Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Byggfilm

from

Draken i Reftele AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-11793
Publication date:	2023-12-13
Valid until:	2028-12-12

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Constructions products, PCR 2019:14, version 1.3.1
PCR review was conducted by: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
Life Cycle Assessment (LCA)
LCA accountability: Peter Ylmén, RISE Research Institutes of Sweden
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: David Althoff Palm, Dalemarken AB Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Draken i Reftele AB
Contact: Christian Sandin, christian.sandin@draken.se
Description of the organisation: Manufacturer of plastic products
Product-related or management system-related certifications: ISO 9001:2015 och ISO 14001:2015
Name and location of production site(s): Draken i Reftele AB Fabriksgatan 1 SE-333 75 Reftele Sweden

Product information

Product name: Byggfilm
Product identification: The name Byggfilm
Product description: The product is a low density polyethylene (LDPE) foil to be used as moisture barrier in building construction.
UN CPC code: 36390
Geographical scope: Sweden

LCA information

Functional unit / declared unit: 1 kg of foil
Time representativeness: Production data is for 2022
Database(s) and LCA software used: Ecoinvent 3.8 with openLCA 2.0
Description of system boundaries:
The scope of the EPD includes the modules A1-A3, A5, C and D with system boundaries in accordance with EN 15804:2012+A2:2019 [3]. There is only one production site that is placed in Sweden, which has been used as the geographical scope. The scenarios used are representative for one of the most probable alternatives of the product life cycle. The system boundary with nature was set to include those processes that provided the material and energy inputs into the system and the following manufacturing, and transport processes up to the factory gate as well as the processing of any waste arising from those processes. The boundary to nature for fossil materials was set as extraction from the ground. The boundary for the biobased packaging includes harvesting of the wood. Cut-off was applied for the additives due to their low share in the product. The generic data for energy, transports and waste management include infrastructure and capital goods. In the datasets for raw materials these are not included

Only primary materials are used in the manufacturing process. With no reuse of materials or processing of secondary materials as input in A1.
There were no flows leaving the system at the end-of-waste boundary of the product stage (A1-A3) allocated as co-products.
There was no reuse of materials, processing of secondary materials used as input, in A1 of the investigated product. There are neither production of ancillary material or pre-products in A3. The study includes the resources used to produce the product at the manufacturing site, production of packaging materials and the produced waste from spillage in the production process. The manufacturing of Byggfilm is made in Reftele, Sweden. Transport of materials from the suppliers are included in the calculations. The manufacturing process requires electricity that is bought from the grid The GWP-GHG value for the energy mix is 0.029 kg CO_2-equivalents per kWh. Only primary resources are used in the production of the product and packaging. The polyethylene spillage is processed an reused inside the manufacturing process for other products. There is no energy recovery of energy inside the factory in Reftele.

Manufacturing process

The manufacturing process starts with the arrival of plastic granulate as bulk (25000-40000 kg), in octabins (1100 kg) or in sacks (25 kg). The granulates are stored in silos or the octabins.

Figure 1. Plastic granulate.

The granulates are sucked to the machines from the storage by suppression and the additives are added. The materials are mixed by gravimetric blenders mounted on the machines before entering the extruder in a closed process.

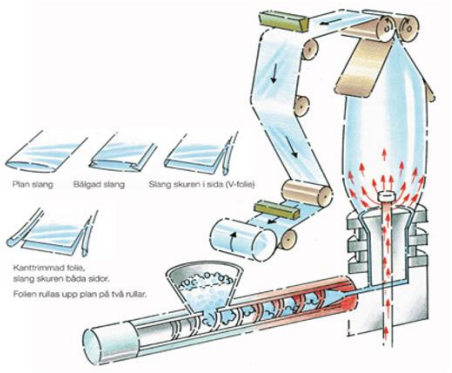


Figure 2. Sketch of the manufacturing process.

