ENVIRONMENTAL PRODUCT DECLARATION

CATIFA 53

EPD Program: International EPD System (www.environdec.com)
Programme operator: EPD International AB
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Reference PCR: PCR 2009:02 v3.0 "Seats" CPC Code: 3811
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CONTENTS

THE COMPANY AND THE PRODUCT

Arper is working on the assessment of the environmental impact of some of its products, to encourage the research aimed at both the improvement of its technical and environmental performances and to realize its commitment to the respect of the environment. Arper has already obtained an EPD certification for several of its products and aims at obtaining it for all the most representative models of its production.

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 it adopted the ISO 14001 environmental management system, in 2007 it introduced the use of the LCA tool, obtaining several product certifications that highlight the different aspects of the achieved results. 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).

PRODUCT DESCRIPTION

Suitable for both indoor or outdoor spaces, Catifa 53 is available in a wide range of materials, colors and finishes of the shell and trunk. The shell is made of curved plywood, one- or two colors polypropylene, with either soft-, hard leather or fabric covering and various padded finishes. The frame is available in chromed steel, satin stainless steel, aluminum, powder-coated aluminum, wood and it is available in different versions: four legs, sled and trestle.

This declaration describes Catifa 53 with propylene shell and a 4-legs base or trestle structure. The 4-legs base is available with a painted or chromed steel finish, the one with trestle structures one comes with a painted or aluminum finish.

This EPD summarizes the indicators related to the environmental impact of Catifa 53 with a white body, which can also be considered representative for versions featuring a body in different colors (black, sepia, anthracite, ivory, yellow, sand, caramel). In fact, it has been ascertained that the differences between the masters account for less than 10% on the overall impact of Catifa, as contemplated by the PCR adopted.

Figure 1 and Figure 2 show the exploded views of the Catifa 53 chair with the 4 legs and trestle base, while Table 1 and Table 2 summarize the materials of the chairs and of the packaging. Either the single chair can be individually packed, or 4 pieces together.

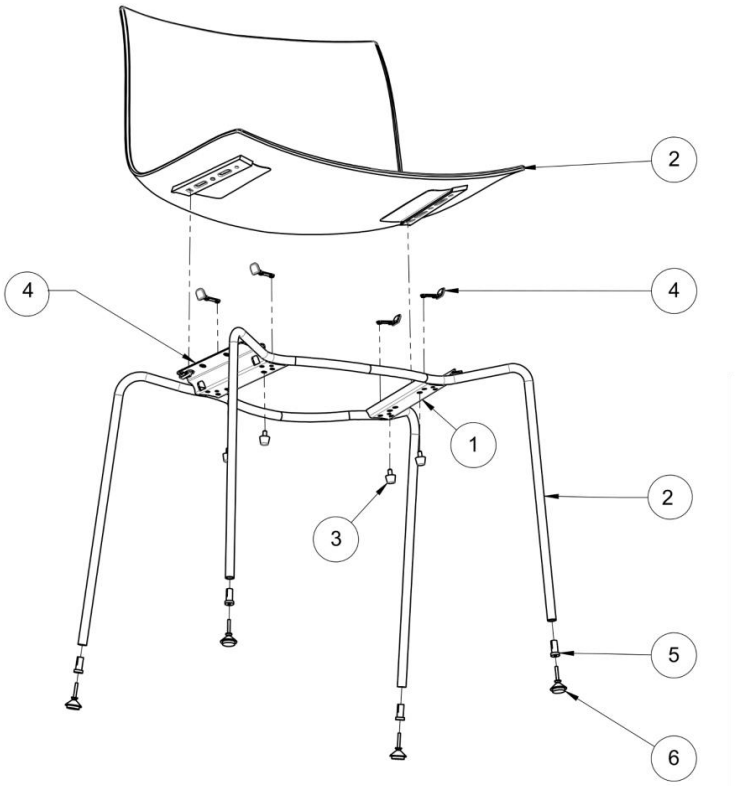

Figure 1 Exploded view of Catifa 46 chair with 4-legs base. 1) PP shell; 2) 4-Legs base; 3) Trays; 4) "Clip It Easy"; 5) Hole cover; 6) Leg cap.

	Materials	Catifa 53 4 legs, chromed		Catifa 53 4 legs, painted	
		kg	%	kg	%
Catifa 53	PP	2.720	52%	2.720	52%
	Steel	2.460	47%	2.460	47%
	PE	0.070	1%	0.070	1%
	Total	5.250	100%	5.250	100%
Packaging x 1	Cardboard	3.413	97%	3.413	96%
	PE	0.071	2%	0.096	3%
	Paper	0.022	1%	0.022	1%
	Steel	0.021	1%	0.021	1%
	Total	3.526	100%	3.551	100%
Packaging x 4	Cardboard	5.169	94%	5.169	93%
	PE	0.272	5%	0.372	7%
	Steel	0.041	1%	0.041	1%
	Paper	0.022	0%	0.000	0%
	Total	5.504	100%	5.582	100%

Table 1: Materials in Catifa 53, four legs

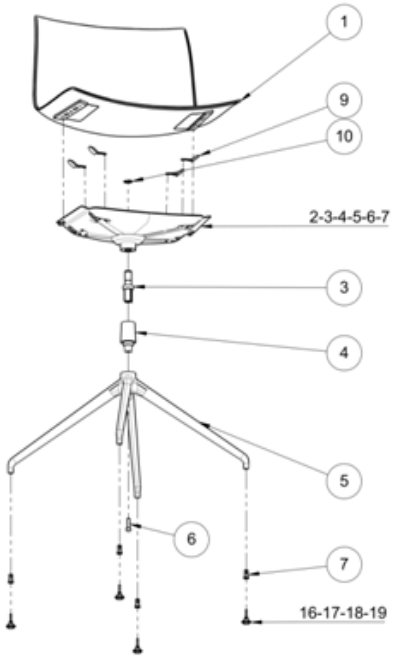

Figure 2: Exploded view of Catifa 53 chair with trestle base. PP shell; 2-7) Under-shell plate; 8) Seeger; 9) Leg pin; 10) Conical adapter; 11) 4-ways base; 12-13) Screw, Washer; 14) Hole cover; 15) Leg cap expander; 16-19) Leg cap.

	Materials	Catifa 53, trestle base, aluminium		Catifa 53 trestle base, painted	
		kg	%	kg	%
Catifa	Steel	3.007	37%	3.075	37%
	PP	2.724	33%	2.736	33%
	Aluminum	2.400	29%	2.4415	29%
	GEB015 (low alloy steel)	0.029	0%	0.029	0%
	PE	0.010	0%	-	-
	Total	8.169	100%	8.281	100%
Packaging x 1	Cardboard	3.5215	97%	3.5215	89%
	PE	0.0845	2%	0.3845	10%
	Paper	0.022	1%	0.022	1%
	Steel	0.02	1%	0.02	1%
	Total	3.648	100%	3.948	100%
Packaging x 4	Cardboard	4.959	76%	4.959	76%
	PE	1.522	23%	1.522	23%
	Steel	0.04	1%	0.04	1%
	Paper	0.022	0%	0.022	0%
	Total	6.543	100%	6.543	100%

Table 2: Materials in Catifa 53 with trestle base

ENVIRONMENTAL IMPACT DECLARATION

DECLARED UNIT

The declared unit considered is 1 seat with a duration 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 the production of raw materials, the production of components and packaging materials, assembly, transport of raw materials and components, storage, distribution, use phase and end of life packaging and product.

Specifically, upstream processes include raw materials, their transport, the production of the chair components, the assembly of the structure of the legs and of the body and the packaging of the body and 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 its production are not included because Arper does not manufacture or assemble its products internally.

The downstream processes include the distribution of the packaged product, the use phase and the end of life of the packaging and of the product.

No cut-off rules were applied.

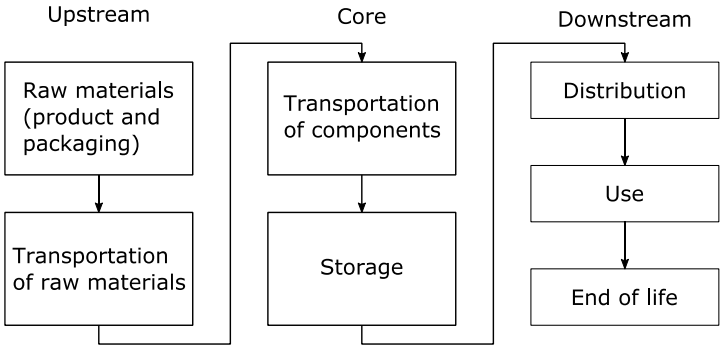

Figure 1: System Boundaries of the LCA of Catifa 53 chair

TIME BOUNDARIES

Primary data come from Arper and are referred to the year 2020. Secondary data come from the Ecoinvent v 3.7 database, allocation and cut-off by classification, published in 2021.

