

ENVIRONMENTAL PRODUCT DECLARATION

JUNO ECO



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Reference PCR: PCR 2009:02 v3.0 "Seats" CPC Code: 3811
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Note: An EPD should provide current information and can be updated if conditions change. The validity therefore depends on the registration and continuous publication on www.environdec.com.

arper

CONTENTS

The company and the product..... 3

Environmental information 5

Contact and other information..... 11

Bibliography 13

THE COMPANY AND THE PRODUCT

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

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 the company 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

Arper has introduced the Eco version of Juno which uses post-industrial recycled polypropylene. Designed for indoor and outdoor environments, Juno Eco is available in two colours: white and grey. The chairs are stackable to facilitate large-scale use and storage.

This version is representative of the grey version. The representativeness was verified through the sensitivity analysis, in which the difference between the values of the indicators of the different Juno chairs does not exceed 10%.

Table 1 contains the materials used to make the Eco version chair and the packaging. The chair can be packed in different amounts: 1x, 2x, 4x and 6x.

The chair was sold in 2020 in Switzerland, the Netherlands and Lithuania and was packed in 1x, 2x and 4x combinations.

TABLE 1: MATERIALS OF JUNO ECO



JUNO ECOWHITE			
	Material	kg	%
Juno eco, white	PP/glass fiber	4.48	55.6
	Master	0.29	3.6
	Nylon	0.02	0.2
	TPU	0.01	0.1
Packaging 1x	Cardboard	2.81	34.9
	PE	0.19	2.4
	Polystyrene	0.19	2.4
	Paper	0.03	0.4
	Plastic	0.03	0.4
	Steel	0.01	0.1
	Nylon	0.00	0.0
	Total	8.06	100
Juno eco, white	PP/glass fiber	4.48	68.3
	Master	0.29	4.4
	Nylon	0.02	0.3
	TPU	0.01	0.2
Packaging 2x	Cardboard	1.42	21.6
	PE	0.10	1.5
	Polystyrene	0.19	2.9
	Paper	0.01	0.2
	Plastic	0.03	0.5
	Steel	0.00	0.1
	Nylon	0.00	0.0
	Total	6.55	100
Juno eco, white	PP/glass fiber	4.48	75.2
	Master	0.29	4.9
	Nylon	0.02	0.3
	TPU	0.01	0.2
Packaging 4x	Cardboard	0.87	14.6
	PE	0.05	0.8
	Polystyrene	0.19	3.2
	Paper	0.01	0.2
	Plastic	0.03	0.5
	Steel	0.00	0.1
	Nylon	0.00	0.0
	Total	5.96	100

Juno eco, white	PP/glass fiber	4.48	77.0
	Master	0.29	5.0
	Nylon	0.02	0.3
	TPU	0.01	0.2
Packaging 6x	Cardboard	0.75	12.9
	PE	0.03	0.5
	Polystyrene	0.19	3.3
	Paper	0.01	0.2
	Plastic	0.03	0.5
	Steel	0.00	0.1
	Nylon	0.00	0.0
	Total	5.82	100

Table 1: List of Juno eco materials.

ENVIRONMENTAL INFORMATION

DECLARED UNIT

The declared unit taken into consideration is 1 chair (including packaging) with a lifetime of 15 years, in accordance with the guidelines contained in the PCR 2009: 02 v3.0. The lifetime of the product corresponds to the time in which the chair maintains its function. Without statistical data, the life expectancy is set with the default value of 15 years.

SYSTEM BOUNDARIES

The system boundaries considered for this study are "from cradle to grave", therefore from the preparation of raw materials to the final disposal of the product and packaging.

The Juno Eco life cycle study is divided into Upstream, Core and Downstream processes, as required by PCR 2009: 02 v3.0.

