Environmental Product Declaration

In accordance with ISO 14025:2006 for:

TOILET PAPER STRONG LUCART 10 ROLLS TOILET PAPER ECO LUCART 10 ROLLS

From

LUCART GROUP

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-6894
Publication date:	2022-08-29
Revision date:	2025-11-13
Valid until:	2027-08-28

Programme information

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: TISSUE PRODUCTS, UN CPC 32131, PCR 2011:05 VERSION 3.0.1
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and were excused from the review. Chair of the PCR review: Lars-Gunnar Lindfors
Life Cycle Assessment (LCA)
LCA accountability: Andrea Fontanella, Ergo Srl – Spin-Off Company of Sant'Anna School of Advanced Study of Pisa (www.ergosrl.net)
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: DNV Business Assurance Italy Srl is an approved certification body accountable for the third-party verification The certification body is accredited by: ACCREDIA Registration number: 008H rev.05
Procedure for follow-up of data during EPD validity involves third-party verifier: ☒ Yes ☐ No

Company information

OWNER OF THE EPD

Serena Carlesi – Lucart S.p.A.
e-mail: serena.carlesi@lucartgroup.com

DESCRIPTION OF THE ORGANISATION

The company, originally named "Cartiera Lucchese dei F.lli Pasquini" was founded in 1953 by the five brothers Alessandro, Eliseo, Fernando, Raffaello and Tarcisio Pasquini in a small village on the hills around Lucca.
Today **Lucart Group** is one of the leading European manufacturers of thin single-sided paper for flexible packaging and is one of the top 10 producers of paper and tissue products.
Over 60 years of experience have allowed Lucart Group to develop the necessary know-how, expertise and technology in order to create quality products that best meet the needs of customers. The production facilities located in 10 Group plants manufacture a wide range of products, with control over the whole production process, from the choice of raw materials to the definition of finished product's characteristics.
Lucart Group paper production capacity is about 395 000 tons/year, spread over 12 continuous machines and 65 converting lines.

The Diecimo plant (Lucca) is one of the largest European factories dedicated to the production and transformation of tissue paper. It is equipped with a paper mill department with three paper machines for the production of tissue paper and MG paper for flexible packaging from virgin fibres and paper for recycling, an industrial wastewater purification plant, a cogeneration system for the combined production of electricity and heat, and a department to cut some products to size.

Certifications related to this site and its products are listed below:

- Ecolabel: ecological quality label issued by the European Commission;
- PEFC™ e FSC®: ensure that raw materials come from suppliers who implement sustainable forest management systems and have a certified custody chain;
- ISO 9001: voluntary international standard which defines how an efficient Quality Management System should work;
- ISO 14001: voluntary international standard which defines how an efficient Environmental Management System should work;
- ISO 50001: voluntary international standard which defines how an efficient Energy Management System should work;
- EMAS (Eco-Management and Audit Scheme): designed for organisations that are committed to assessing and improving their Environmental Efficiency;
- Der Blaue Engel: German ecological-environmental product certification;
- ISO 45001: Occupational Health and Safety Assessment Series;

- IFS HPC: international certification scheme aimed at ensuring compliance with specific safety and quality standards for private label personal and home care products, through certification audits by third-party bodies.

NAME AND LOCATION OF PRODUCTION SITE

Diecimo Plant, Lucart S.p.A., Zona Industriale – I 55023 Diecimo (LU)

Product information

PRODUCT NAME AND DESCRIPTION

The two products covered by this statement are the following:

Toilet paper Strong Lucart 10 Rolls

- Tissue paper from certified virgin fibres
- 2 ply
- 200 sheets
- Net weight per roll: 70,2 g +/- 5%

Toilet paper Eco Lucart 10 Rolls

- Tissue paper from paper for recycling
- 2 ply
- 200 sheets
- Net weight per roll: g 73,4 +/- 5%

Produced by Lucart Group in the Diecimo plant and sold on the Italian and European AFH market.

