

# ENVIRONMENTAL PRODUCT DECLARATION

## DUNA 02 eco

with recycled polypropylene shell

four wood leg base model



EPD Program: International EPD System ([www.environdec.com](http://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

Publication date: 2019-01-18      Valid until: 2021-12-13

Revision date: 2020-07-22

Registration number: S-P-01498



THE INTERNATIONAL EPD® SYSTEM

# arper

## CONTENTS

The company and the product .....	3
Environmental information .....	5
Additional environmental information.....	9
Contact and other information .....	10
Bibliography.....	12

## 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 valorization 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

Made for both residential and indoor contact use, Duna 02 is available in polypropylene version, fully upholstered, the front face upholstery version or with an accessory cushion for improved comfort. Duna 02's refined silhouette is complemented by the different types of base available, making this chair ideally suited for home and hospitality spaces. In addition to polypropylene, Duna 02 is also available in sustainably-made shell, a 100% recycled postindustrial material. The Duna 02 collection is GreenGuard certified.

Duna 02 with recycled polypropylene shell was presented to the public during the last Milan show (April, 2018), tests for its industrial production were conducted in 2017.

This EPD describes Duna 02 with post-industrial recycled polypropylene shell and 4 wood leg base.

This EPD summarizes the indicators related to the environmental impact of Duna 02 with a white shell. The evaluation of the impacts of versions in different colours is conducted through sensitivity analysis.

Table 1 lists the material declaration of both the chair and its packaging. Either the single chair can be individually packed, or 4 pieces together. Data on the packaging are taken from the 2019 sales reports of Duna 02 eco: 72.7% of the Duna 02 eco are packed as 4 pieces together.

TABLE 1: MATERIALS OF THE DUNA 02 WITH 4 WOOD LEG BASE



	Materials	kg	%
Duna 02	Recycle PP + talc + master	2.864	53%
	Multilayer painted wood	1.919	36%
	Steel	0.462	8.6%
	Galvanized steel	0.056	1%
	PP+ glass fiber	0.030	1%
	Zamak	0.015	0%
	Brass	0.013	0%
	PP	0.006	0%
	Total, seat	5.365	100%
Packagin x 4 (material for 1 seat)	Cardboard	1.265	88%
	PE	0.165	11%
	Paper	0.006	0%
	Galvanized steel	0.005	0%
	Other	0.002	0%
	Total, packaging x 4	1.443	100%
Imballo x1	Cardboard	3.760	95%
	PE	0.162	4%
	Paper	0.023	1%
	Galvanized steel	0.009	0%
	Other	0.003	0%
	Total, packaging x 1	3.957	100%
Total weight, seat with packaging x 4		6.808	-
Total weight, seat with packaging x 1		9.322	-

## ENVIRONMENTAL INFORMATION

### DECLARED UNIT

The declared unit is represented by 1 seat with a lifetime of 15 years.