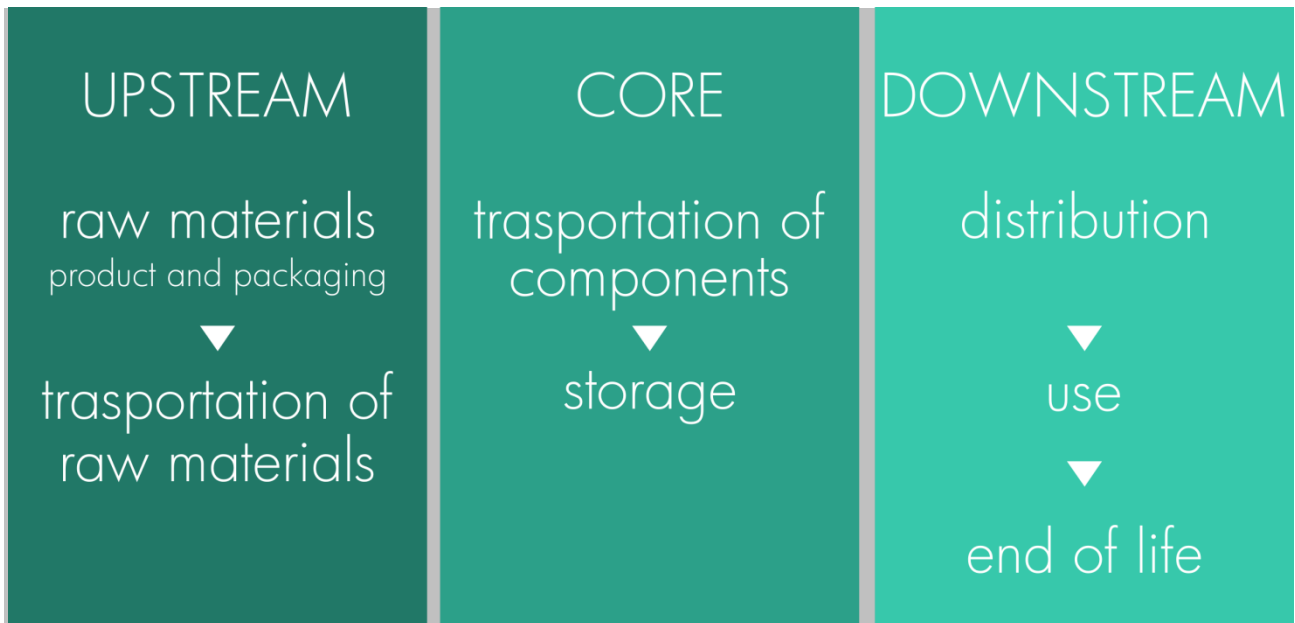
The boundaries of the system include the extraction of raw materials, the production of components and packaging materials, assembly, transport of raw materials and components, storage, distribution, the use phase and the purpose life of the packaging and the product.

Specifically, the Upstream processes include: the raw materials extraction, their transport, the production of the chair components, the assembly of the structure and the final packaging of the structure.

Core processes include: transport to the storage warehouse and consumption of electricity and water for storage. The assembly of the product and / or its production are not included in the Core since Arper does not produce or assemble its products internally; the products are partially assembled

directly by suppliers and then sent to the (external) storage warehouse. Besides, the maintenance phase was excluded from the Core processes given the negligible impact.

Downstream processes include the distribution of the packaged product, the use phase and the end-of-life phase of the product and its packaging.



TIME BOUNDARIES

The primary data come from Arper and refer to the year 2020. The secondary data come from the ecoinvent v 3.8 allocation database, 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 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. Product maintenance was not included in the study. 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

Allocation represents the procedure according to which the inputs and outputs of the system are divided between the different products in order to reflect the underlying physical relationships. The production processes of the raw materials in this study do not involve the formation of co-products, for which therefore it is not necessary to apply criteria for allocating environmental loads.

As regards the allocation related to the end of life, the "cut-off" approach is 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 separated into the different sources.

DATA QUALITY

This EPD is based on primary data for the fundamental aspects of the study, such as the weight of the components and packaging materials. Primary LCA data were collected from Arper's suppliers. The ecoinvent v3.8 database was used for secondary data. The LCA calculation was carried out using the SimaPro 9.3.0.3 software.

The use of proxy data does not exceed the limit of 10% of the overall impact of the main impact categories (Annex 1, LCA Report), as required by the reference PCR.

The methodology described in the manual relating to data collection and the EPD procedure was used to collect the data and carry out the LCA calculations. Primary material data was obtained from the supplier for the main components of the chair. The components for which primary data has been made available belong to the structure, spacers and feet.

The Italian residual energy mix was used for the energy consumption related to the recovery processes of the regenerated polypropylene and the moulding of the chair structure. 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 v3.8 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.



All data relating to sales in the countries of destination of Juno Eco were used for the distribution phase. A road transport was considered (ecoinvent database process: Transport, freight, lorry 16-32 metric ton, euro4 {RER}) with the distance between the Arper headquarters and the capital of the importing country. Local transport of 300 km by road is also evaluated (truck 16-32 t EURO 4).

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) of 100 km is assumed. For the end-of-life scenario, average national data (from Eurostat databases) have been used for the countries in which the product is sold.

IMPACT ASSESSMENT

The method defined by PCR 2009: 02 v3.0 - Seats was 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, global warming - fossil fuels, global warming - biogenic carbon, global warming - land use, acidification, eutrophication, photochemical oxidation, depletion of abiotic resources - elements, depletion of abiotic resources - fossil fuels, water scarcity footprint;
- Resource use indicators: consumption of resources (renewable and non-renewable), secondary materials and fuels and freshwater;
- Waste indicators: hazardous waste, non-hazardous waste and radioactive waste;
- Outflow indicators: materials for recycling and energy recovery;
- Other indicators: human toxicity (carcinogenic and non-carcinogenic effects), ecotoxicity of freshwater and land use.

Impact categories come from the baseline CML, non-baseline CML, USEtox 1.04 recommended + interim, Recipe H / A 2008 and AWARE methods.

The indicators are divided into the contribution of the Upstream, Core and Downstream phases.

