

TRUE COST LABEL



LIFE CYCLE ANALYSIS FILLING PIECES – LOW TOP 683

Oktober 2021

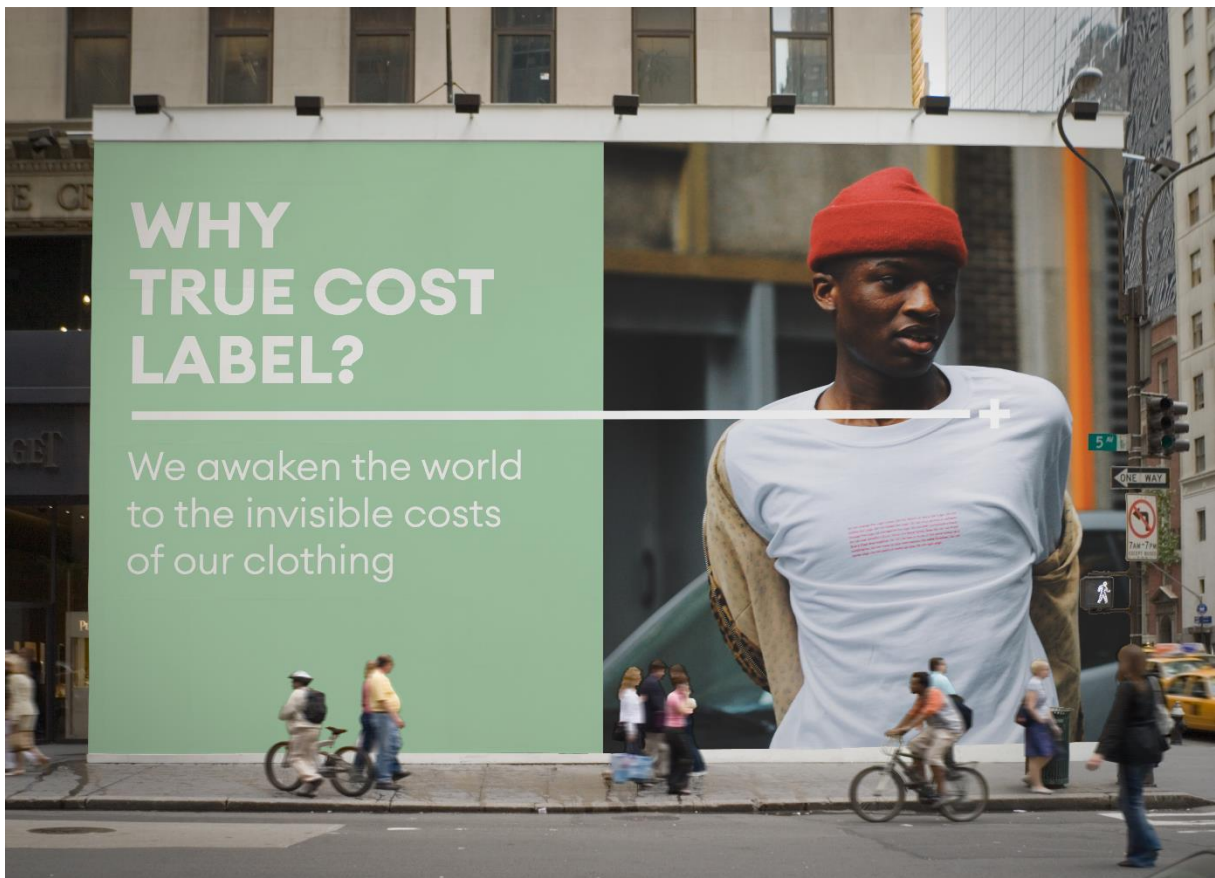
ABOUT THIS REPORT

This Life Cycle Analysis report has been constructed in consultation to Filling Pieces to reveal the invisible costs of their sustainable shoe: the Low Top 683. A True Cost Label impact profile has been generated to show consumers the impact their products have on the planet and its people. To help consumers make more informed decisions, Filling Pieces' products are benchmarked with products of the same material weight according to conventional industrial practices, materials and locations. As a frontrunner, Filling Pieces understands the need for radical transparency which is why they partnered with True Cost Label to generate this Life Cycle Analysis.

