



Understanding The Carbon Footprint Of Cariuma IBI Slip-On

According to:



IBI Slip-On LCA report

Cariuma's Methodology

Cariuma collaborated with PRé Sustainability, a third-party consultant, to conduct a Life Cycle Assessment (LCA) to calculate/quantify the carbon footprint of our products.

PRé Sustainability is a global leader in environmental measurement and methodologies, with more than 25 years of experience in LCAs, and is sought after as an expert in the industry. Their products include the SimaPro software, the world's largest LCA software solution, as well as the development of widely recognized and applied environmental impact assessment methods ReCiPe & Eco-Indicator 99. They are one of the leading professional LCA software packages – used by industries, consultancies, and research institutes in more than 80 countries.

In addition to these products, PRé has a world class team of environmental calculation experts in the Netherlands, and a partner network around the world spanning over 20 countries and all continents. PRé is closely involved in many initiatives to measure environmental and social impact, such as The Sustainability Consortium, The Sustainable Apparel Coalition and the Environmental Footprint initiative by the European Commission.

Goal of the Study

This Carbon Footprint study follows the ISO 14067 standard and has been peer-reviewed to ensure its compliance. Another relevant standard for this study is the draft of Footwear Product Environmental Footprint Category Rules (Footwear PEFCR), which is used for various aspects of the study.

The scope of this study is cradle-to-grave, meaning that it quantifies the carbon footprint resulting from the extraction and processing of raw materials; production of the shoe components; assembly, and storage; use and maintenance; and end of life. The information is used to understand where key emissions take place in the life cycle, and to spot improvement opportunities to further reduce emissions.

The study was conducted in compliance with ISO 14067 and has been peer reviewed by ACV Brasil. The critical review conducted by ACV Brasil consultants involved verifying the approach used in the study, which included the quality of data, system boundaries, assumptions made, and whether or not the methodology used is compatible with the goal of the study.

Additionally, the model developed for the purpose of this study will also be used as a baseline model for future ISO 14067 compliant carbon footprint studies of all Cariuma sneaker models and accessories.

Functional Unit and Average Product Carbon Footprint

The functional unit describes qualitatively and quantitatively the function(s) or the service(s) provided by the products analyzed. The functional unit is a measure of the function of the studied system and it provides a reference to which the inputs and outputs can be related.

The functional unit that is defined in this study is based on the draft of Footwear Product Environmental Footprint Category Rules (PEFCR). The definition of the functional units contains a description of the function, the magnitude, expected quality and lifetime:

Category	Functional Unit
Function / service - “What”	Footwear - size EU 40 - US W9 / M7.5
Magnitude - “How much”	One pair of footwear
Expected quality - “How well”	Wear in good condition with appropriate use
Lifetime - “How long”	The footwear PEFCR considers one year as the reference wear time. However, Cariuma shoes are built to last longer than a year and have gone through several tests to ensure maximized durability.

The carbon footprint of one pair of IBI Slip-On sneakers, including materials, production, use phase and end of life is **5.48 kg CO2 eq.** The results were grouped into life cycle stages to provide insight into the contribution of each life cycle stage to the overall carbon footprint.

IBI Slip-On	Kg CO2 eq.
Materials	3.17
Sneaker production	1.69
Use	0.35
End of life	0.27
Total	5.48

Characteristics of IBI Slip-On

The IBI Slip-On sneaker that is assessed in this study is defined by the following characteristics:

- The upper and lining are made from a combination of bamboo and recycled PET (PolyEthylene Terephthalate) yarns from plastic bottles
- The outsole is made from sugarcane based EVA (Ethylene Vinyl Acetate)
- The insole is made from organic cork & bio-based PU from mamona oil
- IBI Slip-On's threads and logo labels are made from recycled PET (PolyEthylene Terephthalate), sourced from plastic bottles
- Construction: cemented



System Boundaries

In life cycle assessment, the system boundaries¹ indicate which stages of the product's life cycle are included in the assessment. The following comprises the system boundaries for this study:

Life Cycle Stage	Description
Materials production	Includes the extraction and preparation of materials that are needed for the production of the shoe component, such as sugarcane-based EVA, bio based TPU, chemicals, cork, energy, yarn, rubber, water.
Shoe component production	Contains the production of the outsole, insole, upper part and other components, and the other processing steps that are required (such as cutting and stitching).
Manufacturing	Contains the manufacturing process of the finished product including all production stages, from material inspection to cutting, stitching, assembly, and packing.
Use	According to the Footwear PEFCR, maintenance should only be considered when maintenance activities (such as washing and applying durable water repellent spray) are advised by the footwear producer. This study accounted for the possibility that sneakers are being washed during their lifetime, therefore 3 washing cycles (at a water temperature of approximately 30 degrees Celsius) and a complete air-dry cycle have been included in the use phase, per our recommendation.
End of Life	Since Cariuma products are sold worldwide and end-of-life treatments vary greatly between different geographies, with some countries mainly landfilling and others mainly using incineration, a mix of 50% landfill and 50% incineration is used as a recommendation from PRé Sustainability.

¹ The distribution stage through different channels such as wholesale, direct online, independent skate shops, department stores, and distributors is not included in this document given the difference between channels, although it was considered in the full LCA study.

Data Sources

Primary data was collected directly from Cariuma and their suppliers. Cariuma collected data for the bill of materials and processing of the sneaker in different factories, and for the use phase. Different suppliers and manufacturers provided information on the upstream processes, such as the bill of materials of the products they supply and the processing data for this product.

Secondary data was used for background processes. In addition, some secondary data was used to approximate the impact of some foreground processes where primary data was not available. The overall contribution of these particular processes to the total was low. Data was sourced predominantly from the Ecoinvent 3.6 database and supplemented with data from the Agrifootprint database.

Based on the goal and scope, the study has the following limitations:

- The data is collected for the reference year 2019. While yearly fluctuations are expected to be low, it is possible for slight differences per year to influence the results.
- Due to the limited data availability of bio-based materials, both in terms of primary data as well as in the background database, the data used in the study was based on alternative materials – which are likely to produce higher emissions than the actual materials used in IBI Slip-On.

Conclusion of Critical Review

ACV Brasil was hired as an external expert by Cariuma to carry out a critical review of the study "Understanding the carbon footprint of Cariuma sneakers," based on the requirements of ISO 14067. The review was carried out in two phases, after defining the goal and scope and after the final report.

The reviewer emphasizes the excellent work done by PRé Sustainability B.V and Cariuma to assess the carbon footprint of these sneakers.

The reviewer concluded that the methods used in the CFP study are consistent with ISO 14067 standard; that the data is appropriate and reasonable; that the interpretations reflect the limitations, resulting in a study report that is both transparent and consistent.

Note:

Although there is no standardized industry benchmark, here are some relevant examples from other studies of similar footwear. Please note that these are not directly comparable, due to differences in calculation methodology.

- Massachusetts Institute of Technology LCA study in footwear resulting in 14 ± 2.7 kg CO₂ eq. per pair (<https://dspace.mit.edu/handle/1721.1/102070>)