

ENVIRONMENTAL PRODUCT DECLARATION

CATIFA 46

with polypropylene shell

four leg base model, in chromed or painted steel,
trestle base model, painted or aluminium finish



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 contract use, indoors and out, the Catifa 46 shell and base are fabricated in a diverse range of materials, colours and finishes. The shell is constructed in double curved plywood, mono or bicolour polypropylene, covered in leather, hard leather, fabric or finished with upholstered pads. The base comes in chrome finish steel, satin finish stainless steel, aluminium, powder coated aluminium or wood, and is available in the following configurations: sled, four leg, trestle and five ways.

This declaration describes Catifa 46 with propylene shell and a 4 leg or trestle base. The 4 leg base is available with a painted or chromed steel finish, the trestle base comes with a painted or aluminium finish.

This EPD summarizes the indicators related to the environmental impact of Catifa 46 with a white shell, which can be considered representative for versions featuring a shell in different colours (black, sepia, anthracite, ivory, yellow, red, pink, petrol green, green). Representativeness has been verified through sensitivity analysis.

Table 1 and Table 2 list the material declaration of both the chair and its packaging. The single chair can be packed individually, or 4 pieces together.

TABLE 1: MATERIALS OF THE CATIFA 46 WITH 4 LEG BASE.



CATIFA 46 4 LEG		CHROMED BASE		PAINTED BASE	
Materials	kg	%	kg	%	
Catifa 46	Steel with surface treatment	2.388	50%	2.429	50%
	PP	1.564	33%	1.564	32%
	PP + talc	0.840	18%	0.840	17%
	PE	0.004	0%	0.004	0%
	TPU	0.003	0%	0.003	0%
	Total	4.799	100%	4.840	100%
Packaging x 1	Cardboard	2.440	94%	2.440	95%
	PE	0.090	3%	0.069	3%
	Paper	0.030	1%	0.030	1%
	Galvanized steel	0.024	1%	0.024	1%
	Total	2.583	100%	2.562	100%
Packaging x 4	Cardboard	3.627	90%	3.627	92%
	PE	0.345	9%	0.261	7%
	Paper	0.032	1%	0.032	1%
	Galvanized steel	0.024	1%	0.024	1%
	Total	4.027	100%	3.943	100%

TABLE 2: MATERIALS OF THE CATIFA 46 WITH TRESTLE BASE.



	CATIFA TRESTLE		ALUMINIUM BASE		PAINTED BASE	
	Materials	kg	%	kg	%	
Catifa 46	Steel	2.761	36%	2.765	36%	
	Aluminium	2.400	32%	2.400	32%	
	PP	1.572	21%	1.584	21%	
	PP + 5 % Talc	0.840	11%	0.840	11%	
	GEB015	0.029	0%	0.029	0%	
	PE	0.010	0%	-	-	
	Total	7.612	100%	7.617	100%	
Packaging x 1	Cardboard	3.157	88%	3.157	96%	
	PE	0.383	11%	0.083	3%	
	Paper	0.032	1%	0.032	1%	
	Steel	0.023	1%	0.023	1%	
	Total	3.594	100%	3.294	100%	
Packaging x 4	Cardboard	4.511	74%	4.511	92%	
	PE	1.517	25%	0.317	6%	
	Paper	0.032	1%	0.032	1%	
	Steel	0.023	0%	0.023	0%	
	Total	6.082	100%	4.882	100%	