For more information on the products, please visit:

Lucart Professional - Strong Lucart 10 Rolls
Lucart Professional – Eco Lucart 10 Rolls

UN CPC CODE

32131 - Toilet or facial tissue stock, towel or napkin stock and similar paper, cellulose wadding and webs of cellulose fibres

GEOGRAPHICAL SCOPE

Europe

LCA information

FUNCTIONAL UNIT

1 000 kg (1 ton) of tissue paper delivered to the main AFH distribution centres in various destination countries. The packaging used to deliver the product is added to the declared 1 000 kg of tissue paper for impact calculation

TIME REPRESENTATIVENES: 2024

DATABASE AND LCA SOFTWARE USED: Ecoinvent 3.9.1 and Simapro 9.5

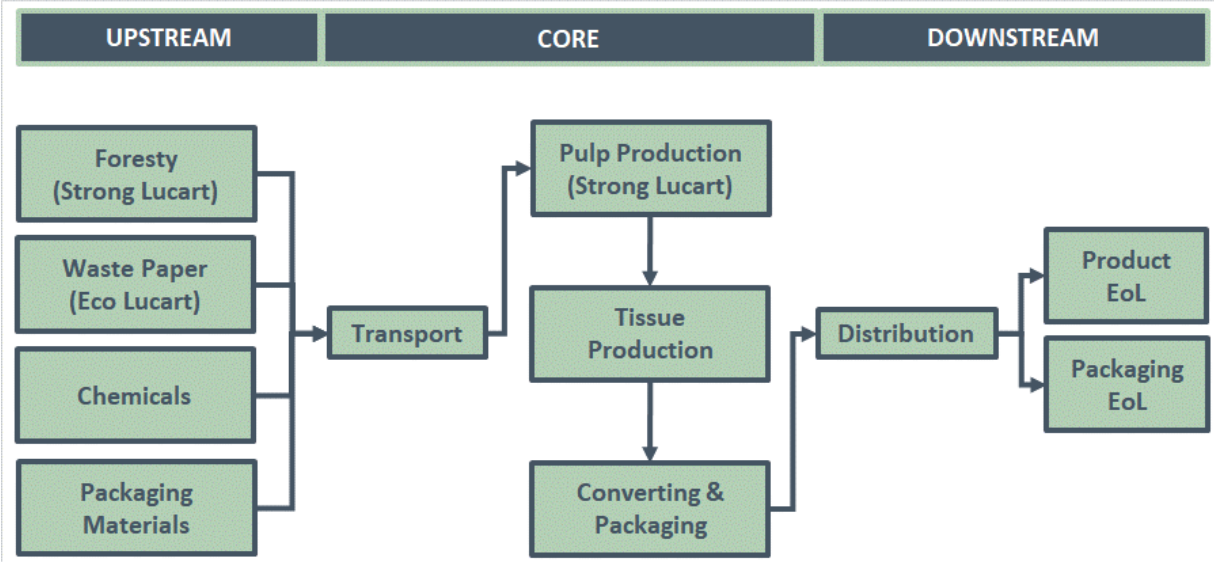
SYSTEM BOUNDARIES

According to a “cradle-to-grave” approach, the system boundaries include all life cycle phases, from forestry or waste paper recycling to the final disposal of the products and their packaging after consumption.

In particular, the system includes the following life cycle phases:

- **"Upstream processes":**
  - forestry (only for Strong Lucart);
  - waste paper recycling (only for Eco Lucart);
  - production of chemicals;
  - production of packaging materials;
- **"Core processes”:**
  - pulp production (only for Strong Lucart);
  - supply of raw materials and packaging materials;
  - tissue paper production;
  - converting and packaging;
  - waste management;
  - wastewater treatment;
- **“Downstream processes”:**
  - distribution of the product;
  - product and packaging materials end of life.

System boundaries are schematically represented in the figure below:



DESCRIPTION OF PRODUCTION PROCESS

Raw materials production and supply

Pulp production – The production cycle of paper from virgin fibres begins with the extraction of cellulose from trees. The collected timber is debarked and then chipped into smaller pieces. The chips are then sent with a mixture of water and chemicals to a digester, where they are turned into pulp. The pulp is then processed in order to remove impurities and, if necessary, bleached. The pulp is finally spread on a rack and, once dried, cut into sheets and assembled in bales. The purchased bales are then transported to the paper mill.