OUR STORholgY

We are True Cost Label, a digital platform that makes it simple to buy and sell sustainable and ethical fashion. Let's face it. Our fashion has a huge impact on the environment, and the people who make it. We reveal these invisible costs. Piece by piece, we break down how each product affects our planet and its people. By translating complicated data into simple facts, we bring clarity. That's how we encourage more informed decisions that involve less pollution and fairer work conditions across the industry.

Finding a new favorite is already a challenge. Let sustainability be the easy part. We bring together conscious fashion brands with like-minded consumers. All in one spot. United as one force. Love the planet. Love your fashion.



LIFE CYCLE ANALYSIS

A Life Cycle Analysis, also known as LCA study, is a deep analysis of the supply chain. Whereas LCAs can be performed for any industry, True Cost Label specializes in those specifically for the fashion sector. An essential step in this, is the mapping of Filling Pieces' supply chain.

The product is broken down at a component level, looking at every single kilogram of material and production process needed to make the shoe. Consequently, the environmental and social impacts of the production of raw materials and the manufacturing of those materials into a final product is collected and computed into total figures. From the tanning of leather to the synthesis of rubber, followed by the cutting, stitching, pressing, moulding, and anything else imaginable within the typical supply chain of a pair of shoes.

Another important aspect of LCA is transport. For every product True Cost Label investigates, the transportation routes from the raw materials to the brand's store are tracked down and included in the impact calculation. This way, the total amount of kilometers a brand's product has traveled is displayed in its True Costs.

FILLING PIECES'S SUPPLYCHAIN

For Filling Pieces, True Cost Label conducted an LCA of their product: the Low Top 683, Size 44, made out of 88 grams EU certified leather, 286 grams of synthetic lining (mix of nylon and polyurethane) a 306 grams outersole made of 55% sugarcane biopolymer and 45% EVA and a 110 grams inner-sole made of 15% cork and 85% recycled EVA.

The shoes are manufactured in Portugal by Filling Pieces' partners. Leather is sourced from certified Dutch organic, bio-grade cattle supplied to Mastrotto & Unileather. The leather is tanned chromium- and metal free using glutar tanning. Materials for the other components are sourced globally and manufactured in, Portugal. Once assembled, the Low Top 683 is shipped by truck to Amsterdam where it is sent by Filling Pieces to their customers.

The figure below gives an overview of Filling Pieces' supplychain. An average manufacturing supplychain has been taken into account for shoe assembly based on Cheah et al (2013). Economic allocation has been applied to account for the lifetime impact of raising cattle according to the Product Category Rules for bovine leather (Envirodec, 2011).