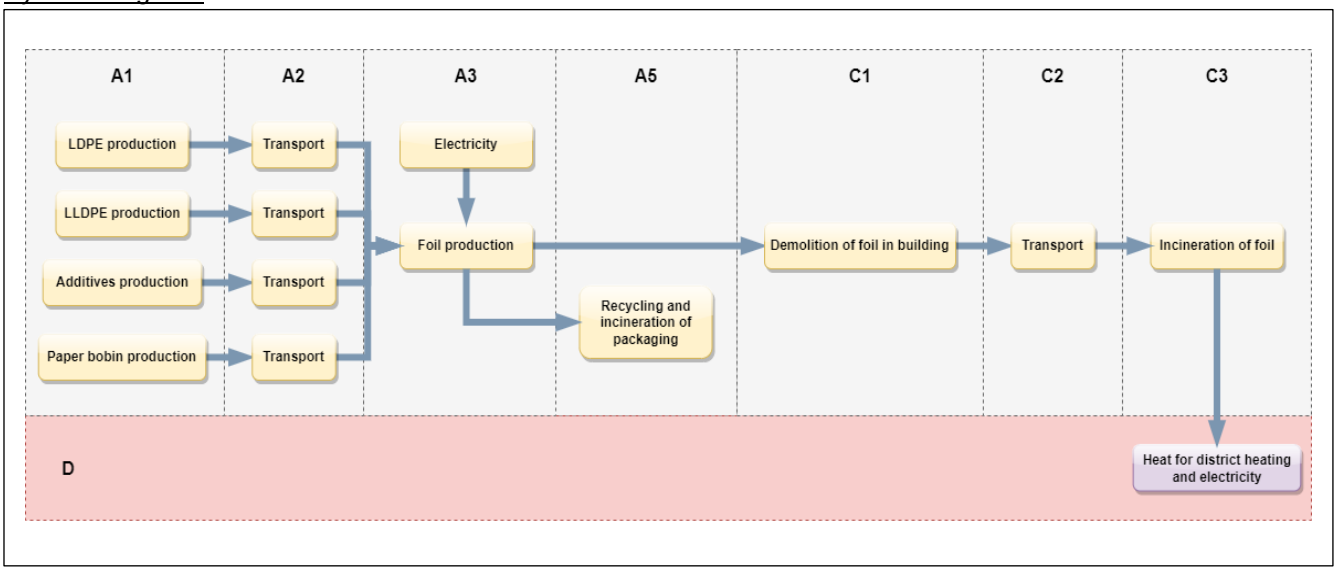
The extruder makes a tube that is cut into two sheets that each follows a lane down to a winder, see Figure 2. The first role is made for adjustments and discarded. The total spillage is about 6%. The spillage is made into new granulates and used in other products from the factory.

Figure 3.Machine to make new granulates of the spillage.

C1: The foil is assumed to be manually dismounted and sorted together with other building plastic. Any energy used for power tools is considered negligible and therefore disregarded.
C2: The foil is transported 50 km to the nearest waste management facility.

C3: Since the plastic has degraded at the time for demolition, it is assumed that it can't be recycled. Therefore, 100% of the plastics are incinerated at 90% heat recovery rate.
C4: No material is sent to a landfill.

System diagram:



More information:
This is an Environmental Product Declaration in accordance with ISO 14025:2006 [4] and EN 15804:2012+A2:2019/AC:2021 for the product Byggfilm. The assessed product is a low-density polyethylene (LDPE) foil to be used as moisture barrier in building construction. The product is sold on the Nordic market for building products. Target audiences of the EPD are customers and other parties (business to business) with an interest in the environmental impacts of the product.

The product is produced in three different thicknesses, 0.12 mm, 0.15 mm and 0.20 mm, with different technical characteristics according to Table 1.

Table 1. Technical properties of Byggfilm at different thicknesses.

Properties according to SS EN 13984:2013 [5]	**0.12 mm**	**0.15 mm**	**0.20 mm**	**unit**
Reaction to fire (5.12)	Klass F	Klass F	Klass F	None
Water tightness (5.5 EN 1928 - method A, water proof at 2 kPa for 24 h)	Approved	Approved	Approved	None
Resistance to impact (5.6 EN 12691 method A)	250			mm
Resistance to impact (5.6 ASTM D 1709 method B)		413	303	G
Durability, after exposure to artificial ageing (5.7.1 EN 1296, 12 weeks in 70°C, evaluation with EN1931)	Pass	Pass	Pass	None
Durability, against alkali (5.7.2 EN 1847 liquid 2, 28d in 23°C evaluation with EN 12311-2 method B, rektangular)	Pass	Pass	Pass	None
Resistance to tearing (nail shank) LR/TR (5.8 EN 12340-1)	75/75	62/68	91/97	N
Water vapour transmission properties (5.10 EN 1931-B)	$3x10^{6}$	$4,1x10^{6}$		s/m
	$4x10^{11}$	$5,7x10^{11}$		$m^{2s}Pa/kg$
	79	111	111	m (s_d-value)
	$6,9x10^{5}$			µ-value
	$5,1x10^{-9}$			kg/m^2s
Tensile properties, tensile strength LR/TR (5.11 ISO 527-3)		24,3/26		Mpa
Tensile properties, elongation at break LR/TR (5.11 ISO 527-3)		651/728	731/837	%