Collection of waste paper - Waste paper comes from different sources, it can be industrial waste (pre-consumer) or domestic paper from recycling (post-consumer). There are also collection and sorting platforms that sell paper for recycling ("end of waste" paper) for tissue paper production.

Paper mill

The production cycle in the paper mill begins with the loading of the pulper with the cellulose bales and other raw materials, and ends with the weighing and labelling of the coils. The production phases of the paper mill are the following:

- **Pulp preparation unit** - This unit consists in a series of plants able to treat the fibre to obtain a specific kind of paper. In the pulper cellulose and other raw materials are reduced in a homogeneous mixture of fibres and water. Any coarse non paper component are retained by a plate placed on the bottom, while the fibrous suspension obtained is discharged into the storage tanks. The fibrous mixture is then purged and refined.
- **Paper machine** - In this phase the sheet of paper is generated. The mixture is homogenized and spread on the canvas in order to form the sheet; it is then dried and rolled on rollers.
- **Rewinder** - This phase consists of the coupling of the veils of several coils and the cutting of the reels in formats that can be used in the converting phase.

Converting

In the converting phase the coils coming from the paper mill are processed to obtain the finished product ready for marketing. The coils are unrolled separating veils and the paper is printed, glued, embossed, scented and then, wound onto cardboard cores to obtain the log. The log is finally cut into individual rolls that will fill the finished product packs. At the end of converting phase the final product is packed.

Distribution

The finished products are delivered to the main distribution centres by different means of transportation.

EXCLUSIONS

In accordance with the reference PCR the use phase is excluded from the system boundaries.
In accordance with the reference PCR the environmental loads associated with these processes are excluded from the system boundaries:

- manufacturing of production equipment, buildings and other capital goods;
- staff travel;
- research and development activities;
- raw materials packaging.

In addition, wastes generated in paper mill and converging cumulatively accounting for less than 1% of the total generated have been excluded from the analysis.

DATA SOURCES

The data used for the LCA were measured in the plant of Diecimo, Italy, and provided directly by the main suppliers of the plant. For selected generic and proxy data Ecoinvent 3.9 datasets have been used.
According to the *General Programme Instructions,* "proxy" data do not exceed 10%.

END OF LIFE SCENARIOS

Considering that the reference market is mainly Italy, for the various waste management treatments Italian scenarios have been taken into account. In particular, for packaging waste the Eurostat "*Packaging waste by waste management operations*" data were used as a reference.
For the end of life of toilet paper it has been assumed that 1 ton of product is disposed as 1 m^3 of an average domestic wastewater.

The scenarios shown in the following table were considered for the end of life of the products and their packaging:

Material	Civil waste water treatment	Recycling	Energy Recovery	Disposal
Toilet Paper Strong Lucart	100%	-	-	-
Toilet Paper Eco Lucart	100%	-	-	-
Paperboard core	-	93%	6%	1%
Film PE	-	49%	43%	8%

Content declaration

PRODUCTS

Material	Unit	Strong Lucart	Eco Lucart
Tissue Paper	kg	1 000	1 000
Paperboard core	kg	77,95	74,58

PACKAGING

	Unit	Strong Lucart	Eco Lucart
CONSUMER PACKAGING:			
PE film	kg	22,79	21,81
DISTRIBUTION PACKAGING:			
PE Film secondary packaging	kg	10,00	9,98
Paperboard Interlayer	kg	0,78	0,74
PE Film tertiary packaging	kg	2,35	2,25
Pallet	kg	341,12	326,38

RECYCLED MATERIAL

Eco Lucart is made 100% of waste paper, 18% industrial waste (*pre-consumer*) and 82% domestic paper from recycling (*post-consumer*).

Environmental performance

All data quantities below relate to the functional unit chosen for the EPD: **1.000 kg (1 ton**) of paper as delivered to the main AFH distribution centres.

All environmental performance indicators has been calculated according to impact assessment methods defined in Version 2.0 default list of EPD International System Programme.