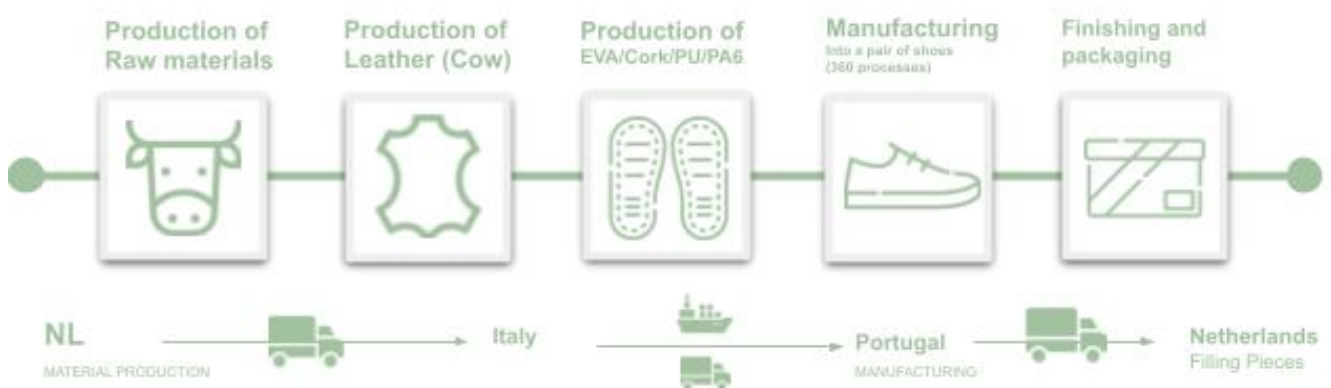
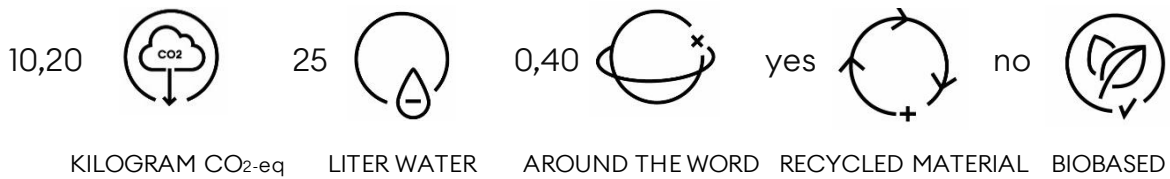
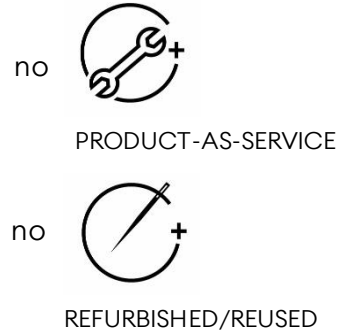


Figure 1: Filling Pieces' Supply Chain

Filing Pieces: 'Low Top 683' Sneaker

Functional unit: One pair of Size 44, 0,790 kg



LCA RESULTS

The results of this LCA are presented in the following table and in the figure above. A full table of the impact for all sizes is included in the appendix of this report.

Indicator	Filing Pieces: Low Top Nappa	Conventional Leather sneaker	Unit	Benchmark versus Conventional Product
Climate change	10,20	53,71	kg CO ₂ -eq	83% better
Water use	25	214	Liter	90% better
Total distance	16000 (0,40x ATW)	25150 (0,63x ATW)	Kilometer	37% better
Accessories	Laces, aiglets and lace mechanism is assumed to be imported globally with laces made from GOTS certified organic cotton. Impact of the aiglets and lace mechanism are marginalized.			
Conventional product	The conventional product is modelled with the same components, except that the materials of leather production come from a more global mix of production countries and is chromium-tanned. The manufacturing of the shoe takes place in Asia to represent an industry average. The weight of the conventional shoe is based on the same weight as the Low Top Nappa, of which TCL also made an LCA report.			

SOCIAL IMPACT

The manufacturing of the Low Top 683 shoe takes place in Portugal following strict EU guidelines and regulations for safe labor and working conditions. In addition to EU guidelines, manufacturers of Filing Pieces work according to the

High Facility Social Labor Module from the Higg index. Working with this module ensures social impact in terms of wages, working hours, health and safety and employee treatment.

REFLECTION & IMPROVEMENT

Breakdown of indicators

True Cost Label's LCAs are broken down in the following indicators:

- Climate change expressed in kilograms of CO₂-equivalents¹;
- Water use expressed in liters of water;
- Distance traveled in amount of kilometers.

In addition, various qualitative indicators and a social impact reflection is taken into account as shown in the previous page. By putting all of these indicators together, True Cost Label aims to provide shoppers with the most complete picture of their product before purchasing it.

Impact visualization & compensation

Filling Pieces Low Top 683 has a climate change impact of 10,20 kg CO₂-eq per pair (size 44). The 2020 production of Low Top 683 is assumed at 20.000 items, similar to the Low top Napp. The total impact for these items is 205 tonnes of CO₂-eq.

To visualize this impact, Filling Pieces would need a forest of 8252 full grown trees capturing CO₂ for a year to compensate these emissions. The total water use of the shoes equals 490 m³ of water. Enough water to support the water demand of 20 families of four for 1 month.

