

Environmental Product Declaration

In accordance with ISO 14025:2006 for:

LINERLESS LABEL

Högånas facility

from



Programme:

The International EPD® System EPD registered through the fully aligned regional programme: Hub EPD Brasil. More information at www.environdec.com

Programme operator:

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Contents

General information	3
Programme information.....	3
Company information: Beontag Corporation and Operations	4
Owner of the EPD	4
Contact	4
Description of the organization.....	4
Name and location of production site(s).....	4
Product information: Linerless Labels	4
Product name	4
Product identification.....	4
Product description	5
Content declaration.....	6
Packaging.....	6
UN CPC code.....	6
3214 – Processed paper and paperboard	6
Geographical scope	6
LCA information: Life Cycle Impact Assessment	6
Declared unit.....	6
Reference service life	6
Time representativeness	7
Database(s) and LCA software used.....	7
Description of system boundaries.....	7
Adopted premises to fill data gaps.....	7
Environmental performance indicators	10
Mandatory impact category indicators.....	10
Resource use indicators	11
Waste indicators.....	11
Additional environmental information	11
References.....	13

General information

Programme information

Programme:	The International EPD® System. More information at www.environdec.com	Brazilian hub	Fundação Vanzolini - www.epdbrasil.com.br
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
Product Category Rules (PCR): 2019:13 version 1.1 “Packaging”
PCR review was conducted by: Maurizio Fieschi
Life Cycle Assessment (LCA)
LCA accountability: <i>Ana Cheibub, Carolina Alves, Thays Sampaio, Peter Shonfield, Fernanda Britto, ERM Brasil Ltda.</i>
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: <ul style="list-style-type: none"> • Edivan Cherubini • EnCiclo Soluções Sustentáveis Ltda. • E-Mail: edivan@enciclo.com.br •

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

The environmental impacts of different EPDs can be compared only taking into account all the technical information supporting the declared/functional unit definition as requested by the PCR.

EPDs within the same product category but from different programmes may not be comparable.

Company information: Beontag Corporation and Operations

Owner of the EPD

Beontag

Address: R. Iaiá 77, 6º Andar – Itaim Bibi, São Paulo – SP, 04542-060.

Contact

esg@beontag.com or visit the website www.beontag.com

Description of the organization

Beontag is a global business enabler that serves as one of the world's leading providers of IoT solutions and graphic and label materials. With operations in more than 15 countries and a footprint in over 40 markets, the multinational company offers end-to-end product capabilities for a wide range of industries and businesses, driving seamless communication between companies, products, and people.

Beontag's business is underpinned by modern manufacturing facilities, strategic investments, R&D, and a range of highly qualified teams. Furthermore, the company is fully committed to enabling positive impacts across the entire value chain. As a member of the UN Global Compact since 2021, Beontag offers its customers a series of increasingly sustainable products while also working towards a diverse and equitable work environment.

To learn more, visit: <https://beontag.com>

Name and location of production site(s)