POTENTIAL ENVIRONMENTAL IMPACTS

TOILET PAPER STRONG LUCART						
PARAMETER		**UNIT**	**Upstream**	**Core**	**Downstream**	**TOTAL**
Global warming potential (GWP)	**Fossil**	kg CO_2 eq.	202,47	1.391,25	125,17	**1.718,89**
	Biogenic	kg CO_2 eq.	20,08	25,78	10,83	**56,70**
	Land use and land transformation	kg CO_2 eq.	2,88	3,94	0,00	**6,82**
	TOTAL	kg CO_2 eq.	225,43	1.420,97	136,01	**1.782,41**
Acidification potential (AP)		kg mol H^+ eq.	1,26	4,32	0,31	**5,89**
Eutrophication potential (EP)	**Aquatic freshwater**	0,03	0,05	0,00	**0,09**	**0,09**
	Aquatic marine	0,34	1,66	0,15	**2,15**	**2,15**
	Aquatic terrestrial	3,58	14,50	1,42	**19,50**	**19,50**
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,63	5,52	0,58	**7,73**
Ozone layer depletion (ODP)		kg CFC 11 eq.-	3,53E-05	5,82E-05	1,64E-06	**9,52E-05**
Abiotic depletion potential (ADP)	**Metals and minerals**	kg Sb eq.	8,60E-05	1,12E-04	2,51E-06	**2,00E-04**
	Fossil resources	MJ, net calorific value	4.151,83	20.013,39	1.012,64	**25.177,86**
Water deprivation potential (WDP)		m^3 world eq.	113,25	435,67	-50,47	**498,45**

TOILET PAPER ECO LUCART						
PARAMETER		**UNIT**	**Upstream**	**Core**	**Downstream**	**TOTAL**
Global warming potential (GWP)	**Fossil**	kg CO_2 eq.	209,86	1.271,68	160,92	**1.642,46**
	Biogenic	kg CO_2 eq.	21,96	63,87	10,37	**96,20**
	Land use and land transformation	kg CO_2 eq.	1,68	0,04	0,00	**1,71**
	TOTAL	kg CO_2 eq.	233,49	1.335,59	171,30	**1.740,38**
Acidification potential (AP)		kg mol H^+ eq.	1,32	3,39	0,55	**5,26**
Eutrophication potential (EP)	**Aquatic freshwater**	kg P eq.	0,02	0,01	0,00	**0,03**
	Aquatic marine	kg N eq.	0,28	2,34	0,23	**2,85**
	Aquatic terrestrial	mol N eq.	3,09	12,34	2,19	**17,62**
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,20	5,34	0,82	**7,37**
Ozone layer depletion (ODP)		kg CFC 11 eq.-	3,56E-05	3,36E-05	2,43E-06	**7,16E-05**
Abiotic depletion potential (ADP)	**Metals and minerals**	kg Sb eq.	6,39E-04	1,21E-05	3,73E-06	**6,55E-04**
	Fossil resources	MJ, net calorific value	4.194,38	17.501,72	1.513,93	**23.210,04**
Water deprivation potential (WDP)		m^3 world eq.	193,41	30,99	-50,02	**174,38**

USE OF RESOURCES

TOILET PAPER STRONG LUCART						
PARAMETER		**UNIT**	**Upstream**	**Core**	**Downstream**	**TOTAL**
Primary energy resources – Renewable	**Use as energy carrier**	MJ, net calorific value	79.265,34	3.137,64	4,26	**82.407,24**
	Used as raw materials[1]	MJ, net calorific value	20.219,40	0	-20.219,40	**0**
	TOTAL	MJ, net calorific value	100.775,34	3.137,64	-21.505,74	**82.407,24**

[1] The value has been calculated assuming that the product is made of 94% dry matter (chemicals content below 1%) and it's net calorific value (NCV) is 21,51 MJ/kg. NCV of 100% dry matter tissue paper has been calculated starting from a value of 16,13 MJ/kg for a 75% dry matter tissue paper (Els van der Roest *et al*, *Converting Waste Toilet Paper into Electricity: A First-Stage Technoeconomic Feasibility Study,* Energy Technol. 2017, 5, 2189–2197), scaled up to 100% dry matter assuming a linear relationship between dry matter content and NCV. Energy content of paperboard core has been considered negligible and excluded from the calculation

