

PRODUCT CATEGORY RULES

NPCR 023 Packaging products and services

Issue date: 15.07.2019

Valid to: 15.07.2024

PCR – PACKAGING PRODUCTS AND SERVICES



REVISION LOG

This is an overview of the changes made to this document. Typology of changes:

- Editorial (ed): Text or layout edited, with no change in content.
- Technical (te): Existing content has been changed.
- Addendum (ad): New content has been added.

Naming convention: Version x.y, where x is a major revision and y is a minor revision.

Date (2019-01-23)	Type	Description of change
Version 1.0		
2019.01.23	Date	First version of PCR for Packaging products and services. This document replaces PCR 023: Seafood Industrial Packaging



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Introduction

These product category rules (PCR) are intended for companies preparing an environmental product declaration (EPD) for all types of packaging products and services, and integrated technical systems used in any type of packaging purpose. Packaging elements and integrated technical systems, incorporated within a package, can be considered packaging products (see chapter 6.1 for a definition of the product group).

This document complies with ISO14044, Environmental management – Life cycle assessment – Requirements and guidelines and ISO14025, Environmental management – Type III environmental declarations – Principles and procedure.

The Technical Committee's mandate suggests a two-tiered PCR system consisting of a Part A and a Part B. Part A describe PCR on a general level for the product group e.g. construction products and services. Part B describe PCRs specific to a product group, e.g. asphalt mixtures. However, the PCR for packaging products and services have no existing reference for a PCR part A. Thus, this document combines PCR part A and PCR part B for packaging products and services.

Subsequently, PCR part A for construction products and services has been used as inspiration for describing requirements that are common for all products within the packaging products and services product group. When preparing an EPD for packaging products and services, all requirements outlined in this document shall be followed. Both PCR part A and PCR part B related content have been discussed and agreed upon by the PCR work group. The purpose of this document is to define clear guidelines when performing a life cycle assessment (LCA), to ensure that the same LCA methods are being used for any product group, and to support the modularity principal, so that each EPD can be used as an information source for packaging.

This document was developed from August 2018 to January 2019, by a Norwegian PCR work group (WG) with representatives from the packaging industry, packaging consumers and with aid from Ostfold Research (Østfoldforskning) and the EPD programme operator The Norwegian EPD Foundation.

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1 Scope

This document complements the criteria and methodologies for the life cycle assessment (LCA) of packaging given in CEN/TR 13910 for the product category of packaging products and services.

In addition to CEN/TR 13910, this document:

- defines the system boundaries
- defines the modelling and assessment of material-specific characteristics
- defines allocation procedures for reuse
- includes the rules for calculating the life cycle inventory (LCI) and the life cycle impact assessment (LCIA) underlying the environmental product declaration (EPD)
- provides guidance and specific rules for the determination of the reference service life (RSL)
- gives guidance on the establishment of default scenarios
- gives guidance on default functional units for packaging products and services

This document complements ISO 14025 by providing specific requirements for the EPD of packaging products and services.

This document provides the principles, specifications and requirements to develop an environmental product declaration (EPD) for packaging products and services, and to further specify the underlying requirements of the supporting life cycle assessment (LCA) report.

CEN/TR 13910 is used in this document to define core rules for LCA valid for all packaging products and services. The different clauses in this document follow CEN/TR 13910. The reader of this document needs to have access to CEN/TR 13910 and the general programme of instructions (GPI) from EPD Norway in order to prepare an EPD.

There are two possible choices of system boundaries for EPDs, as shown in Table 1. For choice 1, cradle-to-grave, the LCA results are reported in relation to a functional unit (FU). A functional unit makes it possible to compare a product's environmental performance within that product group, so long as the products are based on the same PCR, the same FU and with the same intended use. For choice 2, cradle-to-gate, the LCA results are reported in relation to a declared unit (not recommended according to CEN/TR 13910).

This document is developed for a defined product group (packaging products and services) and to support LCA regulations for a specific product group or service. This document includes specific LCA regulations, and a defined functional unit, which enable comparisons between EPDs that are based on the same FU.

Table 1: Two choices for creating EPDs

Choice	EPD type
1	EPD – cradle to grave
2	EPD – cradle to gate

2 Normative references

The following referenced documents are indispensable for the application of this PCR. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TR 14182 – Packaging – Terminology – Basic terms and definitions.

CEN/TR 13910 – Packaging – Report on criteria and methodologies for life cycle analysis of packaging.

Directive 75/442EEC – Council directive of 15 July 1975 on waste

European commission - Waste Framework Directive 2008/98/EC.

ISO 14025 – Environmental labels and declarations Type III environmental declarations Principles and procedures.

ISO 14040 – Environmental management – Life cycle assessment – Principles and framework

ISO 14044 – Environmental management – Life cycle assessment – Requirements and guidelines.

3 Terms and Definitions

Table 2: Overview of packaging levels and terms

Level	Term	Reference
Primary	Sales packaging	See 3.6
Secondary	Grouped packaging	See 3.7
Tertiary	Transport packaging	See 3.8
Quaternary	Freight packaging	See 3.9

3.1 Life cycle assessment (LCA)

As in ISO 14044.

3.2 Life cycle inventory assessment (LCI)

As in CEN/TR 14182 and CEN / TR 13910, section 3.2.

3.3 Life cycle impact assessment (LCIA)

As in CEN/TR 14182 CEN / TR 13910, section 3.3.

3.4 Life cycle interpretation

As in CEN / TR 13910, section 3.4.

3.5 Packaging

As in CEN/TR 14182

NOTE: The term quaternary packaging (freight packaging) is referred to only in this document and has been added to the existing packaging definitions (see Section 3.9).

3.6 Sales packaging

Primary packaging

NOTE: Changed from CEN/TR 14182 to: packaging conceived to protect and/or separate one or several goods from the surrounding environment.

3.7 Grouped packaging

Secondary packaging

NOTE: Changed from CEN/TR 14182 to: packaging conceived to group goods to protect and/or separate several sales packages and goods therein from the surrounding environment.

3.8 Transport packaging

Tertiary packaging

As in CEN/TR 14182.

NOTE: Clarification in this document: Transport packaging constitutes of load carriers and auxiliary packaging materials.

3.8.1 Load carriers

Intermediate packaging conceived to act as a foundation and/or structural support complementary to primary and/or grouped packaging with or without primary and/or secondary packaging, or for carrying smaller quanta of bulked otherwise unprotected goods (e.g. firewood on a pallet).

3.8.2 Auxiliary packaging material

Packaging materials conceived to act as a complementary and/or protective instalment which is set onto but is not a part of the primary or grouped packaging itself (e.g. support corners, additional padding, protection sheets, bands etc.).

3.9 Freight packaging

Quaternary packaging

Intermediate packaging conceived to freight large, bulk and/or grouped goods for road, rail, sea or air transport (e.g. open, partial or closed containers).

3.10 Packaging waste

As in CEN/TR 14182.

3.11 Ancillary materials & energy

Materials & energy needed to maintain or achieve a sought property within the primary, secondary, tertiary or quaternary packaging for the specified purpose of the packaging (e.g. cooling medium, cushioning, filaments etc.).

3.12 Used packaging

As in CEN / TR 13910, section 3.9.

3.13 Distribution system

As in CEN / TR 13910, section 3.10.

NOTE: Transport to the consumer is not included in this PCR, only transport to sales or a final distribution location is considered (e.g. store, post terminal, etc.).

3.14 Maintenance system

As in CEN / TR 13910, section 3.11.

NOTE: The definition of maintenance system is considered to be the same as the definition for 'collection system' in section 3.11 of CEN/TR 13910 but without the content of 'does not include transport to recovery of final disposal'.