TERRITORIAL BOUNDARIES

Components and packaging materials are produced in Italy, with the exception of the 4-ways base of the trestle, which are produced in Vietnam. The product is marketed both in Italy and abroad. The distribution and end-of-life scenario consider the sales of the reference year.

BOUNDARIES IN THE LIFE CYCLE

The construction of the company's buildings and infrastructure, the production of work equipment, other capital assets and personnel activities are not included in the LCA. For processes comprising the infrastructure, such as the processes deriving from the ecoinvent database, the infrastructure has not been omitted.

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 consumptions of the storage warehouse 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 were collected from Arper's suppliers. For secondary data, the ecoinvent v3.7 database was used. Some ecoinvent v3.7 processes, such as powder coating, welding, extrusion of steel bars and injection molding of plastic parts, have been adapted to the Italian situation (or Vietnamese in the case of the spokes of the trestle base) changing the energy mix in order to make them more representative of the system studied.

The LCA calculation was performed using the SimaPro 9.2 software.

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.

For data collection and LCA calculations, the methodology described in the manual for data collection and the EPD processing process was used.

For the main components of the chair, primary data about consumption of production processes were obtained from the supplier. The components for which primary data have been made available are: the polypropylene shell; for the 4 leg version: the legs, the trays, the clips, the feet and the stacking caps, data on chromium-plating and painting processes; for the trestle version, data about the clips.

The national residual energy mix was used for the electricity consumption of the main components of the shell and the structure, adapting the processes related to the italian national mix available in the ecoinvent database. The Vietnamese energy mix was used for the production of the trestle base. "Electricity, medium voltage {VN} | market for electricity, medium voltage | Cut-off, S ".

For the packaging methods of Catifa 53, the information from the sales data in the year 2020 was used: 77% of the Catifa 53 4-legs and 63% of the Catifa 53 trestle base, respectively, are packed in a 4-piece box packaging.

For the product storage primary data were used, provided by the company responsible for the storage of shells and packed structures.

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 headquarters and the capital city of the exporting country. In 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 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.

In the use phase, a consumption of 0.1 l of hot water and 0.8 g of chair soap is assumed. For soap, a solution with 5% Alkylbenzene sulfonate is considered. To heat the water, a consumption of 5.58 MJ of thermal energy is assumed.

For the start of the product and packaging at the end of its life, a road transport (truck 16-32 t EURO4) 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.

ENVIRONMENTAL IMPACT INDICATORS

The following tables show the environmental impact indicators for the life cycle of 1 Catifa 53 chair with 4-legs base, chrome-plated and painted versions and trestle, aluminum and painted versions.

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.

TABLE 3: CATIFA 53, 4 LEGS, CHROMED FINISH, ENVIRONMENTAL INDICATORS					
Impact category	Units	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	25,4	21,9	0,166	3,33
Global warming (GWP100a)_fossil	kg CO_2 eq	24,6	21,7	0,163	2,78
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,723	0,164	0,002	0,557
Global warming (GWP100a)_land use	kg CO_2 eq	3,62E-02	3,57E-02	3,75E-05	5,16E-04
Acidification Potential	kg SO_2 eq	8,73E-02	8,00E-02	6,11E-04	6,70E-03
Eutrophication potential	kg PO_4^{3-}	3,51E-02	3,24E-02	1,31E-04	2,61E-03
Photochemical oxidant formation potential	kg NMVOC eq	7,71E-02	6,83E-02	6,54E-04	8,09E-03
Abiotic depletion	kg Sb eq	1,68E-04	1,61E-04	4,62E-07	5,78E-06
Abiotic depletion (fossil fuels)	MJ	440,59	412,92	2,38	25,29
Water scarcity	m^3 eq	13,29	11,33	0,03	1,92
Renewable resources, energy	MJ	2,31	1,87	0,08	0,37
Renewable resources, materials	MJ	32	32	-	-
Renewable resources, total	MJ	34,29	33,85	0,08	0,37
Non renewable resources, energy	MJ	341,70	313,28	2,51	25,91
Non renewable resources, materials	MJ	150	150	-	-
Non renewable resources, total	MJ	491,69	463,27	2,51	25,91
Water use	m^3	0,331	0,282	0,001	0,048
Hazardous waste	kg	8,28E-02	6,88E-02	1,07E-04	1,38E-02
Non hazardous waste	kg	6,41	4,43	0,07	1,90
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	4,45E-05	4,44E-05	9,73E-09	1,28E-07
Human toxicity, non-cancer	cases	4,22E-06	3,88E-06	1,65E-08	3,19E-07
Freshwater ecotoxicity	PAF.m^3.day	2,48E+05	2,30E+05	5,02E+02	1,72E+04
Land use	species.yr	1,04E-08	9,84E-09	4,18E-11	5,28E-10