ENVIRONMENTAL INFORMATION

FUNCTIONAL UNIT

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

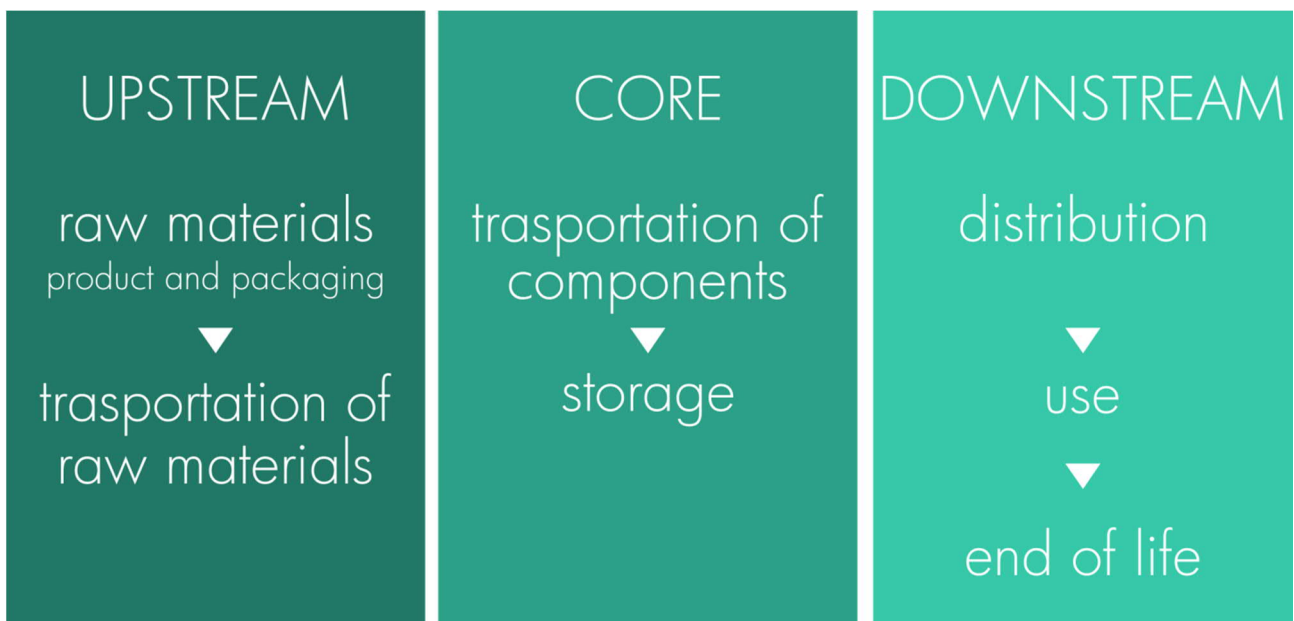
SYSTEM BOUNDARIES

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

GEOGRAPHICAL BOUNDARIES

Components and packaging materials are produced in Italy, except for the trestle base, which is produced in Vietnam. 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.

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 v3.4.

Some ecoinvent v3.4 processes, such as powder coating, welding, extrusion of steel bars and injection moulding of plastic parts, have been adapted to the Italian situation (or Vietnamese in the case of the trestle base) changing the energy mix in order to make them more representative of the system studied. Electricity mixes were taken from the ecoinvent database.

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.

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Primary data have been used for the following components: polypropylene shell, legs, trays, clips, feet and stacking caps, data on chromium plating and painting processes of the 4 leg base, data about clips for the trestle.

For the packaging of Catifa 46, the information from the sales data of the year 2017 has been used: 90% of the Catifa 46 4 leg and 83% of the Catifa 46 trestle are packed in a 4 piece box packaging.

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.

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

Table 3 until table 10 show the environmental indicators of the Catifa 46 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 3: CATIFA 46 4 LEG, CHROMED ENVIRONMENTAL INDICATORS		Units	Total	Upstream	Core	Downstream
Environmental Impact Categories	Global Warming	kg CO ₂ eq	24.7	21.0	0.1	3.6
	Acidification	kg SO ₂ eq	0.106	0.095	0.000	0.011
	Photochemical oxidation	g C ₂ H ₄ eq	6.94	6.42	0.02	0.50
	Eutrophication	kg PO ₄ ³⁻	0.042	0.037	0.000	0.005
	Human toxicity	CTUh 10 ⁻⁵	3.94	3.79	0.00	0.15
	Ecotoxicity	CTUe 10 ³	1.90	0.50	0.00	1.40
	Land use	species.yr 10 ⁻⁸	3.47	3.19	0.02	0.26
Use of resources	Non-renewable resources, materials	kg	8.80	7.17	0.05	1.57
	Non-renewable resources, energy	kg	11.3	10.6	0.0	0.6
	Renewable resources, materials	t	129	123	1	6
	Renewable resources, energy	MJ	39.2	37.9	0.2	1.1
	Secondary resources, materials	kg	-	-	-	-
	Secondary resources, energy	kg	-	-	-	-
	Recovered energy	MJ	-	-	-	-
	Total amount of water *	m ³	129	122	1	6
Direct amount of water used by the core process	l	0.000	0.000	0.000	0.000	
Wastes	Hazardous wastes	kg	0.923	0.024	0.000	0.899
	Radioactive wastes	kg	-	-	-	-
	Non-hazardous wastes	kg	5.94	0.00	0.00	5.94

* 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 4: CATIFA 46 4 LEG, CHROMED, MATERIAL AND ENERGY RESOURCES		Units	Total	Upstream	Core	Downstream
	Non-renewable resources, materials	kg	8.80	7.17	0.05	1.57
	Gravel	kg	4.2	2.6	0.1	1.5
	Iron	kg	2.6	2.5	0.0	0.0
	Calcite	kg	1.3	1.3	0.0	0.0
	Other*	kg	0.7	0.7	0.0	0.0
	Non-renewable resources, energy	kg	11.3	10.6	0.0	0.6
	Coal, hard	kg	4.3	4.2	0.0	0.1
	Oil, crude	kg	3.6	3.2	0.0	0.4
	Gas, natural/m ³	kg	2.4	2.3	0.0	0.1
	Coal, brown	kg	0.9	0.9	0.0	0.0
	Other*	kg	0.0	0.0	0.0	0.0
Use of Resources	Renewable resources, materials	t	129	123	1	6
	Water, RoW	t	39	38	0	0
	Water, IT	t	37	37	0	0
	Water, CN	t	13	13	0	0
	Water, CH	t	11	9	0	3
	Water, FR	t	9	7	0	1
	Other*	t	20	19	0	1
	Renewable resources, energy	MJ	39.2	37.9	0.2	1.1
	Energy, potential, hydropower	MJ	19.5	18.6	0.1	0.8
	Energy, gross calorific value, in biomass	MJ	14.3	14.1	0.0	0.2
	Energy, kinetic	MJ	3.5	3.4	0.0	0.1
	Other*	MJ	1.8	1.8	0.0	0.0

* Resources with a contribution lower than 5 %.

TABLE 5: CATIFA 46 4 LEG, PAINTED, ENVIRONMENTAL INDICATORS		Units	Total	Upstream	Core	Downstream
Environmental Impact Categories	Global Warming	kg CO ₂ eq	28.1	24.3	0.1	3.6
	Acidification	kg SO ₂ eq	0.148	0.137	0.000	0.011
	Photochemical oxidation	g C ₂ H ₄ eq	8.28	7.76	0.02	0.50
	Eutrophication	kg PO ₄ ³⁻	0.048	0.042	0.000	0.005
	Human toxicity	CTUh 10 ⁻⁵	2.43	2.27	0.00	0.15
	Ecotoxicity	CTUe 10 ³	1.80	0.37	0.00	1.42
	Land use	species-yr 10 ⁻⁸	3.74	3.45	0.02	0.27
Use of resources	Non-renewable resources, materials	kg	9.66	8.02	0.05	1.59
	Non-renewable resources, energy	kg	12.8	12.1	0.0	0.7
	Renewable resources, materials	t	142	136	1	6
	Renewable resources, energy	MJ	41.8	40.6	0.2	1.1
	Secondary resources, materials	kg	-	-	-	-
	Secondary resources, energy	kg	-	-	-	-
	Recovered energy	MJ	-	-	-	-
	Total amount of water *	m ³	142	136	1	6
	Direct amount of water used by the core process	l	0.000	0.000	0.000	0.000
Wastes	Hazardous wastes	kg	0.941	0.027	0.000	0.914
	Radioactive wastes	kg	-	-	-	-
	Non-hazardous wastes	kg	6.01	0.00	0.00	6.00

* 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 6: CATIFA 46 4 LEG PAINTED, MATERIAL AND ENERGY RESOURCES		Units	Total	Upstream	Core	Downstream
	Non-renewable resources, materials	kg	9.66	8.02	0.05	1.59
	Gravel	kg	4.51	2.93	0.05	1.52
	Iron	kg	3.02	2.99	0.00	0.02
	Calcite	kg	1.31	1.28	0.00	0.03
	Other*	kg	0.83	0.82	0.00	0.01
	Non-renewable resources, energy	kg	12.8	12.1	0.0	0.7
	Coal, hard	kg	4.9	4.8	0.0	0.1
	Oil, crude	kg	3.8	3.4	0.0	0.4
	Gas, natural/m ³	kg	3.0	2.8	0.0	0.1
	Coal, brown	kg	1.1	1.0	0.0	0.0
	Other*	kg	0.0	0.0	0.0	0.0
Use of resources	Renewable resources, materials	t	142	136	1	6
	Water, RoW	t	45	45	0	0
	Water, IT	t	37	37	0	0
	Water, CN	t	16	15	0	0
	Water, CH	t	12	9	0	3
	Water, FR	t	9	8	0	1
	Other*	t	24	22	0	1
	Renewable resources, energy	MJ	41.8	40.6	0.2	1.1
	Energy, potential, hydropower	MJ	21.1	20.2	0.1	0.8
	Energy, gross calorific value, in biomass	MJ	15.1	14.9	0.0	0.2
	Energy, kinetic	MJ	3.7	3.6	0.0	0.1
	Other*	MJ	1.9	1.9	0.0	0.0

* Resources with a contribution lower than 5 %.

TABLE 7: CATIFA 46 TRESTLE, ALUMINIUM, ENVIRONMENTAL INDICATORS		Units	Total	Upstream	Core	Downstream
Environmental Impact Categories	Global Warming	kg CO ₂ eq	42.2	38.3	0.1	3.9
	Acidification	kg SO ₂ eq	0.227	0.204	0.001	0.022
	Photochemical oxidation	g C ₂ H ₄ eq	13.0	12.0	0.0	1.0
	Eutrophication	kg PO ₄ ³⁻	0.072	0.063	0.000	0.008
	Human toxicity	CTUh 10 ⁻⁵	3.28	3.12	0.00	0.17
	Ecotoxicity	CTUe 10 ⁻³	4.81	3.58	0.00	1.23
	Land use	species.yr 10 ⁸	6.18	5.88	0.02	0.28
Use of resources	Non-renewable resources, materials	kg	12.8	11.0	0.1	1.8
	Non-renewable resources, energy	kg	18.6	17.7	0.0	0.9
	Renewable resources, materials	t	267	259	1	7
	Renewable resources, energy	MJ	67.6	66.1	0.2	1.3
	Secondary resources, materials	kg	-	-	-	-
	Secondary resources, energy	kg	-	-	-	-
	Recovered energy	MJ	-	-	-	-
	Total amount of water *	m ³	267	259	1	7
	Direct amount of water used by the core process	l	0.001	0.000	0.001	0.000
Wastes	Hazardous wastes	kg	1.31	0.14	0.00	1.16
	Radioactive wastes	kg	-	-	-	-
	Non-hazardous wastes	kg	9.52	0.35	0.00	9.17

* 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 8: CATIFA 46 TRESTLE, ALUMINIUM, MATERIAL AND ENERGY RESOURCES		Units	Total	Upstream	Core	Downstream
Use of resources	Non-renewable resources, materials	kg	12.8	11.0	0.1	1.8
	Gravel	kg	6.9	5.1	0.1	1.7
	Iron	kg	2.8	2.8	0.0	0.0
	Calcite	kg	1.5	1.4	0.0	0.0
	Other*	kg	0.6	0.6	0.0	0.0
	Non-renewable resources, energy	kg	1.0	1.0	0.0	0.0
	Coal, hard	kg	18.6	17.7	0.0	0.9
	Oil, crude	kg	8.7	8.6	0.0	0.1
	Gas, natural/m3	kg	4.5	4.0	0.0	0.5
	Coal, brown	kg	3.5	3.4	0.0	0.2
	Other*	kg	1.8	1.8	0.0	0.1
	Renewable resources, materials	t	0.1	0.1	0.0	0.0
	Water, RoW	t	267	259	1	7
	Water, IT	t	103	103	0	1
	Water, CN	t	37	36	0	1
	Water, CH	t	36	35	0	0
	Water, FR	t	28	28	0	0
	Other*		63	57	0	5
	Renewable resources, energy	MJ	67.6	66.1	0.2	1.3
	Energy, potential, hydropower	MJ	37.8	36.7	0.1	0.9
Energy, gross calorific value, in biomass	MJ	24.0	23.8	0.0	0.2	
Energy, kinetic	MJ	3.9	3.7	0.0	0.1	
Other*	MJ	1.9	1.9	0.0	0.0	

* Resources with a contribution lower than 5 %.

TABLE 9: CATIFA 46 TRESTLE, PAINTED, ENVIRONMENTAL INDICATORS		Units	Total	Upstream	Core	Downstream
Environmental Impact Categories	Global Warming	kg CO ₂ eq	44.9	40.7	0.1	4.1
	Acidification	kg SO ₂ eq	0.255	0.232	0.001	0.023
	Photochemical oxidation	g C ₂ H ₄ eq	13.7	12.7	0.0	1.0
	Eutrophication	kg PO ₄ ³⁻	0.075	0.065	0.000	0.009
	Human toxicity	CTUh 10 ⁻⁵	3.34	3.17	0.00	0.17
	Ecotoxicity	CTUe 10 ³	4.81	3.57	0.00	1.25
	Land use	species.yr 10 ⁸	6.41	6.11	0.02	0.29
Use of resources	Non-renewable resources, materials	kg	13.2	11.3	0.1	1.8
	Non-renewable resources, energy	kg	19.8	18.9	0.0	0.9
	Renewable resources, materials	t	273	266	1	7
	Renewable resources, energy	MJ	70.2	68.7	0.2	1.3
	Secondary resources, materials	kg	-	-	-	-
	Secondary resources, energy	kg	-	-	-	-
	Recovered energy	MJ	-	-	-	-
	Total amount of water *	m ³	273	266	1	7
	Direct amount of water used by the core process	l	0.001	0.000	0.001	0.000
Wastes	Hazardous wastes	kg	1.31	0.14	0.00	1.17
	Radioactive wastes	kg	-	-	-	-
	Non-hazardous wastes	kg	9.85	0.34	0.00	9.51

* 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 10: CATIFA 46 TRESTLE, PAINTED, MATERIAL AND ENERGY RESOURCES		Units	Total	Upstream	Core	Downstream
Use of resources	Non-renewable resources, materials	kg	13.2	11.3	0.1	1.8
	Gravel	kg	7.1	5.3	0.1	1.7
	Iron	kg	2.8	2.8	0.0	0.0
	Calcite	kg	1.5	1.5	0.0	0.0
	Other*	kg	0.6	0.6	0.0	0.0
	Non-renewable resources, energy	kg	1.1	1.1	0.0	0.0
	Coal, hard	kg	19.8	18.9	0.0	0.9
	Oil, crude	kg	9.0	8.8	0.0	0.1
	Gas, natural/m3	kg	4.8	4.3	0.0	0.5
	Coal, brown	kg	4.1	3.9	0.0	0.2
	Other*	kg	1.9	1.8	0.0	0.1
	Renewable resources, materials	t	0.1	0.1	0.0	0.0
	Water, RoW	t	273	266	1	7
	Water, IT	t	104	103	0	1
	Water, CN	t	38	37	0	1
	Water, CH	t	38	37	0	0
	Water, FR	t	28	28	0	0
	Other*	t	65	60	0	5
	Renewable resources, energy	MJ	70.2	68.7	0.2	1.3
	Energy, potential, hydropower	MJ	39.1	38.0	0.1	1.0
	Energy, gross calorific value, in biomass	MJ	25.0	24.7	0.0	0.2
	Energy, kinetic	MJ	4.1	4.0	0.0	0.1
	Other*	MJ	2.0	2.0	0.0	0.0

* Resources with a contribution lower than 5 %.

ADDITIONAL ENVIRONMENTAL INFORMATION



Since 2008 "Catifa 46" is GREENGUARD and GREENGUARD GOLD certified, certificate number: 5715-410 and 5715-420.

Catifa 46 with painted base (4 leg and trestle) or aluminium base (trestle) is GECA certified, license number: ARP-2017, licensee since: 02 July 2009, license expiry 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

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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)

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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.

BIBLIOGRAPHY

- 2B Srl, 2018. LCA project Catifa 46 (www.to-be.it).
- Arper Spa, 2B Srl, Manuale descrittivo della procedura EPD Arper v1, giugno 2018.
- Arper Spa, 2B Srl, Raccolta dei dati LCA/EPD v1, giugno 2018.
- EC, Default data for End Of Life (EOL) for Product Environmental Footprint (PEF) during the Environmental Footprint (EF) pilot phase (ec.europa.eu).
- ecoinvent, 2017: Swiss Centre for Life Cycle Assessment, fornitore del database ecoinvent v3.4 (www.ecoinvent.ch).
- Jingying MA et al, 2014. Municipal Solid Waste Management Practice in China. A Case Study in Hangzhou (www.scientific.net).
- 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, 2017. Rapporto Rifiuti Urbani (www.isprambiente.gov.it).
- OECD, Environment at a Glance, 2015 (www.oecd.org).
- PCR 2009:02 v2.0 – 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, version 8.5 (www.pre-sustainability.com).
- SEMC, 2015. International EPD Cooperation (IEC), General Programme Instructions for Environmental Product Declaration EPD, Version 3, 2017-12-11. Swedish Environmental Management Council (www.environdec.com).