

ENVIRONMENTAL PRODUCT DECLARATION

DUNA 02

With polypropylene shell

Four wood leg base model

EPD Program: International EPD System (www.environdec.com)

Programme operator: EPD International AB

Reference GPI: General Programme Instructions IES v.3.0

Reference PCR: PCR 2009:02 v2.0 "Seats" CPC Code: 3811

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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 O2 is available in polypropylene version, fully upholstered, the front face upholstery version or with an accessory cushion for improved comfort. Duna O2'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 O2 is also available in sustainably-made shell, a 100% recycled postindustrial material. The Duna O2 collection is GreenGuard certified.

This EPD describes Duna O2 with propylene shell and 4 wood leg base.

This EPD summarizes the indicators related to the environmental impact of Duna O2 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 2017 sales reports of Duna O2: 78% of the chairs are packed as 4 pieces together.

TABLE 1: MATERIALS IN THE DUNA O2 CHAIR



| | Materials | Weight | |
|--|------------------------|--------|------|
| | | kg | % |
| Duna O2 | PP + talc + master | 2.864 | 53% |
| | Multilayer painted wod | 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, sea | 5.365 | 100% |
| Packaging 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% | |
| Packaging 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

FUNCTIONAL UNIT

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

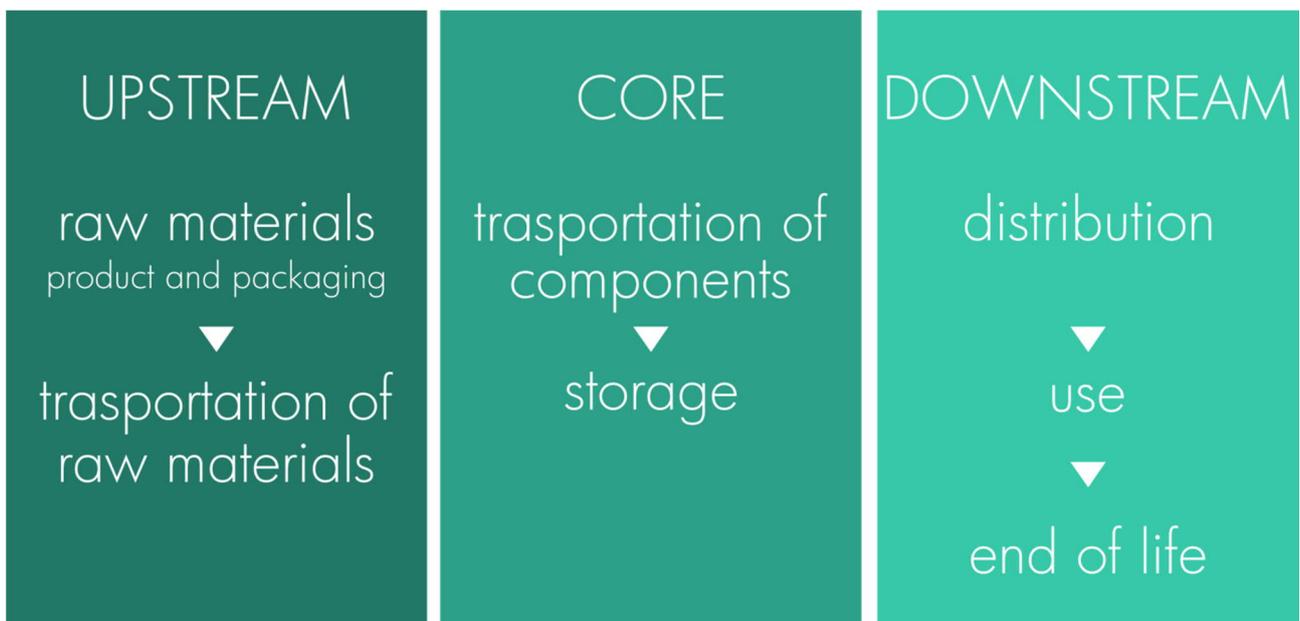
SYSTEM BOUNDARIES

The system boundaries include the 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 2017. Secondary data originate from the ecoinvent v3.4 database (allocation, cut-off by classification) published in 2017.

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.

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.

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 O2 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 v3.4.

The LCA calculation has been performed using the LCA software SimaPro 8.5.

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 on the consumptions in the production processes were made available from the supplier.

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

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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.

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 chair. Environmental indicators consist of 7 impact categories (global warming, acidification, photochemical smog, eutrophication, human toxicity, ecotoxicity and land use), material and energy resources (renewable and non renewable), consumption of water and waste. The indicators are broken down into upstream, core and downstream processes.