3.15 Functional unit

As in ISO 14025 and ISO 14040.

3.16 Declared unit

Quantity of a packaging product for use as a reference unit in an EPD for an environmental declaration based on one or more information modules

[EN ISO 14025]

3.17 Information module

Compilation of data to be used as a basis for a Type III environmental product declaration covering a unit process or a combination of unit processes that are part of the life cycle of a product.

3.18 Packaging location

The location where the packaging is applied for its base purpose of protecting and/ or assembling a product or grouped packaging.

3.19 Final packaging location

The point at which the packaging has fulfilled its purpose by reaching its final commercial location.

NOTE: Households are beyond the system boundary, as the final packaging location, and as such transport to households, is not included in EPDs according to this PCR.

3.20 Maintenance centre

The location in which the maintenance, repair and replacement for reusable packaging is carried out.

3.21 Intermediate storage

One or more storage location(s) for the packaged goods as they undergo the journey from the packaging location to the final packaging location, and which affect ancillary packaging or other packaging associated energy/material consumption in any significant way, and which can be correlated by allocation to the packaging products and services.

3.22 Reuse

As in CEN/TR 14182, section A2.5.

NOTE: Life cycle module B2 Maintenance.

3.23 Recycling

As in CEN/TR 14182, section A.2.6.

3.24 Energy recovery

As in CEN/TR 14182, section A.2.6.

3.25 Disposal

As in Directive 75/442EEC with the following exceptions:

- Waste collection for landfill shall be described as a separate end-of-life life cycle module; Transport to disposal.
- The transformation operation necessary for re-use is not to be included in the disposal or end-of-life management life cycle modules, but in the integrated life cycle system described in Maintenance system.
- The treatment of waste shall be described as a separate end-of-life life cycle module; Waste processing.

3.26 Delivery

The delivery of packaging from the packaging location to the final packaging location.

3.27 Loop

The full use cycle of reusable packaging from the packaging location to the final packaging location and back to the initial or another packaging location for refilling/reuse.

3.28 Reference service life

The lifetime given to the expected number of deliveries the packaging is applicable for, given the packaging's intended use, including periodical maintenance and repair.

3.29 Modified reuse

Reuse of the packaging product intended for packaging purposes, fully or partially dismantled for direct use (e.g. pallets for stacking display, containers at local offices etc.).

4 Abbreviations

EPD Environmental product declaration

DU Declared unit

FU Functional unit

GPI General programme of instructions

LCA Life cycle assessment

LCI Life cycle inventory

LCIA Life cycle impact assessment

PCR Product category rules

RSL Reference service life

ESL Estimated service life

5 General Aspects

5.1 Objective of PCR

This document provides the set of rules, requirements and guidelines that shall be applied to the development of an EPD for any packaging products and services.

This document has been prepared in line with the requirements outlined in EPD Norway's general programme of instructions (GPI) and *CEN / TR 3919*. This PCR takes inspiration from and is supplementary to EN 15804 and NPCR Part A: Construction and products and services. Where relevant, this document refers to EN 15804 for general product category rules that are similar and/or identical for both construction and packaging products.

This document follows the Norwegian requirements for EPDs and provide information on these aspects, such as health effects during the use stage of the packaging, any effect on the packaged content, or choices regarding electricity mix, as specified in the GPI for EPD Norway.

5.2 Types of EPD in respect to life cycle stages covered

This document covers the following types of EPD (see Figure 1):

EPD 1: Cradle-to-grave

EPD 2: Cradle-to-gate

For a cradle-to-grave EPD, the EPD for packaging products and services should declare the whole life cycle of the product, including life cycle modules A1 to C4 (life cycle module D is optional), see Figure 1 (EPD 1). If a component or a part of the packaging products is to be declared e.g. auxiliary packaging, it may be more appropriate to prepare a cradle-to-gate EPD, which considers modules A1 to A4 (EPD 2).

EPD 1 - Cradle to grave, as a minimum A1-C4:

- Mandatory: Life cycle information modules A1- A3
- Mandatory: Life cycle information module A4
- Mandatory: Life cycle information modules B1 – B2
- Mandatory: Life cycle information modules C1-C4
- Optional: Life cycle information module D

EPD 2 – Cradle to gate (not recommended according to *CEN / TR 3919 chapter 4.2.1, paragraph 7*).

- Mandatory: Life cycle information modules A1- A3
- Mandatory: Life cycle information module A4

Packaging product and service life cycle information modules										Supplementary information
A1 - 3			A4	B1 – B2		C1 – C4				D
Product stage			Supply	Use stage		End-of-life stage				
A1	A2	A3	A4	B1	B 2	C1	C2	C3	C4	
Raw material extraction	Transport	Manufacturing	Transport	Distribution	Maintenance	Waste transport	Waste processing	Transport to disposal	Disposal	Benefits and loads beyond the system boundary
Type of EPD	Cradle to grave Functional unit Type 1	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional
	Cradle to gate Declared unit Type 2	Mandatory	Mandatory							

Figure 1: Life cycle information modules and stages for packaging product and services

5.3 Comparability of EPDs for packaging products and services

The comparison of packaging products and services using an EPD shall be carried out in the context of the products intended use. Consequently, comparison of the environmental performance of packaging products and services using the EPD information shall be based on the specific packaging product and service use and its impacts on the goods contained therein. It shall also consider the complete life cycle from cradle-to-grave (all information modules).

The comparison of the environmental performance of packaging products and services using EPD information, shall be based on the packaging product 's ability to serve a function (e.g. protecting certain good(s)) and the relevant number of reuses.

EPDs for different products must be calculated using the same basic assumptions and methodological choices, e.g. allocation, cut-off, scenarios etc., and be valid for a given packaging scenario (e.g. food packaging, chemical packaging etc.) in order to be comparable.

A justification shall be given for any excluded aspects. The contents of the EPD and LCA report shall be as specified in chapter 7 and 8 of this PCR.

NOTE: EPDs that do not have similar technical properties or fulfil similar uses are not comparable.

5.4 Additional information

The technical properties for one unit of packaging, for both cradle-to-gate and cradle-to-grave EPDs include, but are not limited to:

- Internal net volume (m³):
 - o Brim-full capacity as described in CEN/TR 14182.
 - o Nominal capacity as described in CEN/TR 14182.
 - o Total capacity as described in CEN/TR 14182.
NOTE: Filaments in CEN/TR 14182 are to be treated as ancillary materials, as described in this PCR.
- Total external volume (m³), including lids (if any).
- Base, wall and top strength in terms of max load per surface area (kg/m²).
- Stacking strength (max load of stacked capacity on top of the declared packaging (kg / packaging unit) with and without intended support (if any) of tertiary packaging.
- Active or passive ventilation (m³/h).
- Thermal insulation (k⁻¹).
- Net packaging unit weight without goods, ancillary materials and/or auxiliary materials (kg/unit).
- Total packaging weight without goods but including ancillary and/or auxiliary materials

Intended use of one unit of packaging:

- Single use or multiple uses.
- Container usage purpose (e.g. foods, drinks, or other gas, liquid or solid commodities).
- Container properties: cold, hot, vacuumed, vented or modified atmospheres (MAP).
- Laminate as described in CEN/TR 14182, including composition and number of layers.
- Packaging design scenario (e.g. primary, secondary, tertiary (load carrier or auxiliary) or quaternary).

Description of elements on the REACH candidate list within the packaging product (one of the following):

- The product contains no elements described on the REACH candidate list.
NOTE: This statement must be justified.

- The product contains elements under 1% weight percentage described on the REACH candidate list or the Norwegian priority list.
- The product contains elements described on the REACH candidate list of hazardous chemicals.
- The product contains no elements described on the REACH candidate list. The product can be characterised as hazardous waste according to the Waste directive, attachment III (Avfallsforskriften, Vedlegg III).

Direct emissions (if any) leaking or otherwise emitted/transferred during the distribution phase from the packaging product to the environment or packaged good(s).

General level of recyclability:

- number of recycling processes the product material(s) can go through before it experiences a significant downgrading effect.
- number of recycling processes the product material(s) can undergo to be recycled into a usable product material.

5.5 Ownership, responsibility and liability for the EPD

The owner or owners of the EPD have liability and responsibility for the information given in the EPD.

6 Product category rules for the LCA

6.1 Product category

The product group packaging products and services comprises all kinds of packaging carrying or containing packaged or non-packaged good(s) with or without cooling/freezing, heating, modified atmospheres (MAP) or any other ancillary properties.

One unit of packaging is prepared for trade and may be made of different materials. Packaging is not limited to the packaging described in 11.1.1. to 11.1.7.

6.1.1 Film packaging

Sheet or wrap packaging protecting one unit of goods or used as auxiliary packaging of e.g. a stacked pallet. Measured in area.

6.1.2 Product containers (e.g. cans and bottles etc.)

Closed packaging protecting one or several units of goods. Measured in volume.

6.1.3 Boxes, baskets and bags

Open or closed, rigid or flexible packaging units carrying one or more units of goods. Measured in volume.

6.1.4 Crates

Open or closed boxes. Measured in volume.

6.1.5 Pallets

Open surface packaging carrier with or without supporting sides. Measured in surface area.

6.1.6 Freight containers

Open or closed freight-sized containers measured in TEU (Twenty-foot equivalent).

6.1.7 Transport cages

Open or closed cages designed for freight products in an open environment, that have a constrained boundary which enables public transport. Measured in volume.

6.2 Life cycle stages and their information modules to be declared

6.2.1 General

Environmental and resource information for a cradle-to-grave EPD which includes all life cycle stages shall be subdivided into the described information modules A1-A3, A4, B1-B2 and C1-C4, as shown in Table 1. Additional information regarding recycling benefits etc. shall be declared separately from these life cycle modules (A1 – C4) in life cycle information module D.

EPD 1 - Cradle to grave:

- Mandatory: Life cycle information modules A1- A3.
- Mandatory: Life cycle information module A4.
- Mandatory: Life cycle information modules B1 – B2.
- Mandatory: Life cycle information modules C1-C4.
- Optional: Life cycle information module D.

Environmental and resource information for a cradle-to-gate EPD which only includes the production stages of a packaging product shall be subdivided into the described information modules A1-A4.

EPD 2 - Cradle to gate:

- Mandatory: Life cycle information modules A1-A3.
- Mandatory: Life cycle information module A4.

Additional general requirements and practices:

Transport distribution (e.g. sea, air, rail and road) shall include the following:

- Direct emissions during transport (e.g. exhaust, break wear, tyre wear, road wear etc.).
- Upstream emissions from fuel extraction, processing and distribution.
- Life cycle emissions of vehicles (e.g. raw materials, manufacturing, maintenance and disposal).
- Life cycle emissions of infrastructure (e.g. sea, air, rail and road etc.) for the full life cycle (e.g. raw materials, manufacturing, maintenance and disposal).

Input materials and energy (e.g. production, use and end-of-life but which is not inherently part of the declared packaging product (e.g. packaging for distribution of the declared packaging product)) shall be declared in its respective life cycle module. Such input materials or energy shall independently include:

- Direct emissions during the use phase
- Upstream emissions from raw material extraction, processing and distribution.

- Downstream emissions from end-of-life handling
- Life cycle emissions of infrastructure (e.g. factories etc.) necessary through the full life cycle (e.g. raw materials, manufacturing, maintenance and disposal).

Specific requirements for each life cycle module are presented in sub-chapters 6.2.2 to 6.2.6.

6.2.2 A1-A3, Product stage, life cycle information modules

The product stage shall include:

- A1;
 - Life cycle energy and material consumption associated with raw material extraction and processing, and processing of secondary material input (not including those processes that are part of the waste processing in the previous product system) that is inherently part of one unit of the declared packaging product or service
 - Life cycle energy and material consumption associated with transport of raw material(s) to the intermediate base material (tier two raw material input) production site that is inherently part of one unit of the declared packaging product or service.
- A2;
 - Life cycle energy and material consumption associated with transport of all raw materials and remotely manufactured base material input that is inherently part of the declared unit of the packaging product or service.
- A3;
 - Life cycle energy and material consumption associated with manufacturing one unit of packaging product or service, including the provision of all additional materials, products or energy not inherently part of the packaging product but necessary to manufacture the declared unit of the packaging product or service.

NOTE: It is important to clarify whether the substance entering the production process under study is classified as “waste” or as a “secondary product”, i.e. secondary material or secondary fuel.

6.2.3 A4, Supply stage, life cycle information modules

Life cycle module A4 includes the transportation of packaging to the location where it is used, either directly to life cycle module B1 or to life cycle module B2 for redistribution, see Figure 1.

6.2.4 B1-B2, Use stage, life cycle information modules

The use stage shall include a scenario for a cradle-to-grave EPD.

- B1, Distribution of packaging in use, with and/or without ancillary content;
 - Ancillary material required for one delivery in the most likely use scenario.
 - Preparation of packaging for the intended good(s) (e.g. cleaning, organising etc.).
 - Packaging of product (i.e. use of packaging) and required tertiary auxiliary packaging necessary for one delivery in the most likely use scenario.
 - Transport of packaging product or service, including tertiary packaging and ancillary materials in use, between the packaging location and the final packaging location per delivery imperative for one delivery in the most likely use scenario.

- B2, Maintenance and repair at the maintenance centre;
 - Maintenance (e.g. of energy and materials) required for one delivery in the most likely use scenario.
 - Repair (e.g. of energy and materials) required for one delivery in the most likely use scenario.
 - Tertiary auxiliary packaging for transport of packaging necessary for one delivery in the most likely use scenario.
 - Transport between the maintenance centre and the packaging location per delivery imperative for one delivery in the most likely use scenario.
 - Transport of used packaging to the maintenance facility per delivery imperative for one delivery in the most likely use scenario.

NOTE 1: The maintenance scenario (life cycle module B2) shall be zero for EPD's with packaging products and services that have a lifetime equal to 1 delivery (no reuse).

NOTE 2: If data for maintenance and repair in the maintenance and repair life cycle module is impossible to distinguish, then the net inventory for both maintenance and repair activities should be covered in the maintenance section of the maintenance and repair life cycle module. A description and justification for this decision should be provided in the LCA report.



6.2.5 C1-C4 End-of-life stage, life cycle information modules

As in PCR Part A, including the following clarifications:

The end-of-life stage shall include:

- C1, waste transport
 - Includes the transport of the packaging product or service to final waste treatment.
- C2, waste processing
 - Includes all activities associated with preparing for and carrying out the most likely waste handling scenario to enable modified reuse, recovery and/or recycling.
- C3, transport to disposal
 - Includes the transport of packaging material to landfill or final residue from waste processing.
- C4, disposal
 - Includes the disposal process, of sending packaging material or final residue from waste processing to landfill.

6.2.6 Benefits and loads beyond the system boundary, life cycle information module

- Module D, benefits and loads beyond the system boundary
 - Net impacts and benefits associated with the most likely scenario for modified reuse, material recycling and/or energy recovery processes substituting the most likely material and/or energy use purposes of these products, according to the assessed end-of-life treatment scenario declared in life cycle module C.