Linerless plant. Address: Pål Anders Väg 6, SE-263 34 Höganäs, Sweden

Product information: Linerless Labels

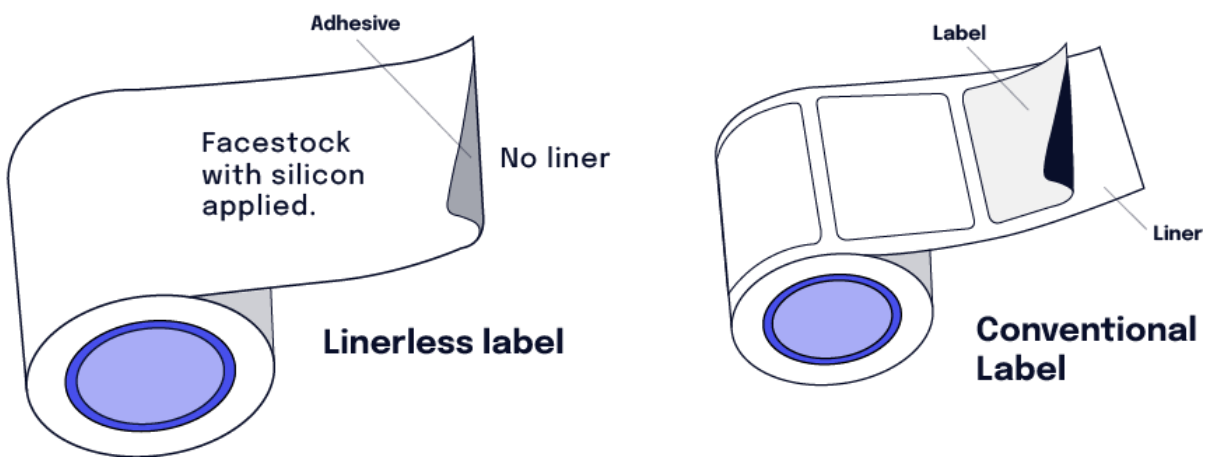
Product name

Linerless label

Product identification

Paper Standard / LLP214

Figure 1: Illustration of Linerless label products and their applications



Product description

Paper Standard / LLP214 is a white wood free, thermal paper with special surface treatment designed for applications with silicon coating. It contains a black imaging thermo-sensitive coating providing excellent resistance to moisture, fat, oil, alcohol, and heat. The material is produced without any added phenols and the paper has a siliconized surface. This thermal paper has a standard sensitivity, making it suitable for thermal print speeds between 100-150 mm/second, depending on printer settings and type.

Table 1 Standard composition of Linerless Labels

Label Structure	Material composition	Grammage (g/m ²)
Face material	Woodfree thermal paper	75
Adhesive	LLP 214	13 ±1
Silicon	UV release coating	1

Table 2 Product Specifications

Face Material Properties	
Basis weight	75 ± 5 g/m ² ISO 536
Caliper	73 ± 5 microns ISO 534
Tensile strength (MD/CD)	>3,7 / >1,8 kN/m ISO 1924-3
Adhesive	
LLP 214	A general-purpose permanent adhesive designed for cutters or cutting equipment to prevent residue on the knife or set off on the platen roller. LLP214 has good initial tack and adhesion on a wide variety of substrates, including apolar, slightly rough and curved substrates. Not advised for labelling highly plasticized materials, e.g. flexible PVC
Composition	Rubber based hot melt
Minimum Application Temperature	8 °C
Service Temperature	-10 to +70 °C
Linerless Laminate	
Material Shelf Life	12 months stored at a temperature of 22 °C ± 2°C / 50 ± 5% of relative humidity, non-UV/sunlight
Typical Laminate Caliper	88 microns
Adhesive coat weight (FTM12)	13 ±1 g/m ² typical

Content declaration

Table 3: Dangerous substances from the candidate list of SVHC for Authorisation

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Linerless labels do not account for any substance listed in the SVHC for authorisation.			

Packaging

Distribution packaging: carton boxes, HDPE insert bags, packing tapes and wooden pallets (3 g/m²)

Consumer packaging: paperboard bobbin and packing tape (1 g/m²)

UN CPC code

3214 – Processed paper and paperboard

Geographical scope

Europe

LCA information: Life Cycle Impact Assessment

Declared unit

1 (one) m² of Linerless label with a nominal grammage of 90 g/m²

Reference service life

Not applicable.

Time representativeness

Primary data for the core process was gathered for one year of operation (2021).

Database(s) and LCA software used

All primary data used was based on the manufacturer’s specific data inventory. For consistency, the background life cycle inventory data from secondary sources used in this LCA were obtained from the databases contained within the Gabi 10.7.0.183 Software: Sphera (from Gabi), Ecoinvent 3.8 and PlasticsEurope. Swedish specific data were preferably considered whenever available.