TABLE 2: WHITE JUNO ECO, ENVIRONMENTAL INDICATORS	Unit	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO ₂ eq	1,34E+01	9,75E+00	2,00E-01	3,41E+00
Global warming (GWP100a)_fossil	kg CO ₂ eq	1,28E+01	9,55E+00	1,97E-01	3,01E+00
Global warming (GWP100a)_ biogenic	kg CO ₂ eq	5,91E-01	1,93E-01	3,31E-03	3,95E-01
Global warming (GWP100a)_land use	kg CO ₂ eq	1,17E-02	1,09E-02	4,19E-05	8,31E-04
Acidification Potential	Kg SO ₂ eq	5,70E-02	4,66E-02	6,80E-04	9,65E-03
Eutrophication potential	kg PO ₄ ³⁻	1,99E-02	1,50E-02	1,51E-04	4,75E-03
Photochemical ozone formation, HH	kg NMVOC eq	4,67E-02	3,45E-02	6,66E-04	1,15E-02
Abiotic depletion	Kg Sb eq	8,07E-05	7,26E-05	4,71E-07	7,57E-06
Abiotic depletion (fossil fuels)	MJ	1,78E+02	1,39E+02	2,83E+00	3,59E+01
Water scarcity	m ³ eq	3,96E+00	3,79E+00	7,01E-02	1,07E-01
Renewable resources, energy	MJ	7,63E+00	7,02E+00	1,17E-01	4,88E-01
Renewable resources, materials	MJ	1,12E+01	1,12E+01	0,00E+00	0,00E+00
Renewable resources, total	MJ	1,88E+01	1,82E+01	1,17E-01	4,88E-01
Non-renewable resources, energy	MJ	1,86E+02	1,46E+02	3,03E+00	3,67E+01
Non-renewable resources, materials	MJ	1,94E+01	1,94E+01	0,00E+00	0,00E+00
Non-renewable resources, total	MJ	2,05E+02	1,65E+02	3,03E+00	3,67E+01
Water use	kg	3,79E+00	3,79E+00	0,00E+00	0,00E+00
Hazardous waste	m ³	1,14E-01	1,08E-01	1,78E-03	4,20E-03
Non-hazardous waste	kg	5,68E-02	5,02E-02	1,13E-04	6,53E-03
Radioactive waste	kg	3,44E+00	1,14E+00	6,91E-02	2,24E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	Kg	1,67E-03	1,67E-03	0,00E+00	0,00E+00
Human toxicity, cancer	kg	2,88E-01	0,00E+00	0,00E+00	2,88E-01
Human toxicity, non-cancer	cases	6,78E-07	5,37E-07	7,84E-09	1,33E-07
Freshwater ecotoxicity	cases	3,30E-06	2,68E-06	1,88E-08	5,97E-07
Land use	PAF.m ³ .day	1,03E+05	9,20E+04	5,63E+02	1,01E+04

Table 2 - List of environmental indicators of white Juno Eco.

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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E-mail: info@environdec.com

Product category rules (PCR): *Seats, 2009:02, version 3.0, UN CPC 3811*

PCR review conducted by: Leo Breedveld, 2B Srl, available on the website of the International EPD Consortium (IEC): www.environdec.com

Independent third-party verification of the declaration and data, according to 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

The EPD owner has the sole ownership, liability and responsibility of the EPD.

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

DIFFERENCES FROM PREVIOUSVERSIONS

Compared to the previous version of this EPD, the ecoinvent database and SimaPro software versions have been updated to 3.8 and 9.3 respectively. The company's impacts (energy consumption and waste treatment), distribution statistics, end-of-life scenarios based on sales statistics have been updated to the new reference year (2020). Furthermore, the transport for distribution and end of life has been modified by replacing the truck > 32t EURO5 with the 16-32t EURO4 truck because it is more representative. The percentage of white and grey master used for the two versions of the Juno Eco has been corrected, with consequent variations in environmental indicators (> 10%), as reported in the document "Esploso_Juno_ECO_2021-02-17".

BIBLIOGRAPHY

- 2B Srl, 2021. LCA project Juno (www.to-be.it).
- Arper spa, 2B srl, Manuale descrittivo della procedura EPD Arper v1.3, novembre 2021.
- Arper spa, 2B srl, Raccolta dei dati LCA/EPD, novembre 2021.
- ecoinvent, 2021: Swiss Centre for Life Cycle Assessment, fornitore del database ecoinvent v3.8(www.ecoinvent.ch).
- 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, https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASTRT.
- Eurostat, https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASPAC.
- 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.environdedec.com).
- PRé Consultants, Olanda. Software SimaPro, versione 9.3.0.3. (www.pre.nl).
- General Programme Instructions for Environmental Product Declaration EPD, Version 3.01, 2019-09-18. Swedish Environmental Management Council (www.environdedec.com).
- Ioelovich, M. et al, 2018. Energy Potential of natural, synthetic polymers and waste materials – review.