NOTE: Estimation of likely substitution scenarios should apply to conservative scenarios (substitution of least environmental burdensome case), unless specific scenarios are clearly described, and a likely substitution scenario is given.

6.3 Calculation rules for the LCA

The scope and variation of products must be declared according to EPD Norway's guidelines. As of 2019, similar products in the same EPD can only be included if the variation in results for each LCIA category does not exceed +/- 10 %. The level of variation shall be stated in the EPD.

6.3.1 Functional units

The functional unit for cradle-to-grave EPDs for a packaging service is defined as:

For single and multiple use packaging:

The amount of packaging needed to deliver 1000 kg (solids or gasses) or 1000 litres (liquids) defined good or group of goods to a defined destination, including ancillary materials and products necessary for keeping the quality requirements for the delivered goods.

The functional unit for cradle-to-grave EPDs for a packaging product is defined as:

For single and multiple use packaging:

One delivery of one unit of packaging for a defined good or group of goods.

If declared per 1000 kg or 1000 litres a conversion factor showing the required number of packaging units for the delivery of the defined good or group of good must be specified in the EPD.

Results should be displayed both per functional unit and per life cycle module A1-A3, A4, B1-B2, C1-C4 and D.

Care shall be taken to present the scenario inventory in a transparent manner, allowing for recalculation and parameter adjustment if need be. All inventory should be presented per unit of packaging.

Environmental impacts, resource consumption and waste generation shall be presented per chosen FU according to the life cycle modules A1 to C4 displayed in 1. Results for life cycle modules A1-A3 can be summarised into one module, labelled "A1-A3" if necessary.

It is proposed that the estimation of environmental impacts, resource use and waste flows associated with one unit of packaging are given per declared unit (one unit of packaging product) for the declared scenario in each life cycle module, and then dispersed across each individual use cycle to estimate the impacts per functional unit.

It is strongly advised that the impact dispersion per delivery is calculated as follows for each life cycle module:

The production stage:

$$(1) \quad A_{RSL,1,2,3,4} = \left(\frac{L_p}{FU}\right) * \left(\frac{A_{U,1,2,3,4}}{n_{RSL}}\right)$$

The use stage:

$$(2) \quad B_{RSL,1} = \left(\frac{L_p}{FU}\right) * B_{U,1}$$

$$(3) \quad B_{RSL,2} = \left(\frac{L_p}{FU}\right) * \frac{B_{U,2} * \left(\frac{1}{n_M}\right)}{n_{RSL}}$$

The end-of-life stage:

$$(4) \quad C_{RSL,1,2,3,4} = \left(\frac{L_p}{FU}\right) * \frac{C_{U,1,2,3,4}}{n_{RSL}}$$

Benefit and loads beyond the system boundary:

$$(5) \quad D_{RSL,1,2,3,4} = \left(\frac{L_p}{FU}\right) * \frac{D_{U,1,2,3,4}}{n_{RSL}}$$

$A_{RSL,1,2,3,4}$, $B_{RSL,1}$, $B_{RSL,2}$, $C_{RSL,1,2,3,4}$ and $D_{RSL,1,2,3,4}$ represent the environmental impacts, resource use and waste flows for each life stage module per functional unit dispersed per reference service life (RSL).

$A_{U,1,2,3,4}$, $B_{U,1}$, $B_{U,2}$, $C_{U,1,2,3,4}$ and $D_{U,1,2,3,4}$ represent the environmental impacts, resource use and waste flow generation for each life cycle module per unit of packaging.

n_{RSL} represents the number of deliveries/loops intended for the declared packaging product and service.

n_M represents the number of deliveries/loops before maintenance is performed.

L_p represents the capacity of one unit of packaging, which for $FU = 1$ delivery = 1, and for $FU = 1000\text{kg}$ or $1000\text{L} = 1000$.

FU represents the chosen functional unit, which for $FU = 1$ delivery = 1, and for $FU = 1000\text{ kg}$ or $1000\text{ L} = 1000$.

NOTE: Goods or other packaging not directly related to the declared packaging product's energy and/or material input or output are not to be included in the declaration.

6.3.2 Declared unit

The declared unit for a cradle-to-gate EPD is defined as:

One produced unit of packaging ready to leave the factory gate.

For film packaging, the declared unit is defined as:

One m² of produced film packaging ready to leave the factory gate.

The declared unit includes all processes up to the point in which the declared product leaves the manufacturer's gate.

Environmental impacts, resource use and waste flows shall be declared per unit of packaging in the proposed life cycle modules A1 to A4, see Figure 1. Results for life cycle modules A1-A3 can be summarised into one life cycle module labelled A1-A3.

6.3.3 Reference service life (RSL)

Packaging products are defined as either single use packaging (includes one delivery) or reusable packaging (more than one delivery) for a specific use scenario.

The lifetime is given per delivery (one half of a loop if reused packaging) of protecting a commodity from the packaging location to the final packaging location. For single use packaging the lifetime is automatically set to 1 delivery and reaches the end-of-life stage after reaching the final packaging location.

For multiple uses, the number of likely reuses is to be provided and documented by the manufacturer and/or distributor/owner of the reusable packaging. A reference service life (RSL) is mandatory for all cradle-to-grave EPD's.

Tests and/or guaranties shall be used to define the RSL. Any necessary measures for the maintenance and repair of the product must be described (e.g. number of loops before maintenance and repair is needed etc.).

6.3.4 System boundaries

6.3.4.1 General

The system boundary of packaging shall be based on the scope of the EPD study (cradle-to-gate or cradle-to-grave). Cradle-to-grave EPDs include the life cycle stages and scenarios proposed in (but not limited to) Figure 2. For cradle-to-gate EPDs the system boundary includes life cycle modules A1-A4.

