were updated to the new reference year (2020). Furthermore, transport for distribution and end-of-life was modified by replacing >32t EURO5 trucks with 16-32 t EURO4 trucks because considered more representative, with consequent environmental indicators variations (>10%).

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