



PRODUCT CARBON FOOTPRINT (PCF) CALCULATION CHECKLIST

Corrugated Board Packaging

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PURPOSE

This document provides a practical checklist for calculating the Product **Carbon Footprint (PCF)** of corrugated cardboard packaging.

In an industry where similar products are made by multiple manufacturers, having a harmonised approach to PCF calculation is essential to ensure comparability, credibility, and transparency.



A PCF quantifies the total greenhouse gas (GHG) emissions associated with a product throughout its life cycle or defined stages, typically expressed in CO₂-equivalents.

This checklist sets out a minimum standard for methodology, data sources, and customer communication, enabling companies to speak a common language on climate impact and support meaningful emissions reductions for their products and plants.

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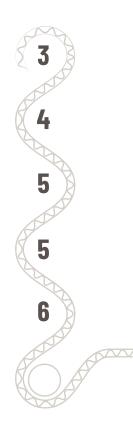
MINIMUM STANDARD FOR PCF CALCULATION

METHODOLOGY GUIDANCE

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CHECKLIST FOR FEFCO PRODUCT CARBON FOOTPRINT (PCF)





MINIMUM STANDARD FOR PCF CALCULATION



System Boundary

Cradle-to-Gate (raw material extraction to factory gate):

- **Biomass**
 - Fibres
 - Mill
- Corrugator
- **Transport**



Calculation

The PCF consists of four separate figures:

- Fossil origin emissions
- Biomass origin emissions
 - · Biogenic removal
- Emissions and removals of biogenic CO₂ due to direct land use change (dLUC)



Cut-off Criteria

Include all flows contributing >1% of mass, energy, or environmental impact



Functional Unit

1 kg of corrugated cardboard (in most cases)

1 m² depending on customer/product type



Allocation Rules

Follow ISO 14044

- Prefer physical allocation (e.g., mass/energy), then economic



Units & Consistency

Report in g CO₂e / net saleable product



METHODOLOGY GUIDANCE



There are plenty of methodologies available on the market. To ensure product-level emissions are calculated in a compatible and consistent manner, we suggest relying on the following framework when opting for a specific methodology:



PACT - The Partnership for Carbon Transparency

A global standard developed to calculate and exchange Scope 3 emissions data across value chains. Based on existing standard and sector specific hierarchy (GHG, ISO, PEF,...) it provides guidance on calculation and data integrity, assurance and verification, exchange of cradle-to-gate PCFs, and creating more and consistent emission data.



GHG Protocol Product Standard

Product Life Cycle GHG accounting a subset of LCA (life cycle assessment) from GHG protocol and the World Resource Institute (WRI) and World Business Council for Sustainable Development (WBCSD), can be used to understand the full life cycle emissions of a product.



PEF Category Rules

The European Commission Product Environmental (PEF) Category Rule (PEFCR) for Intermediate Paper Product provides a unique set of requirements for developing PCF in compliance with EF standard of EU.



ISO Standards

- ISO 14067 (PCF): Greenhouse gases Carbon footprint of products - Requirements and quidelines for quantification and communication.
- •ISO 14040/14044 (LCA Principles): Environmental management – Life cycle assessment – Requirements and guidelines.



Paper and board industry framework

- CEPI's Framework for Carbon Footprints for Paper & Board Products (2017)
- CITPA Guidelines for calculating carbon footprints for paper-based packaging (2018)

In addition, we advise to consider:

Life Cycle Inventory (LCI)

- Primary data: Energy, material, waste, and transport data from own operations.
- Secondary data: Use consistent databases (e.g., ecoinvent, USLCI, GaBi, or other recognised).

Key Impact Categories

Focus on **Climate** Change (CO₂e); optionally mention water, land use, etc.



SECONDARY DATA FRAMEWORK





Sources

Use regionally relevant, up-to-date databases (max 5 years old) such as:

Ecoinvent² USLCI³

Sphera's LCA for Experts (formerly GaBi)4

Quality Requirements

Temporal: ≤5 years old

Geographical: Regionally representative

Technological: Match production technology

Data Gaps

Justify and document assumptions for missing data

Use industry averages where primary is not available (clearly disclosed)

- European Reference Lice Cycle Data System: http://lca.jrc.ec.europa.eu
- Ecoinvent Centre, known as the Swiss Centre for LCA: http://www.ecoinvent.org/
- The National Renewable Energy Laboratory (NREL): https://www.nrel.gov/analysis/lci
- Sphera (GaBi): https://lca-software.org/sphera-gabi/

CUSTOMER COMMUNICATION



Reporting Format

Provide a PCF value per

functional unit with breakdown

(materials, energy, transport, etc.)

Indicate methodological

standards and data quality levels



Claims & Comparisons

No comparative assertions unless verified under ISO rules

> Be transparent about uncertainty and system boundaries



Support

Provide a short interpretation summary

Offer to share methodology and data sources on request

PCF provides transparency for customers, offering real-time data to help them make informed and sustainable choices.



CHECKLIST FOR FEFCO PRODUCT CARBON FOOTPRINT (PCF)

Calculations for Paper-based Packaging

S. NO.	CRITERIA	TICK OPT.	REMARK
1	Are you calculating PCF as per CEPI ten TOE's defined in CITPA Guidelines for calculating Carbon footprints for paper-based packaging?	Yes No	Optional
2	Does your system boundary include all the major components & activities related to – Biomass, Fibres, Mills, Corrugator, and transport?	Yes No	Mandatory
3	Do you calculate all four kinds of emissions from the above components & activities – fossil, biogenic emissions, biogenic removals, and biogenic emissions associated with dLUC (direct land use change)?	Yes No	Mandatory
4	Have you defined your functional unit (i.e. 1 kg Corrugated cardboard or board box)?	Yes No	Mandatory
5	Does the cut-off criteria include all the activities in calculation, which contributes to >1% of mass, energy, or environmental impact?	Yes No	Minimum required. But all the activities can be included even if their share is less than 1% of mass, energy, or environmental impact
6	Physical allocation method is chosen for mass/energy and byproducts?	Yes No	Mandatory - System expansion is also an alternative but then the scope will change
7	Report the calculated emissions in gm or Kg or ton CO ₂ Eq. /net saleable product?	Yes No	Mandatory
8	The Data collected for calculations comes from Primary data (i.e. activity data in mass, volume, tons, meters, km., GJ, MWh, etc.)?	Yes No	Mandatory – More data from primary sources is preferred
9	Have you use a reliable data source for secondary data (emission factors, allocation factors, etc.)?	Yes No	Mandatory - Reliable data sources lead to accurate calculations
10	Have you conducted Data quality assessment – on temporal, geographical, and technological aspects?	Yes No	Optional - It is recommended for both internal/ external communications
11	Have you use reliable/verifiable data sources for missing data (i.e. peer reviewed documents, industry averages, etc.)?	Yes No	Optional - Recommended to use verifiable data sources
12	Are you making any comparative assertions based on the calculations?	Yes No	Optional – But if conducted – set minimum standard of transparency of method and data used





FOLLOWUS:











