ENVIRONMENTAL PRODUCT DECLARATION

BABAR

EPD Program:	International EPD System (www.environdec.com)
Programme operator:	EPD International AB
Reference GPI:	General Programme Instructions IES v3.01
Reference PCR:	PCR 2009:02 v3.0 "Seats" CPC Code: 3811
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EPD®
THE INTERNATIONAL EPD® SYSTEM

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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 fulfill 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

Babar is an indoor stool in plastic with a seat in soft integral polyurethane, regulating with seat height between 63.5 and 76.5 cm. The structure is in stainless steel with a satin or chrome finish. The ABS seat insert is available in four colours.

This declaration summarises the results for the white stool whit chrome finish structure. This version is representative for the other models, since its environmental impact is the most similar to the average environmental impact of the 4 stools. Representativeness of the data was verified through sensitivity analysis, where the difference between the values of the indicators of the different Babar stools does not exceed 10%.

Table 1 lists the materials declaration of Babar and its packaging.

TABLE 1: MATERIALS OF WHITE BABAR

WHITE BABAR	Materials	kg	%
Babar, white,	Steel	9.21	62.72
	ABS	1.38	9.42
	PUR	0.46	3.15
	PP/glass fiber	0.10	0.69
	Master	0.08	0.56
	Felt	0.05	0.33
	POM	0.04	0.30
	Paint	0.04	0.29
	PVC	0.01	0.04
	Rubber	0.00	0.03
Packaging x 1	Paper	2.52	17.16
	Cardboard	0.50	3.38
	Steel	0.26	1.74
	PE	0.03	0.20
	Total	14.69	100%

ENVIRONMENTAL INFORMATION

FUNCTIONAL UNIT

The functional unit is represented by 1 stool with a lifetime of 15 years.

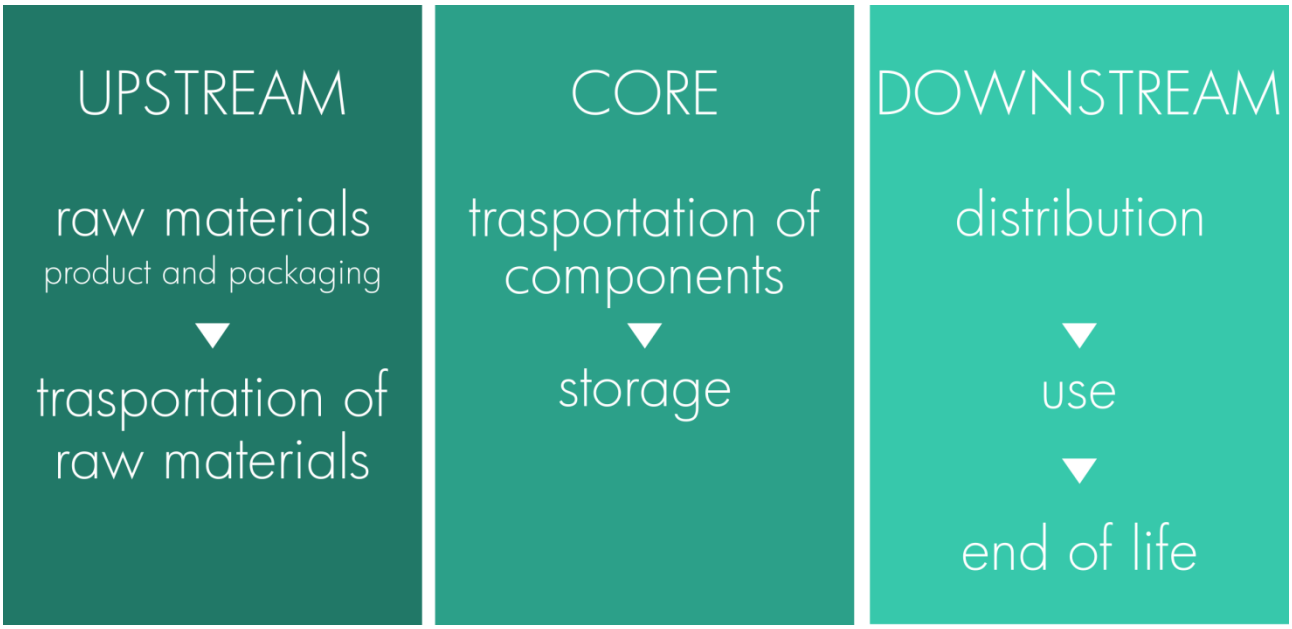
SYSTEM BOUNDARIES

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 stool components, assembly and packaging.