IMPACT REDUCTION STRATEGIES

The impact Filling Pieces' products have are significantly lower than conventional production. The 683 on itself is an impressive achievement in sustainable shoe production with astonishing benchmark numbers to be proud of. Nonetheless, True Cost Label provides Filling Pieces with several strategies to even further lower their impact. The strategies we recommend are:

Strategy	Description
Fruit leather/ alternative leather	A beautiful innovation on the market is to make leather from fruit peels, such as mango or pineapple. It would be interesting to investigate these innovations. Using leftover fruit peels can save high amounts of emissions and water. Alternative leather can be made from several innovative materials.
Renewable Energy	To lower the impact of all manufacturing processes, it is suggested to communicate with the suppliers regarding the use of renewable energy. Manufacturing with renewable energy sources can bring climate impact close to zero emission.
End-of-life + Recycled leather	Setting up a take-back program for end-of-life shoes can be an interesting way to interact with consumers and assess the possibilities of producing recycled leather. Recycled leather will bring impact close to zero-emission.
Social Impact	Supply chain transparency is key to investigating the social standards of the manufacturing factories. Suppliers can be asked to comply with social audits such as SA8000, SMETA or RAP certifications. Also for Portugal.

¹ A CO₂ equivalent abbreviated as CO₂-eq is a measure used to compare emissions from various greenhouse gases on the basis of their global-warming potential (GWP).

IMPACT VISUALISATION



8252 trees are needed to compensate the climate impact of 20.000 pairs of Low Top 683, size 44

20.000 pairs of Low Top 683, size 44 need the same water as **20 families of four** for 1 month



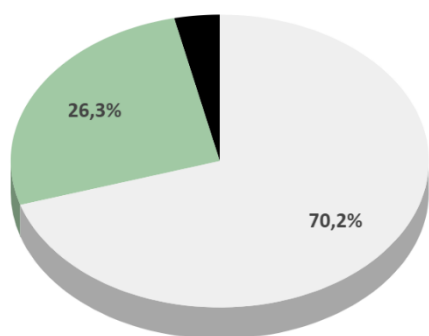
LCA ASSUMPTIONS

The following summary represents some important assumptions made during the Life Cycle Analysis conducted for Filling Pieces:

- Assumption 1: Distances for the supply chain were calculated using Google Maps, Sea-distances.org and estimations plus assumptions for some suppliers' locations.
- Assumption 2: Laces were modelled as cotton produced from global organic cotton with manufacturing based on global averages, then shipped to Portugal (10.000 km overseas)
- Assumption 3: Two academic peer-reviewed papers have been assessed to pinpoint the average CO2 reduction for organic vs conventional cattle. The range of reduction varies from 15 to 27% better for organic. 27% has been assumed for Filling Pieces Dutch organic cattle.
- Assumption 5: impact of aiglets and lace mechanism marginalized (excluded)
- Assumption 6: Truckload of max 24 tons per shipment assumed.
- Assumption 7: Extrusion, injection moulding and glueing assumed for the raw materials of the in and outter soles.

IMPACT SHARE TOTAL

Climate Change (kg CO₂-eq)



● Production ● Manufacturing ● Transport

LIFE CYCLE INVENTORY

The following processes were included in the LCA for Filling Pieces low top 683.

Filling Pieces

Scope: Cradle-to-gate²

Production

- Portugal | Certified NL hides from biological cows, economic allocation (PCR bovine leather), glutar tanning (hides)
- Global | Sugarcane biopolymer (PE), EVA rubber (outer-sole) + injection moulding (outer-sole)
- Global | Organic Cotton (laces)
- Portugal/Global | Portuguese Cork, upcycled EVA rubber, glueing + injection moulding (inner-sole)
- Global | PU/Nylon mix + extrusion (lining)

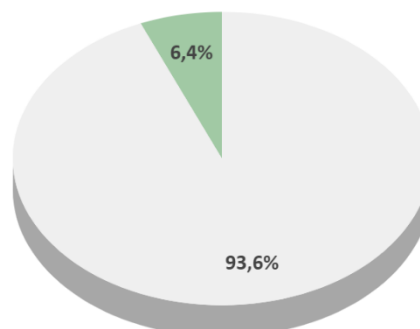
Manufacturing

- Portugal | Shoe manufacturing, 360 steps
- Global | Ginning cotton, hot air drying (laces)
- Global | Ring-spinning cotton (laces)
- Global | Roll/piece dyeing, reactive dyes
- Global | weaving, 200 dtex (laces)