Description of system boundaries

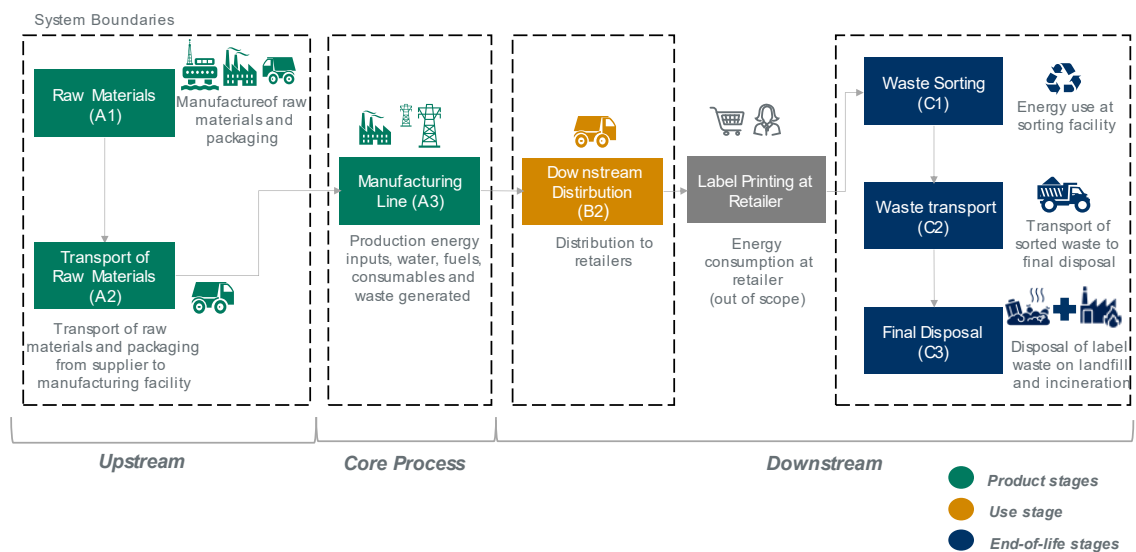
This is a cradle-to-grave study (covering modules A1-A3 + B + C, according to the PCR), which was carried out based on the relevant PCR Packaging 2019:13 and addresses the environmental aspects and potential environmental impacts from raw material acquisition, their transport from the supplier to the production plant and the manufacturing process at Beontag’s facility. The LCA also included the downstream transport at the use phase and the end-of-life stage, from the waste sorting to the final disposal of the self-adhesive label in the municipal waste treatment.

Adopted premises to fill data gaps

The following premises were considered in the study in order to fill data gaps:

- When specific transport distances from external suppliers to the factory were not available, a weighted average distance was used.
- When consumption data could not be directly measured in the plant, the input quantities were estimated based on the purchase invoices.
- At the manufacturing process in which disaggregated data was not available, the specific input values were apportioned based on the production volumes and the total consumptions of the plant.

Figure 2: System boundary of the life cycle assessment for Linerless labels



The life cycle stages included within the system boundaries are:

- A1 – Primary raw material used for the manufacture of Linerless labels.
- A2 – Transportation of all raw materials and auxiliaries from suppliers to the Beontag's manufacturing facility.
- A3 – Core manufacturing process of Linerless labels at Höganäs plant, including the following steps: siliconization, dryer, coating, rewinding, cutting and storage. This module also accounts for the handling and treatment of industrial waste generated in the process.
- B2 – Downstream transport: includes the outbound transportation by road from Beontag's manufacturing site to retail clients located in Europe. A distance of 885 km was considered at this stage, which was calculated based on the weighted average of Beontag's client locations.
- C1 – Sorting of post-consumer waste: the end-of-life stages were based on the average scenario of municipal waste sorting in Europe.
- C2 – Transportation of discarded label and paperboard core to waste processing plant.
- C3 – Final disposal of post-consumer residue: waste treatment of Linerless labels after use by the end-consumer considering the general waste management profile in Europe: 16% was assumed to be directed to landfill and the remaining 84%, to municipal incineration facilities.

The electricity mix considered for this LCA was based on the GaBi dataset for Sweden at module A3 and Europe for module C1.

Table 4: Description of the system boundary according to the PCR

	Upstream			Core Process	Downstream									
	Product Stage				Forming Stage		Use Stage					End of Life Stage		
	Raw material supply	Transport	Manufacturing		Transport to forming or filling	Forming (if present)	Filling operation	Distribution of filled packaging	Transport to reconditioning	Reconditioning	Transport to re-filling point	Disassembling/ Sorting	Transport to recovery/ Disposal	Final Disposal
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	
Modules declared	X	X	X	MND	MND	MND	X	MND	MND	MND	MND	X	X	X
Geography	RER	RER	SE	-	-	-	RER	-	-	-	RER	RER	RER	
Specific data	-	-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	-	-	-	-	-	-	-	-	-	-	-	-	-	
Variation – sites	-	-	-	-	-	-	-	-	-	-	-	-	-	

Linerless labels do not require a final forming step outside the company’s facilities as they exit the factory gate ready to be used by Beontag’s clients. As a result, the modules A4 and A5 are not declared in this EPD because they are not applicable to this product. Because self-adhesive labels are packaging constituents, filling operation and reconditioning, as well as the transport associated with these stages, are also not declared as they are not applicable. Only the downstream distribution from the factory gate to the retailers is considered in module B2.