Core processes include transport to the storage warehouse 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.



TIME BOUNDARIES

Primary data originate from Arper and refer to 2019. Secondary data originate from the ecoinvent v3.6 database (allocation, cut-off by classification) published in 2020.

GEOGRAPHICAL BOUNDARIES

Components and packaging materials are produced in Italy, except for the polyoxymetthylene (POM) of the bushing produced in Germany and raw gas mechanism, which is produced in Korea. The product is sold both in Italy and abroad. The distribution and end of life scenarios 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.

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.

ALLOCATION RULES

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.

DATA QUALITY

This LCA study 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 v3.6.

The LCA calculation has been performed using the LCA software SimaPro 9.1.

The use of proxy data does not exceed the limit of 10% of the impact of the impact categories (see Annex 1 in the LCA Report). All material inputs of the production process have been considered.

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

Some ecoinvent v3.6 processes, like the injection moulding of plastic components have been adapted to the Italian market, to make them more representative. Accordingly, the electricity mix has been changed. Similarly, the German electricity mix was selected for the production of the polyoxymetthylene (POM) of the bushing. Electricity mixes were taken from the ecoinvent database.

For the main components of the stool, primary data relative to the consumption of the different production processes were made available by the supplier. In detail, primary data were made available for the following components: the seat, the structural cone, the base and footrest.

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 v3.6 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.

For the distribution and disposal of the product, sales data of the year 2019 have been used.

Distribution considers a distance between Arper's headquarters and the capital city of the exporting country. In case of transport by ship, a road transport to cover the distance from Arper's facility to the nearest port, transport by ship to the main port of the destination and a local transport of 300 km by road (truck 16-32 t) have been assumed.

The use phase consists of a consumption of 0,1l of hot water and 0,8 g of soap per chair. 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 EURO 5) of 100 km is assumed. For the end of life scenario, average national data have been used for the countries in which the product is sold.

IMPACT ASSESSMENT

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 (total, excluding biogenic carbon), global warming (fossil fuels), global warming (biogenic carbon), global warming (land use), depleted ozone layer, acidification, eutrophication, photochemical oxidation, depletion of abiotic resources, depletion of abiotic resources (fossil fuels), use of water;

- 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 indicators are divided into the contribution of the upstream, core and downstream phases. Table 2 until Table 5 show the environmental indicators of Babar, white with chrome finish.

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TABLE 2: BABAR WHITE WHIT CHROME FINISH, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	53.7	48.2	0.4	5.1
Global warming (GWP100a)_fossil	kg CO_2 eq	54.5	49.4	0.4	4.7
Global warming (GWP100a)_ biogenic	kg CO_2 eq	-0.886	-1.346	0.005	0.455
Global warming (GWP100a)_land use	kg CO_2 eq	0.104	0.103	0.000	0.001
Acidification Potential	Kg SO_2 eq	0.277	0.267	0.001	0.009
Eutrophication potential	kg PO_4^{3-}	0.161	0.156	0.000	0.005
Photochemical ozone formation, HH	kg NMVOC eq	0.218	0.206	0.001	0.011
Abiotic depletion	Kg Sb eq	0.002	0.002	0.000	0.000
Abiotic depletion (fossil fuels)	MJ	688	646	5	36
Water scarcity	m^3 eq	15137	15055	27	54
Renewable resources, energy	MJ	135	134	0	0
Renewable resources, materials	MJ	-	-	-	-
Renewable resources, total	MJ	135	134	0	0
Non renewable resources, energy	MJ	0.046	0.045	0.000	0.001
Non renewable resources, materials	MJ	826	780	6	40
Non renewable resources, total	MJ	826	780	6	40
Water use	m^3	1.17	1.16	0.00	0.01
Hazardous waste	kg	1.08	0.30	0.00	0.77
Non hazardous waste	kg	21.9	17.3	0.2	4.4
Radioactive waste	kg	-	-	-	-
Human toxicity, cancer	cases	2.72E-05	2.68E-05	1.03E-08	3.73E-07
Human toxicity, non-cancer	cases	4.08E-05	3.99E-05	4.74E-08	7.82E-07
Freshwater ecotoxicity	PAF.m^3.day	5719077	5278003	1700	439374
Land use	species.yr	4.35E-08	4.22E-08	1.28E-10	1.12E-09