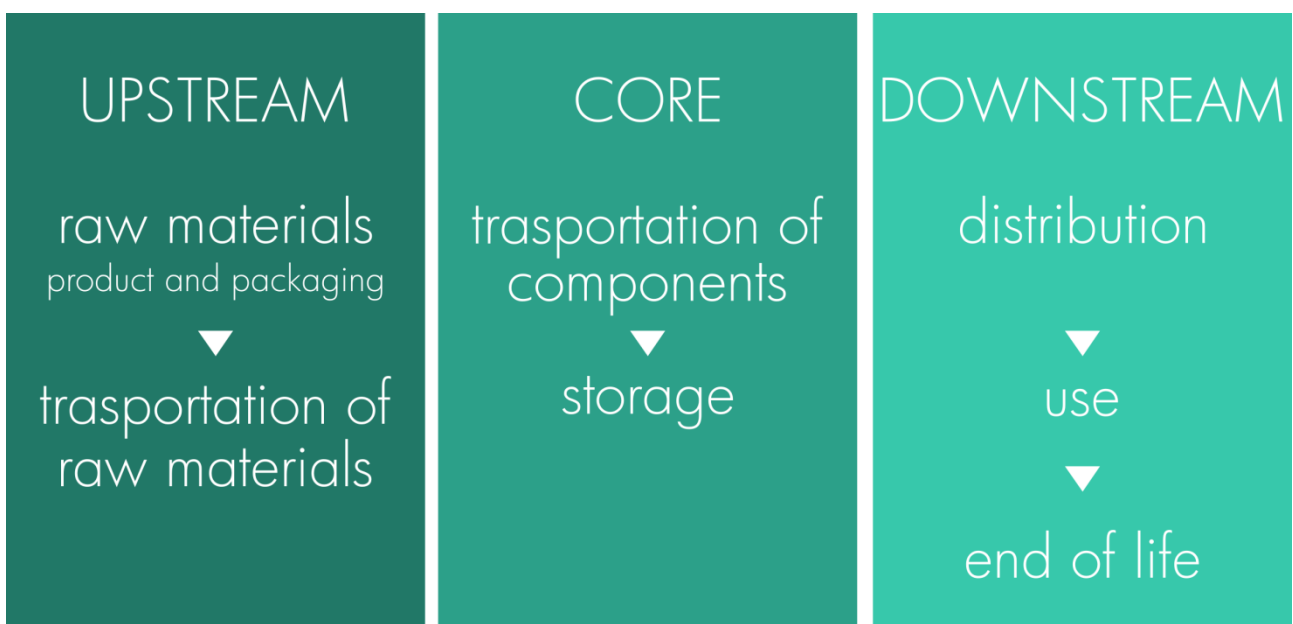
### SYSTEM BOUNDARIES

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 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.



### TIME BOUNDARIES

Primary data originate from Arper and refer to 2019. Secondary data originate from the ecoinvent v3.5 database (allocation, cut-off by classification) published in 2019.

## 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

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

The LCA of Duna 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 v3.5.

The LCA calculation has been performed using the LCA software SimaPro 9.

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 data relative to the consumption in the production process were obtained from the supplier and used for the polypropylene shell. Similarly, primary data were used for the recycling process of the recycled granulate.

Primary data have been used for product storage, provided by the company responsible for the storage.

For the distribution phase sales data have been used considering a road transport (lorry > 32 t) and the 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) has been assumed.

# arper

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) 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

Tables 2 and 3 show the environmental indicators of the Duna 02 chiar. Environmental indicators consist of 10 impact categories (global warming total/fossil/biogenic/land use, acidification, photochemical smog, 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 broken down into upstream, core and downstream processes.

TABLE 1: DUNA 02, 4 WOOD LEG, ENVIRONMENTAL INDICATORS					
Impact category	Units	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO <sub>2</sub> eq	16.4	10.3	0.1	5.9
Global warming (GWP100a)_fossil	kg CO <sub>2</sub> eq	18.1	13.2	0.1	4.8
Global warming (GWP100a)_ biogenic	kg CO <sub>2</sub> eq	-1.83	-2.97	0.00	1.13
Global warming (GWP100a)_land use	kg CO <sub>2</sub> eq	0.042	0.041	0.000	0.001
Acidification Potential	Kg SO <sub>2</sub> eq	0.104	0.078	0.001	0.025
Eutrophication potential	kg PO <sub>4</sub> <sup>3-</sup>	0.041	0.028	0.000	0.013
Photochemical ozone formation, HH	kg NMVOC eq	0.065	0.045	0.001	0.019
Abiotic depletion	Kg Sb eq	0.000	0.000	0.000	0.000
Abiotic depletion (fossil fuels)	MJ	228	194	2	32
Water scarcity	m <sup>3</sup> eq	2693	2579	28	86
Renewable resources, energy	MJ	81.3	80.4	0.2	0.6
Renewable resources, materials	MJ	-	-	-	-
Renewable resources, total	MJ	81.3	80.4	0.2	0.6
Non renewable resources, energy	MJ	0.122	0.121	0.000	0.001
Non renewable resources, materials	MJ	275	237	2	36
Non renewable resources, total	MJ	275	237	2	36
Water use*	m <sup>3</sup>	89.0	85.1	0.7	3.2
Hazardous waste	kg	0.129	0.073	0.000	0.056
Non hazardous waste	kg	6.82	1.91	0.06	4.85
Radioactive waste	kg	-	-	-	-
Human toxicity, cancer	cases	0.000	0.000	0.000	0.000
Human toxicity, non-cancer	cases	0.000	0.000	0.000	0.000
Freshwater ecotoxicity	PAF.m <sup>3</sup> .day	118980	87953	236	30791
Land use	species.yr	0.000	0.000	0.000	0.000