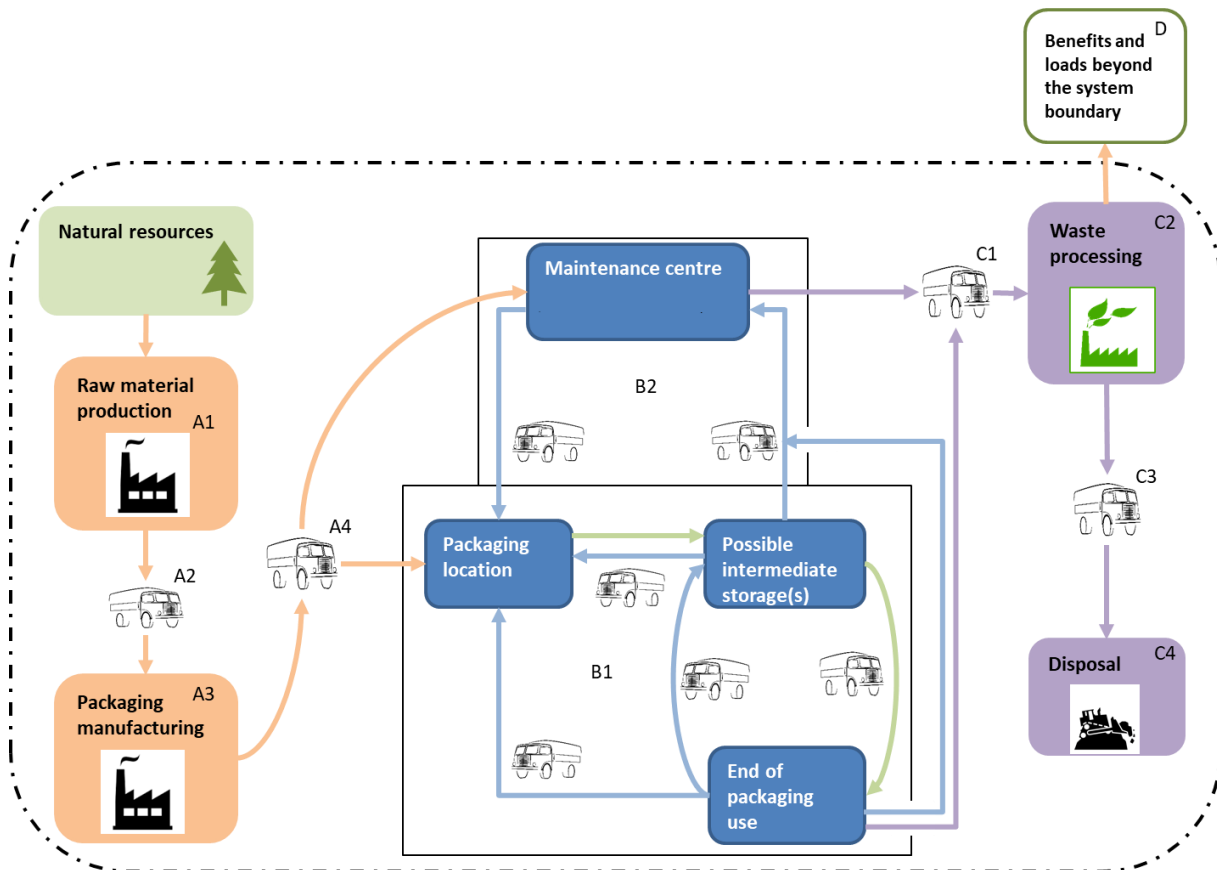


Figure 2: System boundaries, life cycle information modules and likely scenario pathways.

In Figure 2, the green arrows illustrate the extent of one delivery. The orange arrows represent raw, processed or recycled/recovered resources within the system boundary. The blue arrows illustrate use phase transport routes for ready-to-use or used packaging. The purple arrows illustrate possible routes to end-of-life treatment.

A flowchart illustration, similar but not limited to, Figure 2 shall always be included in the EPD with the appropriate system boundary. This shall include life cycle modules and transport scenario routes. A full illustration, with emphasis on chosen modules and transport routes, is recommended.

System boundaries between product systems: If a material or energy from waste treatment from another product system is used as an input in the product system studied, then all processes taking place after the recycling or recovery process shall be included in the product system under study. Environmental impacts associated with materials and energy recovered from treatment of waste that is generated within the studied system boundaries shall be included in life cycle module C. The system boundary between two product systems is when the waste has reached the end-of-waste state, as described in EN15804.

6.3.4.2 Product stage

The product stage is required in any type of EPD according to this document. It includes life cycle modules A1 to A3 as illustrated in Figure 1 and Figure 2. The system boundary with nature, includes extracted resources, including energy and material inputs to the system required for the extraction of raw and base material production processes, distribution of raw and base materials to the packaging manufacturing site, and manufacturing of the packaging product.

When considering secondary materials, fuels and/or recovered energy, the system boundary is set where the materials have achieved an end-of-waste state in the previous product system.

Output flows which are not inherently part of the packaging product, and which have achieved end-of-waste state according to Article 6 (1) and (2) of the Waste Framework Directive 2008/98/EC are treated as co-products. Loads and benefits from allocated co-products shall not be declared in Module D. If another approach is used it must be clearly documented and justified. As such, potential loads and benefits associated with A1 to A3 do not appear in module D.

NOTE 1: If a cradle-to-gate or cradle-to-grave EPD for auxiliary material is applied in the developed EPD, care should be taken to avoid double-counting, and all use phase scenarios should be specifically adapted to the packaging scenario at hand.

The product stage includes, but is not limited to:

A1 Raw material extraction

- Extraction and processing of raw materials (e.g. mining, forestry, agriculture etc.).
- Processing of secondary materials used as an input in manufacturing the declared packaging product, and which are not part of the waste management of the output system.
- Manufacturing of base materials/intermediate materials that are inherently part of the declared packaging product, and not manufactured in the same location and/or process as the declared packaging product (e.g. steel alloys etc.).
- Use of recycled, recovered or reusable material that have achieved an end-of-waste state from the previous system.
- Energy production, distribution and/or transformation used for raw material extraction.

A2 Transport of raw materials to manufacturing

- Transport (e.g. sea, air, rail, road, etc.) of raw materials or base / intermediate materials to the manufacturing site, including necessary freight medium production, infrastructure (e.g. roads, rails, ports etc.), energy consumption (including production, infrastructure, distribution and/or transformation and use) and end-of-life treatment.

NOTE 2: If possible, the appropriate energy consumption and freight medium capacity utilisation factor are to be adjusted. Average data may be used if specific fuel consumption data and/or capacity utilisation factors are not possible or otherwise deemed unnecessary information. If average data is used, then a short explanation should follow.

A3 Manufacturing of the declared packaging product

- Manufacturing of packaging product, including necessary infrastructure (see 6.3.5), direct (e.g. manufacturing process) and indirect (e.g. administration etc.) energy consumption (including production, infrastructure, distribution and/or transformation and use) and direct and indirect end-of-life waste treatment up to disposal or an end-of-waste state.
- Manufacturing of co-products.
- Production (A1-A3), supply (A4) and end-of-life treatment (C1-C4) of primary, secondary, tertiary and/or quaternary packaging required to supply packaging from the maintenance centre back into the distribution loop (B1).

A4 Supply of the packaging product

- Transport (e.g. sea, air, rail, road, etc.) of the declared packaging product to the packaging location or maintenance centre including necessary freight medium production, infrastructure (e.g. roads, rails, ports etc.), energy consumption (including production, infrastructure, distribution and/or transformation and use) and end-of-life treatment.
- Transport (e.g. use of required packaging (B1 and B2)) of primary, secondary, tertiary and quaternary packaging required to supply packaging to either the packaging location or maintenance centre.

6.3.4.3 Use stage

The use stage includes life cycle information modules which covers the active and inactive life cycle stages of the packaging product in any given service scenario, from the point in which the packaging is loaded, until it is unloaded, as well as all associated activities necessary to maintain its function through the complete RSL.

The RSL of auxiliary tertiary packaging and ancillary materials might differ from the RSL of the declared packaging.

The usage area of packaging is defined in two use scenarios, distribution of packaging in use, and maintenance of reusable packaging. To secure a comparative use phase assessment, the life cycle modules define a series of processes for each use stage information module. The environmental impact, resource and waste flows of the use phase modules are to be calculated as the accumulated net result of these processes. A contribution analysis illustrating, at least, the relative contribution of each process to the assigned use-phase module is required in the EPD to secure transparency and justification of the life cycle module results.

The use stage includes, but is not limited to:

Module B1, Distribution of packaging in use

Life cycle module B1, distribution of packaging in use, covers the active life cycle stages and associated return activities involved in the direct reuse of packaging. This involves four processes:

B1 Ancillary material required for one delivery in the most likely use scenario.

- Ancillary materials include production, end-of-life handling, transportation to the production site, activities at the distribution site and end-of-life treatment.
- Transport of ancillary materials during use is to be declared in the ' transport of packaging in use' process and not to be assessed under this sub-module.

B1 Preparation of packaging for the intended good(s) (e.g. cleaning, organising etc.).

- Preparation of packaging for the intended goods includes any preparation of declared packaging product and auxiliary tertiary packaging at the packaging location (e.g. rinsing, rolling, quality check, labelling, printing etc.).
- Minor occasional maintenance and repair necessary for enabling preparation of packaging to be carried out at the packaging location is covered in this sub-module and is not a part of the periodical maintenance and repair at the maintenance centre as covered in life cycle module B2.
- Administrative energy and material consumption, administrative waste flows.