The following results are specific to the Linerless labels manufactured at Beontag’s facility in Högånas. The scenarios included are currently in use and are representative for one of the most probable alternatives.

Environmental performance indicators¹

Mandatory impact category indicators

Table 5: Core environmental impact indicators

Results per declared unit										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	B2	C1	C2	C3	Total
GWP-fossil	kg CO ₂ eq.	1.03E-01	1.74E-02	1.57E-02	1.37E-01	1.75E-02	7.63E-05	6.29E-04	4.18E-03	1.59E-01
GWP-biogenic	kg CO ₂ eq.	-1.61E-02	6.91E-05	5.91E-03	-1.01E-02	7.42E-05	6.87E-07	2.66E-06	8.33E-02	7.33E-02
GWP-luluc	kg CO ₂ eq.	1.46E-03	8.91E-05	4.77E-06	1.56E-03	9.81E-05	1.61E-08	3.52E-06	5.02E-07	1.66E-03
GWP-total	kg CO ₂ eq.	8.89E-02	1.75E-02	2.16E-02	1.28E-01	1.77E-02	7.70E-05	6.35E-04	8.75E-02	2.34E-01
ODP	kg CFC 11 eq.	1.66E-08	1.04E-15	2.09E-11	1.66E-08	1.05E-15	1.12E-15	3.79E-17	6.95E-11	1.67E-08
AP	mol H ⁺ eq.	6.20E-04	1.06E-04	3.49E-05	7.61E-04	5.62E-05	1.67E-07	2.02E-06	2.20E-05	8.41E-04
EP-freshwater	kg PO ₄ ³⁻ eq.	1.07E-04	1.47E-07	3.43E-07	1.07E-04	1.61E-07	6.83E-10	5.79E-09	3.96E-07	1.08E-04
EP-freshwater	kg P eq.	3.47E-05	4.80E-08	1.12E-07	3.49E-05	5.25E-08	2.23E-10	1.89E-09	1.29E-07	3.51E-05
EP-marine	kg N eq.	1.78E-04	3.80E-05	1.12E-05	2.27E-04	2.59E-05	3.76E-08	9.30E-07	1.15E-05	2.65E-04
EP-terrestrial	mol N eq.	1.51E-03	4.22E-04	1.12E-04	2.05E-03	2.90E-04	3.94E-07	1.04E-05	1.27E-04	2.47E-03
POCP	kg NMVOC eq.	3.66E-04	8.66E-05	2.79E-05	4.81E-04	5.07E-05	1.02E-07	1.82E-06	3.18E-05	5.65E-04
ADP-minerals&metals	kg Sb eq.	1.04E-06	1.39E-09	3.10E-09	1.04E-06	1.47E-09	2.08E-11	5.28E-11	7.17E-11	1.05E-06
ADP-fossil	MJ	2.22E+00	2.31E-01	3.96E-01	2.85E+00	2.35E-01	1.38E-03	8.45E-03	4.15E-02	3.14E+00
WDP	m ³	2.07E-01	1.46E-04	4.15E-03	2.11E-01	1.58E-04	1.74E-05	5.67E-06	1.15E-02	2.23E-01
Acronyms	<p>GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources*; ADP-fossil = Abiotic depletion for fossil resources potential*; WDP = Water (user) deprivation potential, deprivation-weighted water consumption*</p> <p>*: The results of these environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator</p>									

¹ The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Resource use indicators

Table 6: Indicators describing resource use

Results per declared unit					
Indicator	Unit	Upstream	Core	Downstream	Total
PERE	MJ	7.51E-01	3.25E-01	1.12E-02	1.09E+00
PERM	MJ	1.08E+00	0.00E+00	0.00E+00	1.08E+00
PERT	MJ	1.83E+00	3.25E-01	1.12E-02	2.17E+00
PENRE	MJ	1.87E+00	3.96E-01	2.87E-01	2.56E+00
PENRM	MJ.	5.85E-01	0.00E+00	0.00E+00	5.85E-01
PENRT	MJ	2.45E+00	3.96E-01	2.87E-01	3.14E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources.				