Table 3 Results of the characterization of the Catifa 53 chair, 4-legs, chromed finish.

TABLE 4: CATIFA 53, 4 LEGS, PAINTED, ENVIRONMENTAL INDICATORS					
Impact category	Units	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	26,5	22,9	0,166	3,35
Global warming (GWP100a)_fossil	kg CO_2 eq	25,7	22,7	0,164	2,80
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,722	0,167	0,002	0,553
Global warming (GWP100a)_land use	kg CO_2 eq	3,60E-02	3,55E-02	3,76E-05	5,16E-04
Acidification Potential	kg SO_2 eq	1,16E-01	1,09E-01	6,13E-04	6,70E-03
Eutrophication potential	kg PO_4^{3-}	3,57E-02	3,29E-02	1,32E-04	2,62E-03
Photochemical oxidant formation potential	kg NMVOC eq	7,94E-02	7,06E-02	6,56E-04	8,09E-03
Abiotic depletion	kg Sb eq	1,45E-04	1,39E-04	4,64E-07	5,77E-06
Abiotic depletion (fossil fuels)	MJ	461,47	433,84	2,39	25,24
Water scarcity	m^3 eq	13,54	11,60	0,03	1,91
Renewable resources, energy	MJ	3,27	2,82	0,08	0,37
Renewable resources, materials	MJ	31,12	31,12	0	0
Renewable resources, total	MJ	34,38	33,94	0,08	0,37
Non renewable resources, energy	MJ	362,88	334,49	2,52	25,86
Non renewable resources, materials	MJ	150,90	150,90	0	0
Non renewable resources, total	MJ	513,78	485,39	2,52	25,86
Water use	m^3	0,339	0,290	0,001	0,048
Hazardous waste	kg	8,13E-02	6,72E-02	1,07E-04	1,40E-02
Non hazardous waste	kg	6,29	4,30	0,07	1,91
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	2,93E-05	2,92E-05	9,76E-09	1,29E-07
Human toxicity, non-cancer	cases	4,12E-06	3,79E-06	1,66E-08	3,21E-07
Freshwater ecotoxicity	PAF.m^3.day	2,31E+05	2,14E+05	5,03E+02	1,72E+04
Land use	species.yr	1,03E-08	9,68E-09	4,20E-11	5,28E-10

Table 4 Results of the characterization of the Catifa 53 4 legs, painted.

TABLE 5: CATIFA 53, TRESTLE, ALUMINIUM, ENVIRONMENTAL INDICATORS					
Impact category	Units	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	46,9	41,8	0,198	4,94
Global warming (GWP100a)_fossil	kg CO_2 eq	46,1	41,5	0,195	4,44
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,688	0,186	0,003	0,499
Global warming (GWP100a)_land use	kg CO_2 eq	6,71E-02	6,61E-02	4,61E-05	9,55E-04
Acidification Potential	kg SO_2 eq	2,22E-01	2,09E-01	7,39E-04	1,25E-02
Eutrophication potential	kg PO_4^{3-}	6,73E-02	6,35E-02	1,58E-04	3,69E-03
Photochemical oxidant formation potential	kg NMVOC eq	1,57E-01	1,41E-01	7,99E-04	1,52E-02
Abiotic depletion	kg Sb eq	3,70E-04	3,59E-04	5,62E-07	1,05E-05
Abiotic depletion (fossil fuels)	MJ	673,12	625,47	2,85	44,79
Water scarcity	m^3 eq	17,34	15,25	0,03	2,05
Renewable resources, energy	MJ	27,86	27,13	0,09	0,64
Renewable resources, materials	MJ	34,75	34,75	0	0
Renewable resources, total	MJ	62,61	61,88	0,09	0,64
Non renewable resources, energy	MJ	582,65	533,80	3,00	45,86
Non renewable resources, materials	MJ	154,96	154,96	0	0
Non renewable resources, total	MJ	737,61	688,76	3,00	45,86
Water use	m^3	0,485	0,432	0,001	0,052
Hazardous waste	kg	4,53E-01	4,29E-01	1,30E-04	2,38E-02
Non hazardous waste	kg	11,52	8,38	0,09	3,05
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	4,00E-05	3,97E-05	1,18E-08	2,31E-07
Human toxicity, non-cancer	cases	9,85E-06	9,33E-06	2,00E-08	4,97E-07
Freshwater ecotoxicity	PAF.m^3.day	1,40E+06	1,19E+06	6,03E+02	2,11E+05
Land use	species.yr	1,51E-08	1,40E-08	5,15E-11	1,02E-09