Transport

- Truck + Trailer average 24-32T capacity
- International Freight Carrier (container ship)

Water use (liters)

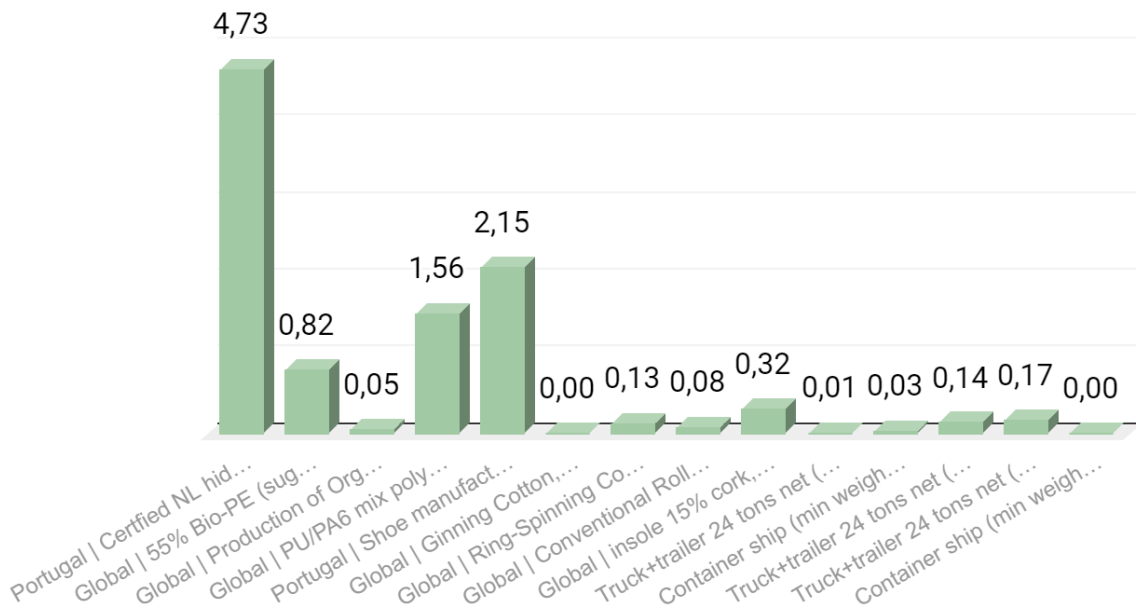


● Production ● Manufacturing

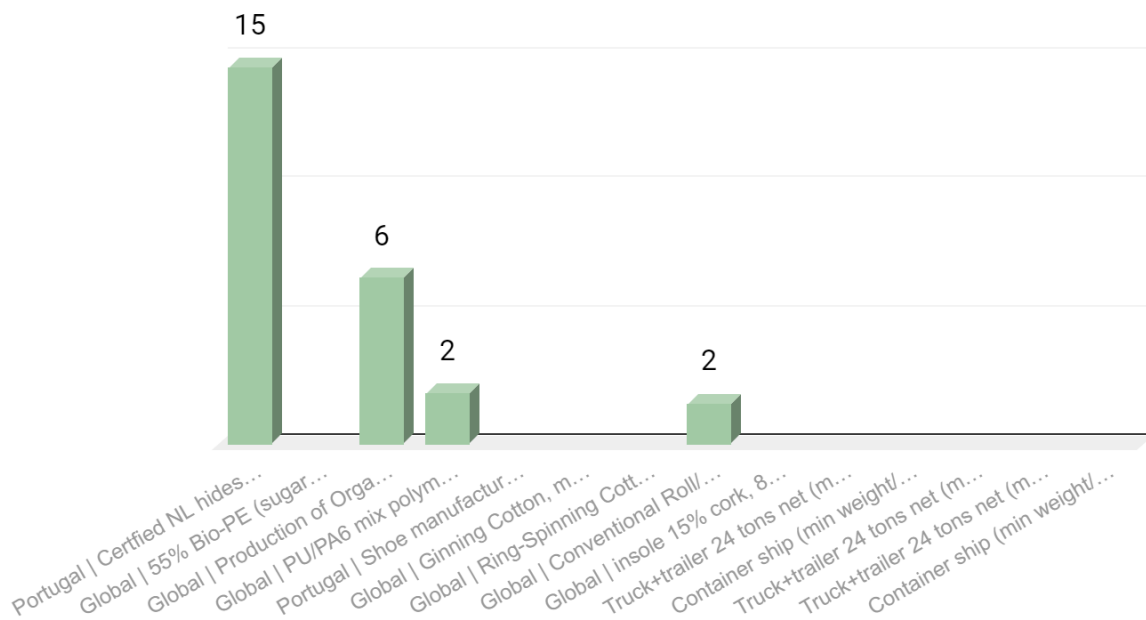
² Product use and end-of-life is not modelled.