TABLE 2: DUNA 02, 4 WOOD LEG, ENVIRONMENTAL INDICATORS

| Impact category | Units | Total | Upstream | Core | Downstream |
|---|------------------------------------|-------|----------|-------|------------|
| Global Warming | kg CO ₂ eq | 22.3 | 18.1 | 0.1 | 4.1 |
| Acidification | kg SO ₂ eq | 0.105 | 0.090 | 0.001 | 0.015 |
| Photochemical oxidation | g C ₂ H ₄ eq | 7.21 | 6.38 | 0.03 | 0.80 |
| Eutrophication | kg PO ₄ ³⁻ | 39.7 | 25.9 | 0.2 | 13.6 |
| Human Toxicity | CTUh 10 ⁻⁵ | 1.12 | 0.96 | 0.00 | 0.16 |
| Ecotoxicity | CTUe 10 ³ | 298 | 167 | 1 | 130 |
| Land use | species.yr10 ⁸ | 11.2 | 10.9 | 0.0 | 0.2 |
| Non-renewable resources, materials | kg | 5.88 | 4.27 | 0.07 | 1.54 |
| Non-renewable resources, energy | kg | 10.1 | 9.4 | 0.1 | 0.6 |
| Renewable resources, materials | t | 86.1 | 82.6 | 0.9 | 2.5 |
| Renewable resources, energy | MJ | 80.0 | 79.2 | 0.3 | 0.5 |
| Secondary resources, materials | kg | - | - | - | - |
| Secondary resources, energy | MJ | - | - | - | - |
| Recovered energy | MJ | - | - | - | - |
| Total amount of water * | m ³ | 86.1 | 82.6 | 0.9 | 2.5 |
| Direct amount of water used by the core process | l | 0.750 | 0.000 | 0.750 | 0.000 |
| Hazardous wastes | kg | 72.8 | 30.3 | 0,1 | 42.3 |
| Radioactive wastes | kg | - | - | - | - |
| Non-hazardous wastes | kg | 7.34 | 0.00 | 0.00 | 7.34 |

* 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: DUNA O2, MATERIAL AND ENERGY RESOURCES | | Units | Total | Upstream | Core | Downstream |
|---|--|-------|-------|----------|-------|------------|
| Non-renewable resources, materials | Total | kg | 5.88 | 4.27 | 0.07 | 1.54 |
| | Other* | kg | 0.461 | 0.440 | 0.001 | 0.020 |
| | Gravel | kg | 3.78 | 2.24 | 0.07 | 1.46 |
| | Iron | kg | 0.579 | 0.555 | 0.002 | 0.022 |
| | Dolomite | kg | 0.548 | 0.548 | 0.000 | 0.000 |
| | Calcite | kg | 0.514 | 0.482 | 0.002 | 0.029 |
| Non-renewable resources, energy | Total | kg | 10.1 | 9.4 | 0.1 | 0.6 |
| | Other* | kg | 0.015 | 0.015 | 0.000 | 0.001 |
| | Oil, crude | kg | 3.84 | 3.44 | 0.03 | 0.37 |
| | Gas, natural/m3 | kg | 3.08 | 2.93 | 0.01 | 0.14 |
| | Coal, hard | kg | 2.52 | 2.41 | 0.02 | 0.09 |
| | Coal, brown | kg | 0.680 | 0.641 | 0.004 | 0.036 |
| Renewable resources, materials | Total | t | 86.1 | 82.6 | 0.9 | 2.5 |
| | Other* | t | 14.2 | 13.3 | 0.1 | 0.9 |
| | Water, IT | t | 37.1 | 36.5 | 0.6 | 0.0 |
| | Water, RoW | t | 12.1 | 11.6 | 0.0 | 0.4 |
| | Water, CH | t | 8.93 | 8.32 | 0.14 | 0.47 |
| | Water, FR | t | 7.48 | 7.11 | 0.10 | 0.27 |
| Renewable resources, energy | Water, CN | t | 6.31 | 5.83 | 0.01 | 0.46 |
| | Total | MJ | 80.0 | 79.2 | 0.3 | 0.5 |
| | Other* | MJ | 4.93 | 4.79 | 0.06 | 0.07 |
| | Energy, gross calorific value, in biomass | MJ | 59.8 | 59.6 | 0.0 | 0.1 |
| | Energy, potential (in hydropower reservoir), converted | MJ | 15.4 | 14.9 | 0.2 | 0.3 |

* resources with a contribution lower than 5 %.

ADDITIONAL ENVIRONMENTAL INFORMATION



Since 2008 "Duna O2" with upholstered shell in virgin polypropylene is GREENGUARD GOLD certified, certificate number: 84962-420.

Duna O2 with upholstered shell in virgin 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). The company references are:

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CERTIFICATION AND CERTIFICATION BODY INFORMATION

Registration N°: S-P-01497

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Geographic area validity: Global

PCR 2009:02, version 2.0 (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)

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.

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