B1 Packaging of product (use of packaging) and required tertiary auxiliary packaging necessary for one delivery in the most likely use scenario.

- Energy use (including production, distribution, infrastructure and use) associated with packaging of the declared packaging product and auxiliary tertiary packaging.
- End-of-life treatment from wasted (not condemned) declared packaging product and auxiliary packaging during the packing process until disposal or an end-of-waste state is reached.

NOTE 1: Condemned packaging is integrated in the average RSL of the declared packaging. Condemned packaging is therefore to be assessed in the end-of-life life cycle modules. Transport from transport associated with the relative share of condemned declared packaging product from the packaging location to waste processing may be assessed as part of life cycle module C1.

B1 Transport of packaging in use, including tertiary packaging and ancillary materials in use, between the packaging location and the final package location for one delivery in the most likely use scenario.

- Transport of the declared packaging product and auxiliary tertiary packaging in use
- Transport associated with the ancillary material content.

- Return of reusable packaging (both declared packaging product and auxiliary tertiary packaging) to the packaging location.
- Use of ancillary materials and/or energy.

NOTE 2: The average load factor, mode of transport, and average fuel / energy consumption should be described in the EPD.

Module B2, Maintenance and repair at the maintenance centre.

Maintenance and repair at the maintenance centre covers the inactive use stages associated with preparing for the reuse of packaging. This includes five processes:

B2 Maintenance (e.g. energy and material resources) required for one delivery in the most likely use scenario.

- Energy use (including production, distribution, infrastructure and use) associated with the maintenance.
- Chemicals (e.g. water, soap etc.) and materials that are not part of the declared packaging product.
- Administrative energy and material consumption, including administrative waste flows.

B2 Repair (e.g. energy and material resources) required per one delivery in the most likely use scenario.

- Supply of new raw materials for repair and end-of-life treatment of broken parts (including production, supply and end-of-life-treatment (life cycle modules A1-A4 and C1-C4)).
- Energy use (including production, distribution, infrastructure and use) associated with the repairing process.

NOTE 3: Condemned packaging is integrated in the average RSL of the declared packaging. Condemned packaging is therefore to be assessed in the end-of-life life cycle modules. Transport associated with the relative share of condemned declared packaging product from the maintenance centre to waste processing may be assessed as part of life cycle module C1.

B2 Packaging for transport of packaging necessary for one delivery in the most likely use scenario.

- Production (A1-A3), supply (A4) and end-of-life treatment (C1-C4) of primary, secondary, tertiary and quaternary packaging required to re-supply the declared packaging product from the maintenance centre back into the distribution loop (B1).
- Energy use associated with packaging of the declared packaging product in tertiary packaging.

B2 Transport between maintenance and the packaging location per one delivery in the most likely use scenario.

- Transport of the declared packaging product to re-supply the declared packaging product from the maintenance centre back into the distribution loop (B1).
- Transport of primary, secondary, tertiary and quaternary packaging (use of packaging, B1-B2) required to re-supply the declared packaging product from the maintenance centre back into the distribution loop (B1).
- Return transport of (if any) reusable primary, secondary, tertiary and quaternary packaging (use of packaging, B1) required to re-supply the maintenance centre.

NOTE 4: The average load factor, mode of transport, and average fuel / energy consumption should be described in the EPD.

NOTE 5: Return transport of reusable packaging to the maintenance centre for packaging of the declared packaging product may be achieved either by exploiting the return trip or by means of new transport. Regardless, the capacity utilisation factor is to be described.

NOTE 6: Reusable primary, secondary, tertiary and quaternary packaging returned by return freight is to be integrated as part of the initial transport of primary, secondary, tertiary and quaternary packaging.

B2 Transport of used packaging to the maintenance centre per one delivery in the most likely use scenario.

- Transport of the declared packaging product to the maintenance centre.
- Transport of reusable auxiliary tertiary packaging to the maintenance centre.



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- Production (A1-A3), supply (A4) and end-of-life treatment (C1-C4) of primary, secondary, tertiary and quaternary packaging required to re-supply the declared packaging product from the maintenance centre back into the distribution loop (B1).
- Energy use associated with packaging of the declared packaging product in tertiary packaging.

NOTE 7: The average load factor, mode of transport, and average fuel / energy consumption should be described in the EPD.

6.3.4.3 End of life stage

The end of life stage includes, but is not limited to:

C1 Waste transport to waste processing

- Collection and transport of the declared packaging product to waste processing, associated with the use phase locations covered in the EPD.

NOTE 1: The average load factor, mode of transport, and average fuel / energy consumption should be described in the EPD.

C2 Waste processing

- Recycling of materials from the declared packaging product into the production of secondary materials up until the recycled materials have met the end-of-state criteria.
- Energy recovery from the declared packaging product.
- Preparation for the modified reuse of packaging material.
- Incineration without energy recovery.

C3 Transport to disposal

- Collection and transport of the partial or complete declared packaging product treated or untreated for final disposal (e.g. wood from wood pallets as a carbon source to soil, and disposal of ashes from incineration etc.).

NOTE 2: The average load factor, mode of transport, and average fuel / energy consumption should be described in the EPD.

C4 Final disposal

Final disposal shall be included using the polluter-pays principle, and include:

- Operational energy use (including production, distribution, infrastructure and use)
- Short and long-term emissions to air, water and ground.
- Administrative energy and material consumption, as well as administrative waste flows.

6.3.4.4 Benefits and loads beyond the product system boundary in module D

To secure consistency in cross-sectoral EPDs this subsection shall follow the guidelines for benefits and loads beyond the product system boundary as outlined in EN 15804.

6.3.5 Criteria for the exclusion of inputs and outputs (cut-off)

The exclusion of LCI inputs and outputs in the LCA, are carried out to secure efficient calculation procedures when estimating the most relevant impacts and consumption of resources. The cut-off procedure is not to be applied to avoid the inclusion and/or exclusion of relevant data which might have a significant contribution to any of the included environmental impact categories, resource use and/or waste scenarios.

The exclusion of impacts, resources or waste inventory shall not exceed 1 % contribution to any indicator for any life cycle module stage, and with a maximum cumulation of +/-5 % for the net environmental declaration (cradle-to-gate and cradle-to-grave EPDs) as otherwise stated in ISO 14044.

The exclusion of inputs and outputs shall be well documented, and a justification for exclusion is required. The following procedure shall be followed for the exclusion of inputs and outputs as adapted from EN 15804:

- All inputs and outputs for a (unit) process for which data are available shall be included in the calculation.
- Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices shall be documented. Care should be taken when including material and energy flows known to have the potential to cause significant emissions to air, water or soil related to the environmental indicators of this document. Conservative assumptions in combination with plausibility considerations and expert judgment can be used to demonstrate compliance with these criteria.

The following processes may be excluded from the assessment if they meet the requirements below and are in accordance with the cut-off criteria described above:

- Production of machinery used in the production of packaging products.
- Production of machinery used in the production of raw materials.
- Production, construction and demolition of facilities, warehouses, and other capital building infrastructure.

NOTE 1: If machinery or building infrastructure is suspected to be of any significance but it is not possible to gather the appropriate data, conservative assumptions in combination with plausible considerations and expert judgement should be used to choose the most likely proxy data to check relevance. If not relevant, then this may be excluded and described in the LCA report. If relevant, then the chosen proxy data set and its significance should be included in the EPD, and the choice of proxy data, and its relevance should be briefly described.

Processes beyond the scope of an EPD, in accordance with this document include:

- Impacts and resource consumption associated with employees, temporal employees or other additional visiting personnel's food consumption and travel to and from the associated workplaces covered by the system boundary.