\* 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 2: DUNA 02 ECO, MATERIAL AND ENERGY RESOURCES		Unit	Total	Upstream	Core	Downstream
Non-renewable resources, materials	Total	MJ	275	237	2	36
	Gas, natural/m3	MJ	112	103	1	8
	Oil, crude	MJ	84	59	1	24
	Coal, hard	MJ	44	41	0	2
	Uranium	MJ	27	26	0	1
	Coal, brown	MJ	7	6	0	1
	Other	MJ	1	1	0	0
Non-renewable resources, energy	Total	MJ	0.122	0.121	0.000	0.001
	Energy, gross calorific value, in biomass	MJ	0.122	0.121	0.000	0.001
Renewable resources, materials	Total	MJ	0.000	0.000	0.000	0.000
Renewable resources, energy	Total	MJ	81.3	80.4	0.2	0.6
	Energy, gross calorific value, in biomass	MJ	60.9	60.7	0.0	0.1
	Energy, potential, hydropower	MJ	15.1	14.6	0.1	0.4
	Energy, kinetic	MJ	3.3	3.2	0.0	0.1
	Other	MJ	1.9	1.9	0.0	0.0

## ADDITIONAL ENVIRONMENTAL INFORMATION



Since 2008 “Duna 02” with upholstered shell in polypropylene is GREENGUARD GOLD certified, certificate number: 84962-420.

Duna 02 with upholstered shell in polypropylene is GECA certified, license number: ARP-2017, licensee since: 02 July 2009, license expire date: 07 February 2020.



## 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](http://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](mailto:michelapossagno@arper.com)

web-site: [www.arper.com](http://www.arper.com)

### CERTIFICATION AND CERTIFICATION BODY INFORMATION

Registration N°: S-P-01498

Publishing date: 2019-01-18

Document valid until: 2021-12-13

Revision date: 2020-07-22

Reference year: 2019

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](http://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](http://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](http://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 PREVIOUS VERSIONS

In comparison to the previous version of this EPD, 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 minor changes in the environmental indicators (< 10%).

## BIBLIOGRAPHY

- 2B srl, 2020. LCA project Duna 02 ([www.to-be.it](http://www.to-be.it)).
- Arper Spa, 2B Srl, Manuale descrittivo della procedura EPD Arper v1.1, dicembre 2019.
- Arper Spa, 2B Srl, Raccolta dei dati LCA/EPD v1.1, dicembre 2019.
- EC, Default data for End Of Life (EOL) for Product Environmental Footprint (PEF) during the Environmental Footprint (EF) pilot phase ([ec.europa.eu](http://ec.europa.eu)).
- ecoinvent, 2019: Swiss Centre for Life Cycle Assessment, fornitore del database ecoinvent v3.5 ([www.ecoinvent.ch](http://www.ecoinvent.ch)).
- ISO 14025:2006. Environmental labels and declarations, type 3 environmental declarations, principles and procedures ([www.iso.org](http://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](http://www.iso.org)).
- ISPRA, 2018. Rapporto Rifiuti Urbani ([www.isprambiente.gov.it](http://www.isprambiente.gov.it)).
- OECD, Environment at a Glance, 2015 ([www.oecd.org](http://www.oecd.org)).
- Solid Waste Management in Saudi Arabia EcoMENA, 2015 ([www.ecomena.org](http://www.ecomena.org)).
- An Econometric Analysis of Global Waste Paper Recovery and Utilization, 2003 ([www.researchgate.net](http://www.researchgate.net)).
- Netwall et al. Emerging Issues in Solid Waste Management in Argentina, 2014 ([publications.iadb.org](http://publications.iadb.org)).
- S. Kumar et al. Challenges and opportunities associated with waste management in India, February 2017 ([www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)).
- 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](http://www.environdec.com)).
- PRé Consultants, Olanda. Software SimaPro, versione 9 ([www.pre-sustainability.nl](http://www.pre-sustainability.nl)).
- SEMC, 2015. International EPD Cooperation (IEC), General Programme Instructions for Environmental Product Declaration EPD, Version 3.01, 2019-09-18. Swedish Environmental Management Council ([www.environdec.com](http://www.environdec.com)).