TOILET PAPER STRONG LUCART						
PARAMETER		**UNIT**	**Upstream**	**Core**	**Downstream**	**TOTAL**
Primary energy resources – Non-renewable	**Use as energy carrier**	MJ, net calorific value	4.151,83	20.013,39	1.012,64	**25.177,86**
	Used as raw materials	MJ, net calorific value	0,00	0,00	0,00	**0,00**
	TOTAL	MJ, net calorific value	4.151,83	20.013,39	1.012,64	**25.177,86**
Secondary material		kg	0,00	0,00	0,00	**0,00**
Renewable secondary fuels		MJ, net calorific value	*INA*	*INA*	*INA*	*INA*
Non-renewable secondary fuels		MJ, net calorific value	*INA*	*INA*	*INA*	*INA*
Net use of fresh water		m^3	2,99	20,31	-1,13	**22,16**

TOILET PAPER ECO LUCART						
PARAMETER		**UNIT**	**Upstream**	**Core**	**Downstream**	**TOTAL**
Primary energy resources – Renewable	**Use as energy carrier**	MJ, net calorific value	10.337,71	911,50	5,47	**11.254,68**
	Used as raw materials[1]	MJ, net calorific value	20.219,40	0	-20.219,40	**0**
	TOTAL	MJ, net calorific value	31.847,71	911,50	-21.504,53	**11.254,68**
Primary energy resources – Non-renewable	**Use as energy carrier**	MJ, net calorific value	4.194,38	17.501,72	1.513,93	**23.210,04**
	Used as raw materials	MJ, net calorific value	0,00	0,00	0,00	**0,00**
	TOTAL	MJ, net calorific value	4.194,38	17.501,72	1.513,93	**23.210,04**
Secondary material		kg	940,00	0,00	0,00	**940,00**
Renewable secondary fuels		MJ, net calorific value	*INA*	*INA*	*INA*	*INA*
Non-renewable secondary fuels		MJ, net calorific value	*INA*	*INA*	*INA*	*INA*
Net use of fresh water		m^3	4,91	12,48	-1,13	**16,26**

WASTE PRODUCTION

TOILET PAPER STRONG LUCART					
PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	0,01	0,09	0,01	**0,10**
Non-hazardous waste disposed	kg	14,05	90,32	160,78	**265,16**
Radioactive waste disposed	kg	0,01	0,02	0,00	**0,03**

TOILET PAPER ECO LUCART					
PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	0,01	0,08	0,01	**0,10**
Non-hazardous waste disposed	kg	19,36	59,75	153,88	**232,99**
Radioactive waste disposed	kg	0,01	0,00	0,00	**0,01**

It should be noted that EPDs within the same product category but from different programmes may not be comparable.

Differences versus previous versions

Previously published EPD, based on 2023 data, has been updated with actual version because of:

- A change in the pulp mix, within the limits allowed by the recipe, and in part of the supply nations (for Strong Lucart product);
- A change in the electricity mix of the production plant.

As a consequence of the update, results on water depletion potential increase of more than 10%.

References

For LCA study and EPD declaration fulfilment, the following documents were used:

- *General Programme Instructions (GPI) for Environmental Products Declarations (Version 3.01);*
- PCR 2011:05 (Version 3.0.1);
- UN CPC 32131: Toilet or facial tissue stock, towel or napkin stock and similar paper, cellulose wadding and webs of cellulose fibres;
- Life Cycle Assessment dei prodotti: Carta Igienica Strong Lucart 10 rotoli e Carta Igienica Eco Lucart 10 rotoli, Prodotti da Lucart Group a Diecimo (LU), Italia (26/08/2022, rev.03) and following update (09/09/2025, rev.00);

- Els van der Roest *et al*, *Converting Waste Toilet Paper into Electricity: A First-Stage Technoeconomic Feasibility Study,* Energy Technol. 2017, 5, 2189–2197
- Ecoinvent 3.9 Database (http://www.ecoinvent.ch);

EPD®

www.environdec.com