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

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TABLE 3: BABAR WHITE WHIT CHROME FINISH, MATERIAL AND ENERGY RESOURCES		Unit	Total	Upstream	Core	Downstream
Non-renewable resources, materials	**Total**	**MJ**	**826**	**780**	**6**	**40**
	Oil, crude	MJ	254	221	4	29
	Gas, natural/m3	MJ	249	241	1	8
	Coal, hard	MJ	204	202	0	2
	Uranium	MJ	84	83	0	1
	Coal, brown	MJ	29	29	0	0
	Gas, mine	MJ	3	3	0	0
	Other	MJ	1	1	0	0
Non-renewable resources, energy	**Total**	**MJ**	**0.046**	**0.045**	**0.000**	**0.001**
	Energy, gross calorific value, in biomass	MJ	0.046	0.045	0.000	0.001
Renewable resources, materials	**Total**	**MJ**	-	-	-	-
Renewable resources, energy	**Total**	**MJ**	**135**	**134**	**0**	**0**
	Energy, gross calorific value, in biomass	MJ	81	81	0	0
	Energy, potential, hydropower	MJ	44	44	0	0
	Energy, kinetic	MJ	7	7	0	0
	Energy, solar	MJ	1	1	0	0
	Energy, geothermal	MJ	1	1	0	0

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TABLE 4: BABAR WHITE WHIT SATIN FINISH, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	53.4	47.9	0.4	5.1
Global warming (GWP100a)_fossil	kg CO_2 eq	54.1	49.1	0.4	4.7
Global warming (GWP100a)_ biogenic	kg CO_2 eq	-0.877	-1.337	0.005	0.455
Global warming (GWP100a)_land use	kg CO_2 eq	0.103	0.102	0.000	0.001
Acidification Potential	Kg SO_2 eq	0.276	0.265	0.001	0.009
Eutrophication potential	kg PO_4^{3-}	0.160	0.155	0.000	0.005
Photochemical ozone formation, HH	kg NMVOC eq	0.218	0.205	0.001	0.011
Abiotic depletion	Kg Sb eq	0.002	0.002	0.000	0.000
Abiotic depletion (fossil fuels)	MJ	685	643	5	36
Water scarcity	m^3 eq	14051	13969	27	54
Renewable resources, energy	MJ	133	132	0	0
Renewable resources, materials	MJ	-	-	-	-
Renewable resources, total	MJ	133	132	0	0
Non renewable resources, energy	MJ	0.046	0.045	0.000	0.001
Non renewable resources, materials	MJ	820	775	6	40
Non renewable resources, total	MJ	820	775	6	40
Water use	m^3	1.17	1.16	0.00	0.01
Hazardous waste	kg	1.07	0.30	0.00	0.77
Non hazardous waste	kg	21.8	17.2	0.2	4.4
Radioactive waste	kg	-	-	-	-
Human toxicity, cancer	cases	2.60E-05	2.56E-05	1.03E-08	3.73E-07
Human toxicity, non-cancer	cases	4.08E-05	4.00E-05	4.74E-08	7.82E-07
Freshwater ecotoxicity	PAF.m^3.day	5710155	5269081	1700	439374
Land use	species.yr	4.34E-08	4.22E-08	1.28E-10	1.12E-09