IMPACT PER PROCESS

Climate change, kg CO₂-eq



Water use, Liters



HOW WE GENERATE THE TRUE COSTS OF YOUR PRODUCT

All LCAs made by True Cost Label B.V. including the data and methods contained within are calculated using our own developed tool, the 'True Cost Generator'. A custom LCA tool built by True Cost Label, specifically for Fashion LCAs and the detailed supply chains of the fashion industry.

1

Software, Databases and Methodology applied.

We apply OpenLCA[1] software to access input data for the True Cost Generator, with data mainly but not exclusively deriving from the following databases:

Ecoinvent 3.6 [2];

Idemat 2021 by TU Delft [3];

2

We apply the following Impact Assessment Methods for data retrieved and used in our LCAs

A) Carbon footprint: IPCC 2013 GWP 100a [4] as recommended by the European Platform on Life Cycle Assessment: ILCD [5] (International Reference Life Cycle Data System);

B) Water Depletion: ILCD 2011; Resource depletion - water; midpoint; freshwater scarcity; Swiss Ecoscarcity 2006.

C) Total distance in kilometer and mode of transport: Supply chain data provided by the customer in combination with Google maps and Sea Distances.

In addition, LCA data is included from carefully selected LCAs from peer reviewed scientific papers.

This is mostly done for innovative textile production processes or processes poorly modelled in existing databases. Assumptions made for these additions are stated in detail in each report

3

Goal and scope

We calculate our LCAs with a functional unit of total impact per kg of product from the raw materials to the manufacturing of the product with all transport processes included. (Cradle-to-Gate).

4

Standardization

True Cost Label Applies the ILCD method for its impact numbers, which is standardized according to EU-PEF method: European Product Environmental Footprint (EC, 2018. Product environmental footprint category rules, version 6.3). Our LCAs, LCA Reports and advise given based on LCA results follow the general principles of the ISO14044 quality standard for Life Cycle Assessment

5

References:

1. <https://www.openlca.org/>

2. <https://www.ecoinvent.org/database/older-versions/ecoinvent-36/ecoinvent-36.html>

3. <https://www.ecocostsvalue.com/EVR/model/theory/5-Idemat.html>

4. <https://www.ipcc.ch/>

5. <https://epiqa.jrc.ec.europa.eu/uploads/ILCD-Recommendation-of-methods-for-LCIA-def.pdf>

6. <https://www.iso.org/standard/38498.html>

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FINAL NOTE

The LCAs conducted by True Cost Label are continuously updated and improved in line with changing regulations, standardizations and new publications of data sources providing increasingly higher data quality. Therefore, it may be the case that these numbers will be updated in the future at the product display on the True Cost Label platform.

True Cost Label aims for 100% transparency 100% of the time. That said, the ultimate goal is to use actual factory data from the very supply chain parties involved in the Cradle2Gate lifecycle of every product that runs on the platform. This way all brands connected to True Cost Label will be at a 100% transparency with real-time impact data of the product's supply chain. To ensure this goal True Cost Label will keep innovating and streamlining its processes.

Only together we will be able to shift the fashion industry into a new sustainable paradigm. United as one force. Love the planet, love your fashion.