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	SE	SE	SE		SE								SE	SE	SE	SE	SE
Specific data used	4%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Low density polyethylene (LDPE)	0.80	0	0
Linear low density polyethylene (LLDPE)	0.20	0	0
Additives	<0.01	0	0
TOTAL	1.00	0	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Paper bobin	0.02	2	0.45
TOTAL	0.02	2	0.45

The product contains no dangerous substances from the candidate list of SVHC for Authorisation.

Results of the environmental performance indicators

Since the functional unit is related to the weight of the product and the production process is the same for all thicknesses, the results are valid for all thicknesses.

The use of the results of modules A1-A3 should not be used without considering the results of module C.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks."

The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Mandatory impact category indicators according to EN 15804

		Results per declared unit						
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	**2.16E+00**	**1.25E-04**	**0.00E+00**	**6.53E-03**	**3.02E+00**	**0.00E+00**	**-1.21E+00**
GWP-biogenic	kg CO_2 eq.	**1.38E-02**	**6.95E-03**	**0.00E+00**	**4.82E-06**	**1.61E-04**	**0.00E+00**	**7.73E-04**
GWP-luluc	kg CO_2 eq.	**1.40E-02**	**2.92E-08**	**0.00E+00**	**3.07E-06**	**4.88E-06**	**0.00E+00**	**-2.56E-03**
GWP-total	kg CO_2 eq.	**2.18E+00**	**7.07E-03**	**0.00E+00**	**6.53E-03**	**3.02E+00**	**0.00E+00**	**-1.21E+00**
ODP	kg CFC 11 eq.	**4.07E-08**	**6.31E-12**	**0.00E+00**	**1.43E-10**	**8.73E-10**	**0.00E+00**	**-9.45E-09**
AP	mol H^+ eq.	**8.41E-03**	**1.14E-06**	**0.00E+00**	**2.20E-05**	**3.76E-04**	**0.00E+00**	**-9.28E-03**
EP-freshwater	kg P eq.	**4.70E-04**	**1.34E-08**	**0.00E+00**	**4.64E-07**	**2.59E-06**	**0.00E+00**	**-5.01E-04**
EP-marine	kg N eq.	**1.63E-03**	**6.10E-07**	**0.00E+00**	**7.60E-06**	**1.94E-04**	**0.00E+00**	**-1.21E-03**
EP-terrestrial	mol N eq.	**1.64E-02**	**5.28E-06**	**0.00E+00**	**8.04E-05**	**1.98E-03**	**0.00E+00**	**-1.29E-02**
POCP	kg NMVOC eq.	**9.28E-03**	**1.35E-06**	**0.00E+00**	**3.42E-05**	**4.88E-04**	**0.00E+00**	**-3.94E-03**
ADP-minerals&metals*	kg Sb eq.	**1.30E-05**	**3.16E-10**	**0.00E+00**	**1.80E-08**	**5.74E-08**	**0.00E+00**	**-6.60E-07**
ADP-fossil*	MJ	**1.57E+01**	**8.12E-04**	**0.00E+00**	**9.62E-02**	**2.21E-01**	**0.00E+00**	**-1.57E+01**
WDP*	m^3	**2.02E+00**	**3.29E-04**	**0.00E+00**	**4.94E-04**	**6.56E-02**	**0.00E+00**	**-2.09E-01**
Acronyms		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						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