NOTE 2: Yearly waste treatment from administrative activities associated with the declared packaging product and service are to be included. Administrative waste includes all waste flows

not directly related to the packaging product or service and include but are not limited to waste from employees, temporal employees or other additional visiting personnel.

A list of hazardous and toxic materials and substances shall be included in the inventory. The general cut-off rules do not apply to such substances. However, substances included in amounts below the limits for chemical product's health and environment hazard classification do not have to be declared.

Exceptions apply for substances on the REACH candidate list and Norwegian priority list, whereby a cut-off of 0.1 weight% applies. All REACH candidate list substances occurring in amounts equal to or exceeding 0.1 weight% of the finished product must be declared. The same limit applies to all substances on the Norwegian priority list.

6.3.6 Selection of data

6.3.6.1 General

Site specific data derived for each material and energy input and waste output within the system description of each life cycle module, should always use first-choice data when calculating an EPD. It is up to the LCA practitioner to decide whether material and energy inputs are further partitioned into sub-processes or assessed in a "black box" within the appropriate life cycle module. An impact contribution analysis of sub-modules associated with the relevant module is obligatory and only excludable if it can cause significant market disadvantage. If excluded, a short description is required.

6.3.6.2 Electricity data

EPD Norway accepts two different approaches when collecting electricity data, namely a physical national grid mix, or an electricity source with a guarantee of origin.

In the case of a physical national grid mix, the data shall be from the country where energy consuming processes take place. The chosen mix of electricity (calculation procedure) shall be documented in the LCA report. Any deviations from these requirements shall be justified. If the manufacturer purchases a guarantee of origin for their electricity, then these may be used instead of the physical national grid mix, according to the requirements given in the GPI.

Guidance for calculating the electricity grid mix:

- *The electricity mix used shall calculate the physical national production mix, including imports, direct emissions, infrastructure and transmission losses associated with the process/activity location and at the appropriate level of transmission (high, medium, low etc.). This scope shall be applied for electricity consumed in life cycle modules A1-A4 to C4 if scenarios are reported. If the national electricity mix is not available, then conservative approximations may be used, or regional or global energy data can be applied as proxy if these are assumed to be conservative approximations.*

EPD Norge recognise that the physical electricity mix can be calculated in Europe, based on statistics published by ENTSO-E, whereby ENTSO-E information is summarised, by combining it with generic data for different energy sources in order to calculate the environmental performance of the electricity grid in some countries.

Specific data for electricity consumed in life cycle module A3, and if relevant life cycle modules B1 and B2 shall use average values from the last 3 to 5 years if the electricity mix is not stable.

Guidance for guarantees of origin:

Actors (responsible for a process or activity in any life cycle module) that purchase guarantees of origin may use this instead of the grid mix given for the country of manufacture. If guarantees of origin are used, the actors shall ensure that these are used throughout the validity period of the EPD. (The specifications given here may be overruled by requirements given in the General Programme of Instructions, Section 4.4).

Losses considered by different users and the installed voltage supplied

If this information is lacking at the national average level, then grid losses may be used.

6.3.7 Data quality requirements

Data quality requirements shall follow the guidelines provided in ISO 14044. In addition, the following requirements are needed for packaging products and services in accordance with this EPD:

- Data (e.g. product description, LCI and scenarios) shall be as current as possible. Generic datasets for background LCIs shall not be older than ten years. Data sets and LCIs associated to the foreground system shall not be older than five years.
- Average data sets shall be based on 3 to 5-year averaged data; deviations shall be justified.
- A 100-year time period will be used for inputs to and outputs from the system, from the year for which the data set is deemed representative. A longer time period shall be used if relevant.
- The technological coverage shall reflect the physical reality of the declared product or product group.
- Generic data: Guidance for the selection and use of generic data is provided in CEN/TR 15941. Generic data shall be checked for plausibility.
- Data sets shall be complete according to the system boundary within the limits set by the criteria for the exclusion of inputs and outputs (see section 6.3.5).
- When calculating cradle-to-gate inventory data for input, the PCR for the given product shall be used when a PCR exists. E.g. for directly consumed heat and electricity, infrastructure shall be included in accordance with the PCR for electricity, steam, and hot and cold water generation and distribution, PCR CPC 17.
- Hazardous waste shall be specified according to relevant national regulations (specific and/or average background data).

6.3.8 Scenarios at the product level

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

6.3.9 Units

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

6.4 Inventory analysis

6.4.1 Data collection

Data collection shall follow the guidelines provided in ISO 14044.

6.4.2 Calculation procedures

Data calculation shall follow the guidelines provided in ISO 14044. The life cycle inventory (LCI) is to be presented per life cycle scenario module (life cycle modules A1-A3 may be presented together).

6.4.3 Allocation of input and output flows and output emissions

6.4.3.1 General

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

6.4.3.2 Co-product allocation

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

6.4.3.3 Allocation of reuse, recycling and recovery

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs. In addition:

NOTE 1: Reuse is considered an integrated part of the use phase and therefore not to be covered in this chapter.

NOTE 2: modified reuse follows the description of reuse in *EN 15804*.

NOTE 3: Life cycle modules B and C follow this document, and not the life cycle modules B and C outlined in *EN 15804*.

6.5 Impact assessment

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7 Content of the EPD

7.1 Declaration of general information

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

The following information about the product shall be declared:

- Product description
- Technical data (including weight and measurements, etc.)

- Market in which the declared product is distributed
- Estimated service life
- Table showing the material composition of the declared product

If the EPD declares a product service, the product name on page 1 shall be followed by a specification of the defined good or group of goods delivered (see 6.3.1).

Example:

“Product Name” for delivery of 1000 kg “defined good or group of goods”

7.2 Declaration of environmental parameters derived from LCA

7.2.1 General

The assessed packaging product and service EPD shall contain a simplified flow diagram/chart (referencing Figure 1 or Figure 2 as an example) that describes all processes included in the LCA. They shall be sub-divided to include the life cycle modules as a minimum, but a full system sketch with emphasis on included life cycle modules is recommended. The stages may be further sub-divided.

7.2.2 Rules for declaring LCA information per module

All life cycle information should be provided according to the life cycle modules in order to support the application of the modularity principle in EPDs.

For a cradle-to-gate EPD a declaration of the RSL is not possible. The RSL shall be declared as: “not specified”. Normally in this type of EPD module D is not declared.

For a cradle-to-grave EPD (life cycle declaration covering all modules from stages A to C) a declaration of the RSL is required, see section 6.3.3.

7.2.3 Parameters describing environmental impacts

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.2.4 Parameters describing resource use

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.2.5 Other environmental information describing waste categories and output flows

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.3 Scenarios and additional technical information

7.3.1 General

7.3.2 Supply process stage

A4, Transport from the packaging manufacturing location to the packaging location or the maintenance centre.

Parameters	Unit (expressed per packaging unit)	Description
Fuel type/ fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Capacity utilisation in weight (average load factor)	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume capacity utilisation	% (m ³ /m ³)	[max cap(s) in volume]

NOTE: If possible, emission profiles adapted to the appropriate fuel blend are to be used. If this is not possible, conservative proxy data are to be used for the fuel type /fuel blend.