Table 5 Results of the characterization of Catifa 53, trestle, aluminum.

TABLE 6: CATIFA 53, TRESTLE, PAINTED, ENVIRONMENTAL INDICATORS					
Impact category	Units	Total	Upstream	Core	Downstream
Global warming (GWP100a)_total	kg CO_2 eq	50,7	45,3	0,199	5,16
Global warming (GWP100a)_fossil	kg CO_2 eq	49,8	45,0	0,196	4,63
Global warming (GWP100a)_ biogenic	kg CO_2 eq	0,769	0,232	0,003	0,534
Global warming (GWP100a)_land use	kg CO_2 eq	6,84E-02	6,74E-02	4,65E-05	9,62E-04
Acidification Potential	kg SO_2 eq	2,78E-01	2,65E-01	7,44E-04	1,26E-02
Eutrophication potential	kg PO_4^{3-}	7,09E-02	6,69E-02	1,59E-04	3,89E-03
Photochemical oxidant formation potential	kg NMVOC eq	1,65E-01	1,49E-01	8,05E-04	1,53E-02
Abiotic depletion	kg Sb eq	3,98E-04	3,86E-04	5,66E-07	1,06E-05
Abiotic depletion (fossil fuels)	MJ	733,20	685,26	2,87	45,07
Water scarcity	m^3 eq	18,81	16,75	0,03	2,03
Renewable resources, energy	MJ	30,12	29,39	0,09	0,64
Renewable resources, materials	MJ	37,19	37,19	0	0
Renewable resources, total	MJ	67,32	66,59	0,09	0,64
Non renewable resources, energy	MJ	642,02	592,86	3,02	46,14
Non renewable resources, materials	MJ	161,24	161,24	0	0
Non renewable resources, total	MJ	803,26	754,10	3,02	46,14
Water use	m^3	0,525	0,472	0,001	0,052
Hazardous waste	kg	4,54E-01	4,29E-01	1,31E-04	2,52E-02
Non hazardous waste	kg	12,01	8,75	0,09	3,16
Radioactive waste	kg	0	0	0	0
Human toxicity, cancer	cases	4,04E-05	4,01E-05	1,19E-08	2,34E-07
Human toxicity, non-cancer	cases	1,02E-05	9,66E-06	2,02E-08	5,19E-07
Freshwater ecotoxicity	PAF.m^3.day	1,42E+06	1,21E+06	6,07E+02	2,15E+05
Land use	species.yr	1,61E-08	1,50E-08	5,19E-11	1,03E-09

Table 6 Results of the characterization of Catifa 53 trestle, painted.

ADDITIONAL ENVIRONMENTAL INFORMATION

Since 2008 "Catifa 53" is GREENGUARD and GREENGUARD GOLD certified, certificate number: 5716-410 and 5716-420.
Catifa 53 with painted base (4-legs and trestle) or aluminum (trestle) is GECA certified, license number: ARP-2017, Licensee since: 02 July 2009, License expiry date: 07 February 2023.

INFORMATION ABOUT THE COMPANY AND ON THE CERTIFICATION

ARPER – CONTACT INFORMATION

The Life Cycle Assessment Study (LCA) and this Environmental Product Declaration (EPD) were conducted by Arper in collaboration 2B Srl. (www.to-be.it). The company references are:

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CERTIFICATION AND CERTIFICATION BODY INFORMATION

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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.

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