

LIFE CYCLE ASSESSMENT BALLOGRAF

RESULT REPORT

April 2024

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:	<ul style="list-style-type: none"> 15110 FRIENDLY Highlighter chisel yellow 15120 FRIENDLY Highlighter chisel blue 15130 FRIENDLY Highlighter chisel green 15140 FRIENDLY Highlighter chisel pink 15150 FRIENDLY Highlighter chisel 4/pk 18310 FRIENDLY Flipchart bullet black 18320 FRIENDLY Flipchart bullet blue 18330 FRIENDLY Flipchart bullet green 18340 FRIENDLY Flipchart bullet red 18350 FRIENDLY Flipchart bullet 4/pk 18110 FRIENDLY Flipchart chisel black 18150 FRIENDLY Flipchart chisel 4/pk



Product owner: Ballograf AB

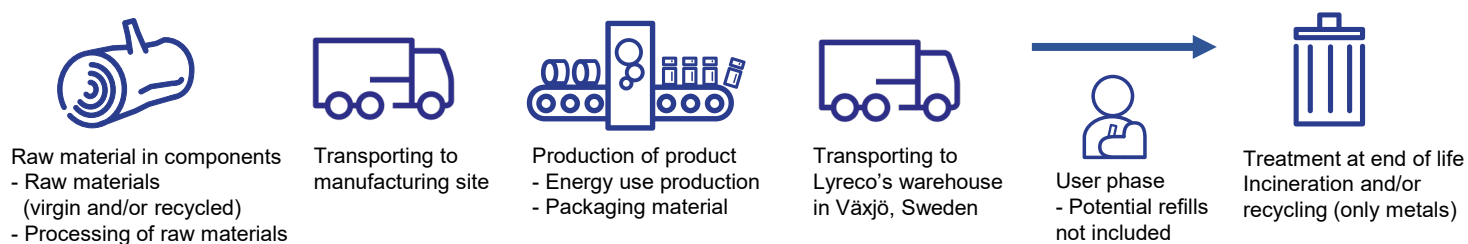
Additional information

Refillable: No

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, transportation of components, manufacturing of the product, transportation to Lyreco warehouse and waste treatment. Potential impact from the user phase is not included.

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.

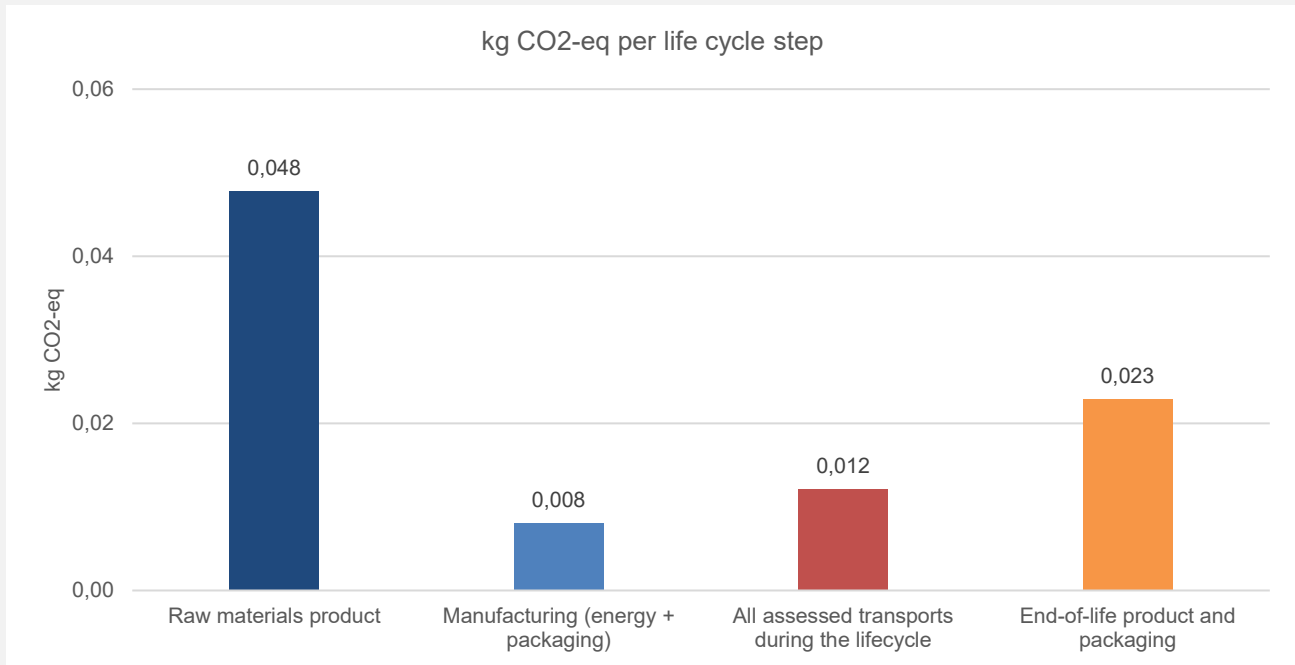


Result

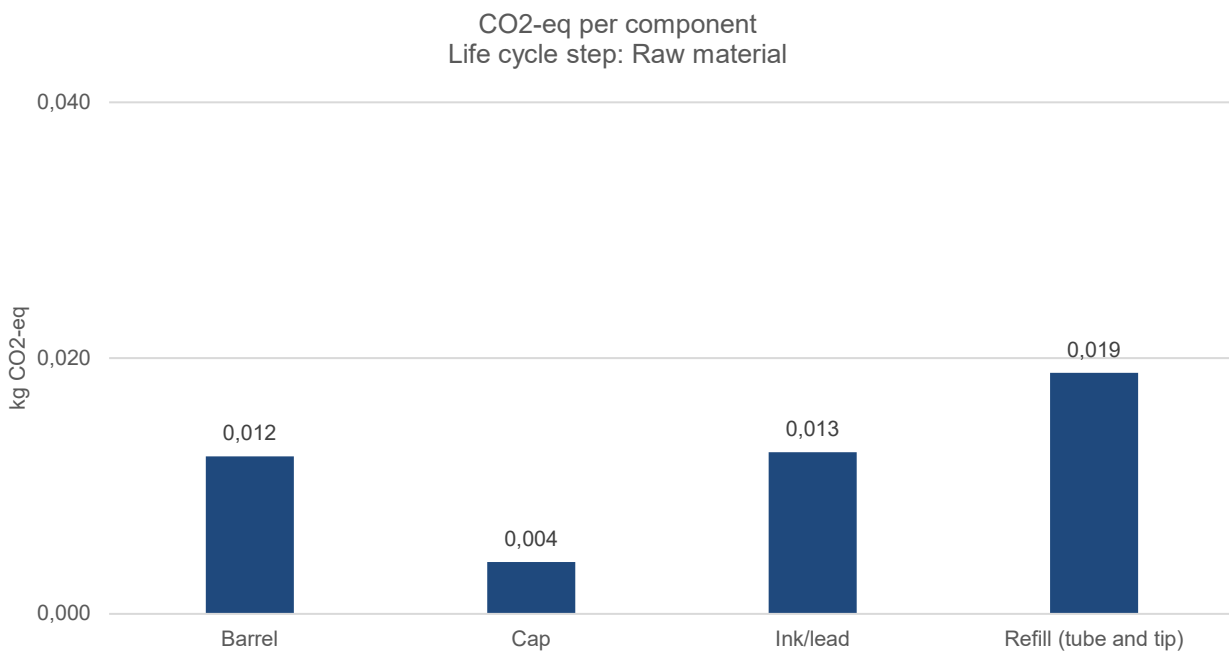
The result is presented for one pen including packaging.

Total kg CO2-eq is 0,091.

Impact category	Unit	Total lifecycle	Raw materials	Manufacturing	All transports	End-of-life
Climate change – Total	kg CO2-eq	0,091	0,048	0,008	0,012	0,023
Climate change – Fossil	kg CO2-eq	0,084	0,042	0,007	0,012	0,023
Climate change - Biogenic	kg CO2-eq	0,001	0,000	0,001	0,000	0,000
Climate change - Land use and LU change	kg CO2-eq	0,006	0,006	0,000	0,000	0,000



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), ink/lead and barrel.



LCA information

Generator of data:

Mattias Holm, mattias.holm@ballograf.se

Inventory period:

2023/24

Date of assessment:

2024-04-12

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 1.2

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 of components to manufacturing
- Transport of finished products to Lyreco's warehouse in Växjö, Sweden

Keep in mind that this assessment is based on data relevant for manufacturing in 2024, 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 for the lifecycle steps where primary data has been collected, it has been evaluated that 100% of the impact can be derived to the following data quality levels: 18% level 1, 52% level 2 and 30% level 3. End-of-life is excluded from this assessment as any treatment in end-of-life is based on conservative assumptions how materials are treated currently.

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: Everything is level 2, except from ink that is level 3. Manufacturing data: Level 1.
Technological representativeness	Raw material data: Majority considered to be level 2, except from ink that is level 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, as well as the glue that is being used in the barrel due to very low amount. 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.