7.3.3 Distribution stage B1 and maintenance stage B2

Parameters	Unit (expressed per packaging unit)	Description
B1: Ancillary material production		
Direct energy/ energy mix and consumption	kWh	[energy type(s)]



Chemical type and consumption	L or kg	[type chemical(s)]
Indirect energy/ energy mix and consumption	kWh	[energy type(s)]
Volume capacity utilisation	% (m ³ /m ³)	
B1: Preparation of packaging		
Auxiliary packaging material(s)	kg	[packaging type(s)]
Direct energy, energy mix and consumption used during the preparation of packaging	kWh	[energy type(s)]
Indirect energy, energy mix and consumption associated with administration	kWh	[energy type(s)]
Direct waste flows	kg	[waste flow(s)]
Indirect waste flows	kg	[waste flow(s)]
B1: Packaging of the product		
Direct energy, energy mix and consumption associated with packaging	kWh	[energy type(s)]
Direct waste flows	kg	[waste flow(s)]
B1: Transport of packaging		
Fuel type/ fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Ancillary energy consumption	kWh (alternately L, kg etc. in parentheses)	[energy type(s)]
Capacity utilisation in weight (average load factor)	% (kg packaging /kg cap.)	[max cap(s)in weight]
Return packaging capacity utilisation factor (average load factor)	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume capacity utilisation	% (m ³ /m ³)	[max cap(s) in volume]



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(average volume factor)		
Declared packaging weight	kg	
Auxiliary packaging weight	kg	
Ancillary material weight	kg	
Transport distance	km	

Parameters	Unit (expressed per packaging unit)	Description
B2 Maintenance		
Direct energy, energy mix and consumption associated with maintenance	kWh	[energy type(s)]
Indirect energy, energy mix and consumption associated with administration	kWh	[energy type(s)]
Chemical type and consumption	L or kg	[type chemical(s)]
Direct waste flows associated with maintenance	kg	[waste flow(s)]
Indirect waste flows associated with administration	kg	[waste flow(s)]
B2: Repair		
Repair material(s)	kg	[material type(s)]
Direct energy, energy mix and consumption	kWh	[energy type(s)]
Direct waste flows associated with repair	kg	[waste flow(s)]
B2: Packaging for the transport of packaging		



Packaging material used for the transport of declared packaging	kg	[packaging types]
Declared packaging weight	kg	
Direct waste flows associated with packaging used for the transport of declared packaging	kg	[waste flow(s)]
Direct energy, energy mix and consumption associated with maintenance	kWh	[energy type(s)]
B2: transport between the maintenance centre and the packaging location		
Fuel type, fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Declared packaging weight	kg	
Packaging material weight for the transport of the declared packaging	kg	
Transport distance from the maintenance centre to the packaging location	km	
Capacity utilisation in weight (average load factor) from the maintenance centre to the packaging location	% (kg packaging /kg cap.)	[max cap(s)in weight]
Return packaging load factor associated with transport from the maintenance centre to the packaging location	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume capacity utilisation (average volume factor)	% (m ³ /m ³)	[max cap(s) in volume]
B2: Transport of used packaging to the maintenance centre		



Fuel type/ fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Capacity utilisation in weight (average load factor) from final the packaging location to the maintenance centre	% (kg packaging /kg cap.)	[max cap(s)in weight]
Return packaging load factor associated with transport from the final packaging location to the maintenance centre	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume load factor associated with transport from the final packaging location to the maintenance centre	% (m ³ /m ³)	[max cap(s) in volume]
Transport distance from the final packaging location to the maintenance centre	km	

7.3.4 End of life

C1: Transport to waste treatment		
Fuel type/ fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Capacity utilisation in weight (average load factor)	% (kg packaging /kg cap.)	[max cap(s)in weight]
Return load factor	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume load factor associated with transport	% (m ³ /m ³)	[max cap(s) in volume]
C2: Waste processing		



Direct energy, energy mix and consumption associated with waste processing	kWh	[energy type(s)]
Indirect energy, energy mix and consumption associated with administration	kWh	[energy type(s)]
Direct material consumption associated with modified re-use, recycling and/or energy recovery	kg	[material type(s)]
Declared packaging for modified re-use	kg	[intended application(s), modified re-use efficiency]
Declared packaging for modified recycling	kg	[intended application(s), recycling efficiency]
Declared packaging for energy recovery	kg	[intended application(s), recovered energy efficiency]
Declared packaging for final disposal	kg	[state of material(s) to final disposal]
C3: Transport to disposal		
Fuel type/ fuel composition and consumption	kWh (alternately L, kg etc. in parentheses) / km	[Fuel mix, engine class (if known)]
Capacity utilisation in weight (average load factor)	% (kg packaging /kg cap.)	[max cap(s)in weight]
Return load factor	% (kg packaging /kg cap.)	[max cap(s)in weight]
Volume load factor	% (m ³ /m ³)	[max cap(s) in volume]
C4: Waste processing		
Direct energy, energy mix and consumption associated with disposal	kWh	[energy type(s)]
Indirect energy, energy mix and consumption associated with administration	kWh	[energy type(s)]



Emission(s) to air from disposal	kg	[emission type]
Emission(s) to water from disposal	kg	[emission type]
Emission(s) to ground from disposal	kg	[emission type]

7.3.5 Reuse, recovery and recycling

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.4 Additional information

This clause includes all significant environmental and health impacts not included in the impact categories of this document. See section 6.5.

7.4.1 Additional information on the release of dangerous substances to indoor air, soil and water: Indoor air

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.4.2 Additional information on the release of dangerous substances to indoor air, soil and water: Soil and water

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

7.4.3 Additional Norwegian requirements

7.4.3.1 Greenhouse gas emissions from electricity use in A3 Manufacturing

The global warming potential (GWP) of the electricity used by the manufacturer shall be shown in the EPD, as emissions of kg CO₂-equivalents per kWh, or as kg CO₂-equivalents per MJ.

7.4.3.2 Dangerous substances and content declaration

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs. In addition:

A specification of materials and substances that can adversely affect human health and environment shall be reported.

A detailed list of the product's substances (chemicals included in packaging products and services), including CAS number and health class (risk phrases or CLP (Classification, labelling and packaging) regulations, Regulation (EC) No. 1272/2008) when these are in force, shall be included in the product content declaration. The content of substances shall be declared in terms of weight percentages. Only substances that are mentioned in the raw material safety declaration sheets (SDS) shall be included. The EPD owner has no obligation to investigate the content of ingredients used in raw material production, except for products on the REACH candidate list and the Norwegian Priority List.

In cases where information about contents could affect patent or company secrets, a qualitative list of chemicals including the risk phrases and their expected functions is enough. This does not apply to substances registered under the REACH candidate list.

7.4.3.3 Carbon footprint

Additional information regarding the carbon footprint can be included. Examples of additional information is carbon footprint declarations (e.g. according to ISO 14067), separate reporting on indicators related to issues under development that are relevant for the carbon footprint, etc.

7.4.4 Additional environmental information on packaging products and services

Additional information about packaging products and services can be added in the "product description field". This must be relevant, objective and verifiable information.

This clause has a wider scope compared to other standards, and includes additional information not derived from the LCA, or information about product variations or markets (e.g. a table that describes the climate footprint for different models).

7.5 Aggregation of information modules

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

8 Project Report

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.



9 Verification and Validity of an EPD

This chapter follows the procedures outlined in EN 15804 to secure consistency across cross-sectoral EPDs.

10 Bibliography

CEN/TR 14182 – Packaging – Terminology – Basic terms and definitions.

CEN/TR 13910 – Packaging – Report on criteria and methodologies for life cycle analysis of packaging.

Directive 75/442EEC – Council directive of 15 July 1975 on waste

European commission - Waste Framework Directive 2008/98/EC.

ISO 14025 – Environmental labels and declarations Type III environmental declarations Principles and procedures.

ISO 14040 – Environmental management – Life cycle assessment – Principles and framework

ISO 14044 – Environmental management – Life cycle assessment – Requirements and guidelines.

EN 15804 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.