		Results per declared unit						
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	**2.15E+00**	**1.25E-04**	**0.00E+00**	**6.49E-03**	**3.02E+00**	**0.00E+00**	**-1.21E+00**
PM	disease inc.	**8.44E-08**	**9.02E-12**	**0.00E+00**	**6.59E-10**	**1.49E-09**	**0.00E+00**	**-1.01E-07**
IRP*	kBq U235 eq.	**6.78E-01**	**2.82E-06**	**0.00E+00**	**1.20E-04**	**4.88E-04**	**0.00E+00**	**-3.11E-01**
ETP-fw**	CTUe	**3.28E+00**	**8.36E-03**	**0.00E+00**	**4.59E-02**	**5.76E-01**	**0.00E+00**	**-3.62E+00**
HTP-c**	CTUh	**5.19E-10**	**2.66E-13**	**0.00E+00**	**2.84E-12**	**6.57E-11**	**0.00E+00**	**-3.76E-10**
HTP-nc**	CTUh	**1.37E-08**	**1.06E-11**	**0.00E+00**	**6.91E-11**	**3.04E-09**	**0.00E+00**	**-1.17E-08**
SQP**	-	**4.08E+00**	**2.17E-04**	**0.00E+00**	**9.69E-02**	**5.24E-02**	**0.00E+00**	**-9.78E+00**
Acronyms		PM = Potential incidence of disease due to particular matter emissions; IRP = Ionizing radiation, human health; ETP-fw = Eco-toxicity (freshwater); HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Land use related impacts/Soil quality.						

** This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator*

*** The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

	Results per declared unit							
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	**2.81E+00**	**4.64E-05**	**0.00E+00**	**1.40E-03**	**7.23E-03**	**0.00E+00**	**-3.77E+00**
PERM	MJ	**3.20E-01**	**-3.20E-01**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
PERT	MJ	**3.13E+00**	**-3.20E-01**	**0.00E+00**	**1.40E-03**	**7.23E-03**	**0.00E+00**	**-3.77E+00**
PENRE	MJ	**1.56E+01**	**7.72E-04**	**0.00E+00**	**9.00E-02**	**2.10E-01**	**0.00E+00**	**-1.53E+01**
PENRM	MJ	**2.16E+01**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**-2.16E+01**	**0.00E+00**	**-4.10E-01**
PENRT	MJ	**3.72E+01**	**7.72E-04**	**0.00E+00**	**9.00E-02**	**-2.14E+01**	**0.00E+00**	**-1.57E+01**
SM	kg	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
RSF	MJ	**4.01E-04**	**6.95E-07**	**0.00E+00**	**2.35E-05**	**1.26E-04**	**0.00E+00**	**-5.63E-03**
NRSF	MJ	**2.45E-04**	**2.82E-07**	**0.00E+00**	**1.59E-05**	**8.33E-05**	**0.00E+00**	**-2.19E+00**
FW	m^3	**5.00E-02**	**5.23E-06**	**0.00E+00**	**1.28E-05**	**5.62E-04**	**0.00E+00**	**-1.00E-02**
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; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Waste indicators

	Results per declared unit							
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	**2.73E-03**	**6.01E-05**	**0.00E+00**	**9.02E-05**	**1.75E-02**	**0.00E+00**	**-2.29E-02**
Non-hazardous waste disposed	kg	**1.67E-01**	**7.20E-05**	**0.00E+00**	**8.28E-03**	**3.23E-02**	**0.00E+00**	**-2.11E-02**
Radioactive waste disposed	kg	**1.58E-04**	**7.02E-10**	**0.00E+00**	**2.91E-08**	**1.21E-07**	**0.00E+00**	**-6.69E-05**

Output flow indicators

	Results per declared unit							
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Material for recycling	kg	**8.30E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Materials for energy recovery	kg	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Exported energy, electricity	MJ	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**2.59E+00**	**0.00E+00**	**0.00E+00**
Exported energy, thermal	MJ	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**1.69E+01**	**0.00E+00**	**0.00E+00**

References

1. General Programme Instructions of the International EPD® System. Version 4.0.
2. PCR 2019:14 Construction products (EN 15804:A2) (1.3.1)
3. EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
4. ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
5. SS-EN 13984:2013 Flexibla tätskikt - Ångspärrar av plast och gummi - Definitioner och karaktäriserande egenskaper
6. Report of LCA for EPD of Byggfilm. RISE report no. 1167080.

EPD®

www.environdec.com