

LIFE CYCLE ASSESSMENT BALLOGRAF

RESULT REPORT

November 2023

LCA by Lyreco is a tool for life cycle assessment built for Lyreco by Miljögraff. The result from LCA by Lyreco gives an indication of the carbon footprint of a product based on specific data on material composition and energy use in production. Data from database ecoinvent 3.9 is used to model the impact of raw materials.

Product information

Declared unit:	One pen including packaging
Products included in assessment:	136231 Epoca Recycled Plastic 13623-24 Epoca Recycled Plastic
Product owner:	Ballograf AB

Additional information

Writing length:	8000 meters
Refillable:	Yes



LCA scope and system boundaries

The Life Cycle Assessment is based on a cradle to grave perspective and includes the raw materials used in components, manufacturing of the product, transportation throughout the product's life cycle and waste treatment.

This LCA is based on the assumption that waste in production as well as the product with packaging are incinerated once they are disposed. This is applied for all materials except metals, which are assumed to go to material recycling.



Raw material in components
- Raw materials (virgin and/or recycled)
- Processing of raw materials



Transporting to manufacturing site



Production of product
- Energy use production
- Packaging material



User phase
- refills not included



Treatment at end of life
Incineration and/or recycling (only metals)

Result

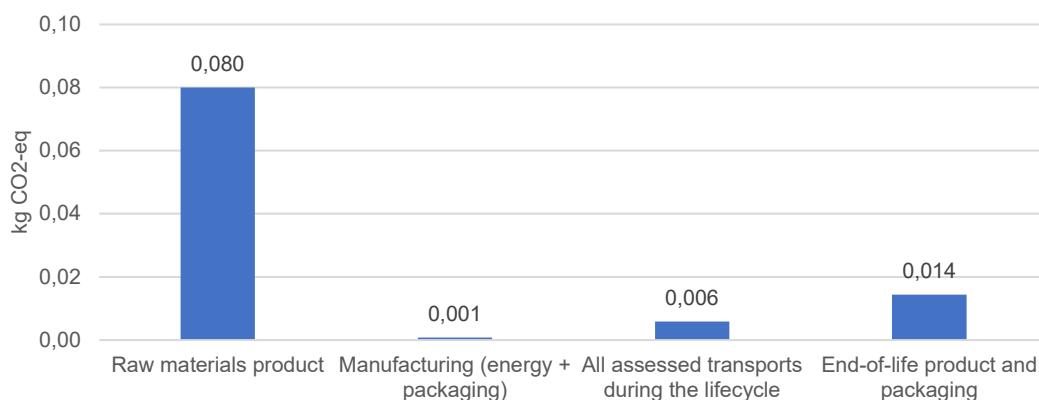
The result is presented for one pen including packaging.

Total kg CO₂-eq is 0,101.

The impact of writing 100 meters is 0,001 kg CO₂-eq.

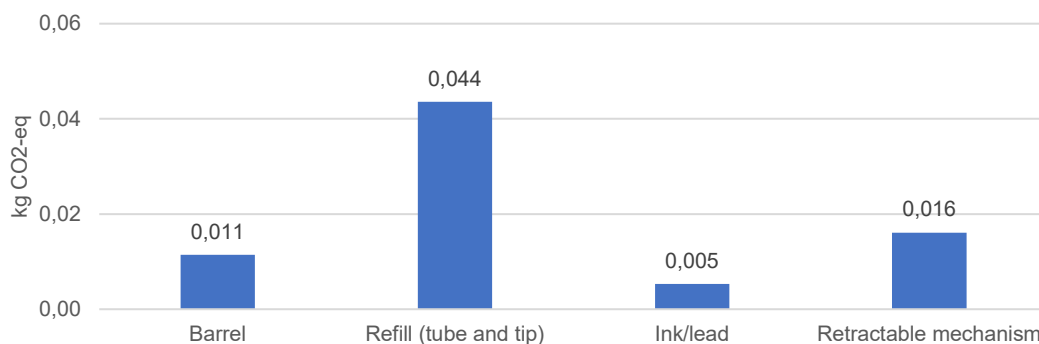
Impact category	Unit	Total lifecycle	Raw materials	Manufacturing	All transports	End-of-life
Climate change – Total	kg CO ₂ -eq	0,101	0,080	0,001	0,006	0,014
Climate change – Fossil	kg CO ₂ -eq	0,097	0,077	0,001	0,006	0,014
Climate change - Biogenic	kg CO ₂ -eq	0,001	0,001	0,000	0,000	0,000
Climate change - Land use and LU change	kg CO ₂ -eq	0,003	0,002	0,000	0,000	0,000

kg CO₂-eq per life cycle step



The raw material stands for the highest CO₂-eq emission. The components that contributes the most to this result are the refill (tube and tip) and retractable mechanism.