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

TABLE 5: BABAR WHITE WHIT SATIN FINISH, MATERIAL AND ENERGY RESOURCES		Unit	Total	Upstream	Core	Downstream
Non-renewable resources, materials	**Total**	**MJ**	**820**	**775**	**6**	**40**
	Oil, crude	MJ	254	221	4	29
	Gas, natural/m3	MJ	248	239	1	8
	Coal, hard	MJ	203	201	0	2
	Uranium	MJ	83	82	0	1
	Coal, brown	MJ	29	28	0	0
	Gas, mine	MJ	3	3	0	0
	Altro	MJ	1	1	0	0
Non-renewable resources, energy	**Total**	**MJ**	**0.046**	**0.045**	**0.000**	**0.001**
	Energy, gross calorific value, in biomass	MJ	0.046	0.045	0.000	0.001
Renewable resources, materials	**Total**	**MJ**	-	-	-	-
Renewable resources, energy	**Total**	**MJ**	**133**	**132**	**0**	**0**
	Energy, gross calorific value, in biomass	MJ	81	81	0	0
	Energy, potential, hydropower	MJ	42	42	0	0
	Energy, kinetic	MJ	7	7	0	0
	Energy, solar	MJ	1	1	0	0
	Energy, geothermal	MJ	1	1	0	0

ADDITIONAL ENVIRONMENTAL INFORMATION

Babar is GREENGUARD certified: certification number: 5714-420, licensee since: 4 November 2008, license expiry date: 4 November 2019.

CONTACT AND OTHER INFORMATION

ARPER CONTACT INFORMATION

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

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CERTIFICATION AND CERTIFICATION BODY INFORMATION

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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 VERSUS PREVIUS VERSIONS

In comparison to the previous version of this EPD (published on 2019-09-05), the reference PCR Seats 2009:02 has evolved from version 2.0 to version 3.0, the latter based on the newest version of the General Programme Instruction, version 3.1. Although the product composition is unaltered, new PCR and GPI require several updates like the addition of the reference Service Life (RSL), the update of the environmental indicators and the update of the additional environmental indicators. Furthermore, the company impacts (energy consumption and waste treatment), distribution statistics, end-of-life scenarios based on sales statistics have been updated to the new reference year (2019), resulting in changes in the environmental indicators (>10%).

BIBLIOGRAPHY

- 2B Srl, 2020. LCA project Babar (www.to-be.it).
- Arper Spa, 2B Srl, Manuale descrittivo della procedura EPD Arper v1.2, novembre 2019.
- Arper Spa, 2B Srl, Raccolta dei dati LCA/EPD v1.1, novembre 2019.
- EC, Default data for End Of Life (EOL) for Product Environmental Footprint (PEF) during the Environmental Footprint (EF) pilot phase (ec.europa.eu).
- ecoinvent, 2020: Swiss Centre for Life Cycle Assessment, fornitore del database ecoinvent v3.6 (www.ecoinvent.ch).
- ISO 14025:2006. Environmental labels and declarations, type 3 environmental declarations, principles and procedures (www.iso.org).
- ISO 14040/14044:2006. ISO series on Life Cycle Assessment (Valutazione del ciclo di vita), UNI EN ISO 14040:2006 e 14044:2006 (www.iso.org).
- ISPRA, 2019. Rapporto Rifiuti Urbani (www.isprambiente.gov.it).
- OECD, Environment at a Glance, 2015 (www.oecd.org).
- Osbeck S., Bergek C., Klässbo A., Thollander P., Harvey S., Rohdin P., (2011). Energy efficiency opportunities within the powder coating industry. Industrial Energy Efficiency.
- 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, versione 9.1 (www.pre.nl).
- General Programme Instructions for Environmental Product Declaration EPD, Version 3.01, 2019-09-18. Swedish Environmental Management Council (www.environdec.com).