ENVIRONMENTAL PRODUCT DECLARATION

STACY

polypropylene shell

and chromed or painted sled

EPD Program: International EPD System (www.environdec.com)
Programme operator: EPD International AB
Reference GPI: General Programme Instructions IES v3.01
Reference standard: ISO 14025
Reference PCR: PCR 2009:02 v3.0 "Seats" CPC Code: 3811
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arper

EPD®
THE INTERNATIONAL EPD® SYSTEM

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

Designed for interiors and exteriors, Stacy is available in both painted and chromed versions, and in five colors: white, black, dark blue-green, rust and ivory (only chromed version).

This declaration summarises the results for Stacy white in painted and chromed version. This version is representative for the other models, since its environmental impact is the most similar to the average environmental impact of the 5 chairs. Representativeness of the data was verified through sensitivity analysis, where the difference between the values of the indicators of the different Stacy chairs does not exceed 10%.

Table 1 lists the materials declaration of Stacy standard and its packaging. The chair can be packed in two combinations: 1x and 4x.

TABLE 1: MATERIALS OF STACY

STACY WHITE		PAINTED		CHROMED		
	Materials	kg	%	Materials	kg	%
Stacy white	PP + MF	2.10	22.04	PP + MF	2.10	22.06
	Master	0.08	0.86	Master	0.08	0.84
	Steel	3.24	33.90	Steel	3.24	34.03
	Brass	0.01	0.15	Brass	0.01	0.11
	Iron	0.09	0.94	Iron	0.09	0.95
	PA6	0.04	0.37	PA6	0.04	0.42
	Paint	0.04	0.40	Chrome	0.01	0.11
Packaging 1x	Cardboard	3.76	39.37	Cardboard	3.76	39.50
	Nylon	0.00	0.03	Nylon	0.00	0.00
	Paper	0.02	0.23	Paper	0.02	0.21
	Steel	0.01	0.07	Steel	0.01	0.11
	PE	0.16	1.63	PE	0.16	1.68
	Total	9.54	100%	Total	9.52	100%
Stacy white	PP + MF	2.10	31.72	PP + MF	2.10	31.77
	Master	0.08	1.24	Master	0.08	1.21
	Steel	3.24	48.80	Steel	3.24	49.02
	Brass	0.01	0.21	Brass	0.01	0.15
	Iron	0.09	1.36	Iron	0.09	1.36
	PA6	0.04	0.53	PA6	0.04	0.61
	Paint	0.04	0.57	Chrome	0.01	0.15
Packaging 4x	Cardboard	0.87	13.09	Cardboard	0.87	13.16
	Nylon	0.00	0.02	Nylon	0.00	0.00
	Paper	0.01	0.08	Paper	0.01	0.15
	Steel	0.00	0.03	Steel	0.00	0.00
	PE	0.16	2.35	PE	0.16	2.42
	Total	6.63	100%	Total	6.61	100%

Table 1: List of Stacy materials.

ENVIRONMENTAL INFORMATION

FUNCTIONAL UNIT

The functional unit is represented by 1 chair 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

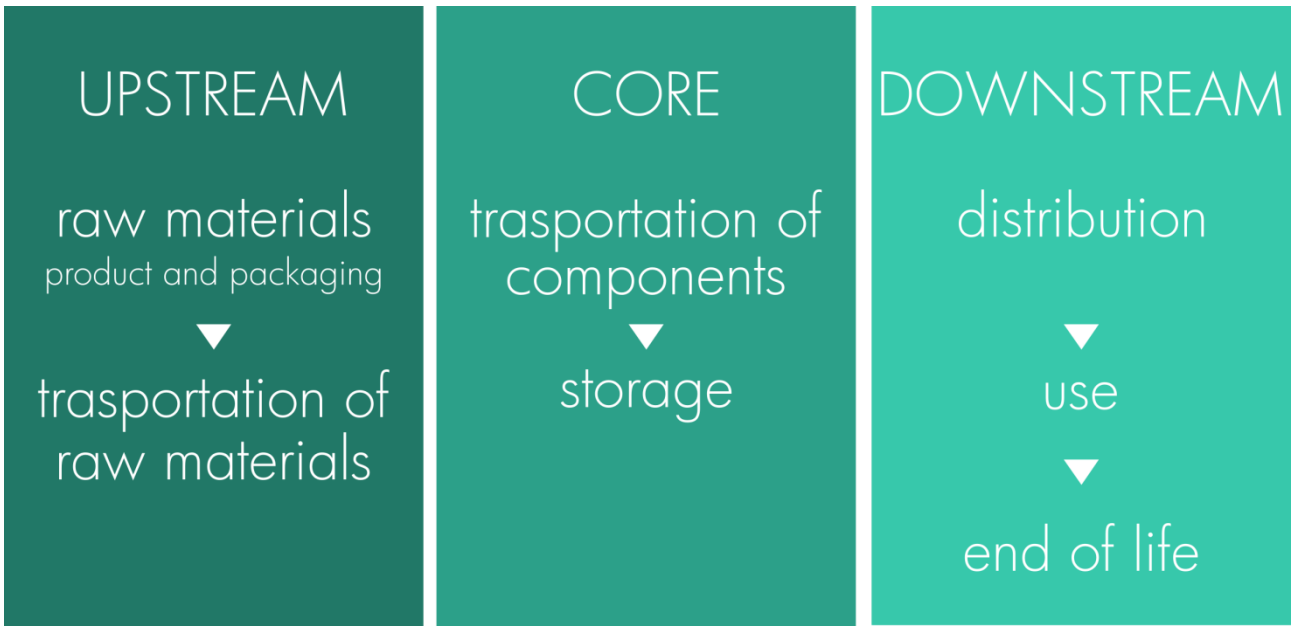
The system boundaries include production of raw materials, production of components and packaging materials, assembly, transport of raw materials and components, storage, distribution, use phase and end of life of the product and its packaging.

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

Core processes include transport to the 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.

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, except of white master (Luxembourg), dark blue-green and ivory master (Belgium), white paint (Austria), and a foot component (Germany). 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. The data contained in the inventory must represent at least 99% of the total flows to the core module. Flows not included in the LCA must be documented in the EPD.

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.

CO_2 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

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 v3.7.

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 overall impact of the main impact categories, as contemplated by the reference PCRs. All the 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 v3.7 processes have been adapted to make them more representative. in particular the injection moulding of the seat and backrest, the cutting, folding, welding, chromium-plating and painting of all the elements of the drum have been adapted to the Italian situation, changing electricity mix. Electricity mixes were taken from the ecoinvent database.

For the main components of the chair, 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: structure, spacers and foot.

Primary data have been used for product storage, provided by the company responsible for the storage. 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 packaging methods of Stacy, the information from the sales data in the year 2020 was used: 95% of the Stacy are packed in a 4-piece box packaging.

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 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 4) for 100 km is assumed. For the end-of-life scenario, average national data (Rapporto Rifiuti Urbani 2020 ISPRA, OECD and Eurostat data) were used for the countries in which the product is sold.

IMPACT ASSESSMENT

Table 2 and 3 show the environmental indicators of white Stacy in painted and chromed version.

Environmental indicators consist of 10 impact categories (global warming total/fossil/biogenic/land use, acidification, photochemical oxidant formation potential, eutrophication, abiotic depletion, abiotic depletion for fossil fuels and water scarcity), 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.

The indicators are broken down into upstream, core and downstream processes.

TABLE 2: STACY WHITE, PAINTED, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	18,5	13,2	0,5	4,7
Global warming (GWP100a)_fossil	kg CO_2 eq	17,6	13,2	0,5	3,9
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,878	0,053	0,006	0,819
Global warming (GWP100a)_land use	kg CO_2 eq	0,0269	0,0260	0,0001	0,0008
Acidification Potential	kg SO_2 eq	0,068	0,050	0,002	0,016
Eutrophication potential	kg PO_4^{3-}	0,0281	0,0206	0,0004	0,0071
Photochemical ozone formation, HH	kg NMVOC eq	0,062	0,043	0,002	0,017
Abiotic depletion	kg Sb eq	3,23E-04	3,14E-04	1,52E-06	7,50E-06
Abiotic depletion (fossil fuels)	MJ	294,5	250,7	7,4	36,3
Water scarcity	m^3 eq	7,2	7,0	0,1	0,1
Renewable resources, energy	MJ	1,8	1,1	0,2	0,5
Renewable resources, materials	MJ	17,46	17,46	0	0
Renewable resources, total	MJ	19,2	18,6	0,2	0,5
Non renewable resources, energy	MJ	231,4	186,6	7,8	37,0
Non renewable resources, materials	MJ	91,88	91,88	0	0
Non renewable resources, total	MJ	323,3	278,5	7,8	37,0
Water use	m^3	0,176	0,169	0,003	0,004
Hazardous waste	kg	0,0638	0,0330	0,0004	0,0304
Non hazardous waste	kg	6,3	2,3	0,3	3,7
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	1,76E-05	1,73E-05	3,21E-08	1,97E-07
Human toxicity, non-cancer	cases	3,69E-06	3,00E-06	5,39E-08	6,41E-07
Freshwater ecotoxicity	PAF.m^3.day	318670	299197	1591	17882
Land use	species.yr	6,35E-09	5,47E-09	1,43E-10	7,35E-10

* 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 3: STACY WHITE, CHROMED, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	18,9	13,6	0,5	4,7
Global warming (GWP100a)_fossil	kg CO_2 eq	17,9	13,5	0,5	3,9
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,891	0,066	0,006	0,819
Global warming (GWP100a)_land use	kg CO_2 eq	0,0274	0,0264	0,0001	0,0008
Acidification Potential	kg SO_2 eq	0,069	0,051	0,002	0,016
Eutrophication potential	kg PO_4^{3-}	0,0286	0,0211	0,0004	0,0071
Photochemical ozone formation, HH	kg NMVOC eq	0,062	0,043	0,002	0,017
Abiotic depletion	kg Sb eq	3,31E-04	3,22E-04	1,52E-06	7,50E-06
Abiotic depletion (fossil fuels)	MJ	297,8	254,1	7,4	36,3
Water scarcity	m^3 eq	7,3	7,1	0,1	0,1
Renewable resources, energy	MJ	3,4	2,7	0,2	0,5
Renewable resources, materials	MJ	17,46	17,46	0	0
Renewable resources, total	MJ	20,9	20,2	0,2	0,5
Non renewable resources, energy	MJ	236,3	191,5	7,8	37,0
Non renewable resources, materials	MJ	91,88	91,88	0	0
Non renewable resources, total	MJ	328,2	283,4	7,8	37,0
Water use	m^3	0,179	0,172	0,003	0,004
Hazardous waste	kg	0,0646	0,0344	0,0004	0,0299
Non hazardous waste	kg	6,4	2,4	0,3	3,7
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	1,82E-05	1,80E-05	3,21E-08	1,96E-07
Human toxicity, non-cancer	cases	3,75E-06	3,06E-06	5,39E-08	6,40E-07
Freshwater ecotoxicity	PAF.m^3.day	323010	303778	1591	17641
Land use	species.yr	6,40E-09	5,52E-09	1,43E-10	7,35E-10

* 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.

ADDITIONAL ENVIRONMENTAL INFORMATION

Stacy is GECA certified, license number: ARP-2017, Licensee since: 02 July 2009, License expiry date: 07 February 2023.

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 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. 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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