CO₂-eq per component
Life cycle step: Raw material



LCA information

Generator of data:

Mattias Holm, mattias.holm@ballograf.se

Inventory period:

2022/23

Date of assessment:

25-09-23

Recorder of data:

Ellen Söderlund, ellen.soderlund@lyreco.com

Standard:

ISO 14067, consistent with ISO 14040-44

Type II environmental declaration, self declared with no third party review

Impact assessment method:

Environmental Footprint 3.1

Indicators:

Global Warming Potential (GWP-100)

Tool:

SimaPro Explore

Background data:

ecoinvent 3.9

Allocation:

Cut-off approach

Archetype model in SimaPro:

Archetype 4 - Pens & Pencils

Version 1.0

Archetype model made by:

Miljögiraff

Method report:

Method report – LCA by Lyreco, Notebooks, Folders, Notes, Pens & Pencils

Version 1

Interpretation and limitations

The carbon footprint is based on specific data on material composition and energy use in production. Ecoinvent 3.9 is used to model the impact of raw materials. The level of uncertainty in the results is significantly influenced by the selection of data representing specific materials. The underlying calculation tool has been developed and verified by Miljögiraff AB. However, the specific result generated by the tool have not undergone a third-party review to assess its plausibility.

The result covers only one environmental impact, the carbon footprint. No overall statements on the environmental performance of the product can be given. Furthermore, the results are presented per declared unit and do not offer insights into how the product's environmental performance relates to its intended function.

Data quality assessment

Primary data has been collected for:

- Product composition: raw material
- Product manufacturing: energy, waste, packaging materials
- Transports during the lifecycle

Keep in mind that this assessment is based on data relevant for manufacturing in 2023, hence the data should be updated if any significant changes are made within the product system. It is recommended that the data is updated at least every five year to stay accurate and relevant.

LCI data composition:

Based on the assessment of climate impact results, it has been evaluated that 95% of the impact can be derived to the following data quality levels: 7% level 1, 43% level 2 and 45% level 3.

Data quality for manufacturing and transports are specific, hence they are considered as level 1. The data quality for raw materials has been determined based on the following criteria:

Level	Description
1	Suppliers' Environmental Product Declarations (ISO 14025) and verified LCA (ISO 14044).
2	Self declared (ISO 14021) LCA and LCA screening. Representative LCA models (selected generic data), or similar product's EPD.
3	Climate impact per type of industry. Close proxy by generic LCI data. Averages from several EPDs from the same industry.

Aspect	Notes
Data quality assessment scheme	The data quality level and criteria from EN15804 have been applied in this study.
Geographical coverage	Raw material data: Level 2 and 3. Manufacturing data: Level 1.
Technological representativeness	Raw material data: Level 2 and 3. Manufacturing data: Level 1.
Time-related coverage	Data of external processes: Not older than 10 years. Manufacturing data: 2023
Validity	Assess whether the technological and geographical coverage of the data chosen reflects the physical reality of the product system modelled.
Plausibility	Result of plausibility checks, for example: Specific data used has been checked for plausibility, using as reference for example EPDs for similar products when possible.
Precision	Material and energy flow quantified based on generic data from the following LCI databases: e.g. ecoinvent 3.9.1 Cut-off
Completeness and treatment of missing data	Simplifications done in the model: When more than one transport option exists for a raw material the option with most significant climate impact have been selected. Consumables in manufacturing are excluded. A maximum of 5% cut-off was applied.
Consistency, allocation method, etc.	Allocation follows physical causality in line with EN 15804.
Final result of data quality assessment	Data quality as required in EN15804 is met.