Waste indicators

Table 7: Environmental information describing waste categories

Results per declared unit					
Indicator	Unit	Upstream	Core	Downstream	Total
HWD	kg	3.39E-11	3.63E-11	3.55E-12	7.38E-11
NHWD	kg	1.88E-04	9.82E-04	1.14E-02	1.26E-02
RWD	kg	2.69E-06	9.95E-05	1.78E-06	1.04E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	1.56E-02	3.00E-03	1.86E-02
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	9.05E-03	7.26E-02	8.17E-02
EET	MJ	0.00E+00	1.64E-02	2.07E-01	2.23E-01
Acronyms	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy				

Additional environmental information

ESG is at the core of Beontag’s business strategy.

As part of our 2030 ESG Strategy, we are committed to providing customers with a range of sustainable solutions and products, encompassing material reduction, recycled content, responsible sourcing, and recyclability. A standout of our sustainable portfolio is the innovative Linerless labels, which distinctly showcase reduced environmental impact throughout their life cycle, from cradle-to-gate. By 2030, our target is to have 70% of our annual sales comprised of sustainable products.

For more information, please visit our website - [Beontag | Sustainability and Goals](#).

The environmental profile of Linerless labels distributed in other market scenarios is presented below.

Table 8: Environmental impact indicators for other market scenarios outside of Europe

Impact Indicators	Total Results (A + B + C) ²											
	EU (Baseline)	USA	CL	SA	JP	AU	PA	MX	BR	CO	AR	CN
GWP - total	2.34E-01	2.54E-01	2.63E-01	2.61E-01	2.68E-01	2.69E-01	2.59E-01	2.57E-01	2.59E-01	2.58E-01	2.60E-01	2.66E-01
GWP - fossil	1.59E-01	1.54E-01	1.63E-01	1.61E-01	1.68E-01	1.69E-01	1.59E-01	1.57E-01	1.59E-01	1.58E-01	1.60E-01	1.67E-01
GWP - biogenic	7.33E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02
GWP - luluc	1.66E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03	1.59E-03
ODP [kg CFC-11 eq.]	1.67E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08
AP [Mole of H+ eq.]	8.41E-04	1.01E-03	1.36E-03	1.27E-03	1.54E-03	1.57E-03	1.20E-03	1.14E-03	1.21E-03	1.18E-03	1.26E-03	1.48E-03
EP - freshwater [kg P eq.]	3.51E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05
EP - marine [kg N eq.]	2.65E-04	3.06E-04	3.97E-04	3.75E-04	4.45E-04	4.52E-04	3.56E-04	3.38E-04	3.58E-04	3.50E-04	3.70E-04	4.30E-04
EP - terrestrial [Mole of N eq.]	2.47E-03	2.83E-03	3.83E-03	3.58E-03	4.35E-03	4.44E-03	3.38E-03	3.19E-03	3.40E-03	3.31E-03	3.53E-03	4.18E-03
POCP [kg NMVOC eq.]	5.65E-04	7.08E-04	9.64E-04	9.00E-04	1.10E-03	1.12E-03	8.48E-04	8.00E-04	8.53E-04	8.31E-04	8.88E-04	1.05E-03
ADPE [kg Sb eq.]	1.05E-06	1.04E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.05E-06	1.05E-06
ADPF [MJ]	3.14E+00	3.07E+00	3.19E+00	3.16E+00	3.24E+00	3.25E+00	3.14E+00	3.11E+00	3.14E+00	3.13E+00	3.15E+00	3.23E+00
Acronyms	EU (Baseline) = European market considering a distribution distance of 885km by road; USA = United States of America, 215 by road + 7156 km by container ship; CL = Chile, 215 km by road + 19059 km by container ship; SA = South-Africa, 215 km by road + 16112 km by container ship; JP = Japan, 215 km by road + 25230 km by container ship; AU = Australia, 215 km by road + 26237 km by container ship; PA = Panama, 215 km by road + 13642 km by container ship; MX = Mexico, 215 km by road + 11394 km by container ship; BR = Brazil, 215 km by road + 13881 km by container ship; CO = Colombia, 215 km by road + 12836 km by container ship; AR = Argentina, 215 km by road + 15503 km by container ship; CN = China, 215 km by road + 23230 km by container ship.											

² For the European Market, it was considered a final disposal scenario of 84% being directed to incineration and 16% to landfills. For the other scenarios of distribution to markets outside of Europe, the post-consumer label waste was assumed to be 100% directed to landfill. The scenarios presented in the table differ among each other in terms of the distribution distance by container ship.

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