HEARING PROTECTION DEVICES

PCR REGISTRATION NUMBER TO BE ADDED BY THE SECRETARIAT
DRAFT VERSION 1.0.0. FOR OPEN CONSULTATION. DO NOT USE OR CITE

VALID UNTIL 20XX-YY-ZZ *(TO BE ADDED BY THE SECRETARIAT)*

DRAFT FOR OPEN CONSULTATION

INTRODUCTION TO OPEN CONSULTATION

This draft PCR document is available for open consultation from 2024-12-13 until 2025-02-11. Feel free to forward the draft to any other stakeholder you might think is relevant, including colleagues and other organisations.

We are interested in comments from stakeholders on:

- General
  - Alignment with relevant PCRs available in other programmes for type III environmental declarations and industry-specific LCA standards, guidelines or similar.
- Scope of PCR
  - Product category definition and description
  - Classification of product category, e.g., using UN CPC codes
- Goal and scope, life cycle inventory and life cycle impact assessment
  - Functional /declared unit
  - System boundary
  - Allocation rules
  - Data quality requirements
  - Recommended databases for generic data
  - Impact categories and impact assessment methodology
- Additional information

Specific topics on which the PCR Committee want your input are highlighted in yellow boxes throughout the document.

Comments shall be sent directly to the PCR Moderator (contact details available in Section 2.1). There is a template for comments on https://www.environdec.com/product-category-rules-pcr/get-involved-in-pcr-development#pcrsinopenconsultation that should be used.

For questions about the PCR, please contact the PCR Moderator. For general questions about the International EPD System, EPD or PCR development, please contact the Secretariat via https://environdec.freshdesk.com/support/home.

TABLE OF CONTENTS

1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD System: a programme for Environmental Product Declarations (EPD)[1] according to ISO 14025:2006, ISO 14040:2006, ISO 14044:2006, and product-specific standards, such as EN 15804 and ISO 21930 for construction products. EPDs are voluntary documents for a company or an industry association to present transparent, consistent, and verifiable information about the environmental performance of their products (goods or services).

The General Programme Instructions (GPI), publicly available on www.environdec.com, includes the rules for the overall administration and operation of the programme and the basic rules for developing EPDs registered in the programme. A PCR complements the GPI and the normative standards by providing specific rules, and guidelines for developing an EPD for one or more specific product categories (see Figure 1), thereby enabling the generation of consistent EPDs within a product category. A PCR should not repeat the rules and guidelines of the GPI, but include additions, specifications and deviations to the rules set in the GPI. As such, a PCR shall be used together with the GPI.

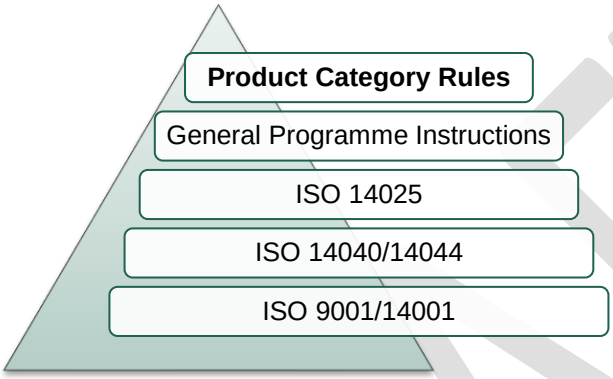

Figure 1. The hierarchy between PCRs, standards, and other documents. EN 15804 and ISO 21930 are normative standards for construction products only.

The present PCR uses the following terminology:

- The term “shall” is used to indicate what is obligatory, i.e., a requirement.
- The term “should” is used to indicate a recommendation. Any deviation from a recommendation shall be justified in the EPD development process.
- The terms “may” or “can” are used to indicate an option that is permissible.

For definitions of other terms used in the document, see the GPI and normative standards.

Any references to this PCR shall include the PCR registration number, name, and version number.

The programme operator maintains the copyright of the PCR to ensure that it is possible to publish, update, and make it available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Termed type III environmental declarations in ISO 14025.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Hearing Protection Device
Registration number and version:	*To be added by the Secretariat*
Programme:	The International EPD System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: support@environdec.com
PCR Moderator:	Paolo Simon Ostan, paolo.simon@mail.com
PCR Committee:	European Safety Federation (ESF), 3M, Bouygues Travaux Publics (BYTP), Protective Industrial Products (PIP), Elacin International B.V., Paolo Simon Ostan (freelance consultant)
Publication date:	*To be added by the Secretariat* See Section 9 for a version history of the PCR.
Valid until:	*To be added by the Secretariat* The validity may change. See www.environdec.com for the latest version of the PCR and the latest information on its validity and transition periods between versions.
Development and updates:	The PCR has been developed following ISO 14027, including public consultation and review. The rules for the development and updating processes are described in Section 9 of the GPI. The PCR is valid for a pre-determined time period to ensure that it is updated at regular intervals. When the PCR is about to expire, the PCR Moderator shall initiate a discussion with the Secretariat on if and how to proceed with updating the PCR and renewing its validity. A PCR may be updated before it expires, based on changes in normative standards or provided significant and well-justified proposals for changes or amendments are presented. When there has been an update of the PCR, the new version should be used to develop EPDs. For small updates (change of third-digit version number), the previous version is normally immediately removed from the PCR library on www.environdec.com and there is no transition period. For medium updates (change of second-digit version number), the previous version of the PCR is valid in parallel during a transition period of at least 90 days, but not exceeding its previously set validity period. For large updates (change of first-digit version number), the previous version is valid in parallel during a transition period of at least 180 days, but not exceeding its previously set validity period. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR may be sent directly to the PCR Moderator and/or the Secretariat during its development or during its period of validity.

Standards and documents conformance:	General Programme Instructions of the International EPD System, version 5.0.0, based on ISO 14025 and ISO 14040/14044.[2]
PCR language(s):	At the time of publication, this PCR was available in English. If the PCR is available in several languages, these are available on www.environdec.com. In case of translated versions, the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 INTRODUCTION TO HEARING PROTECTION DEVICES

Hearing Protection Devices (HPDs) refer to devices worn by a person to prevent harmful effects from noise and other loud acoustic stimuli. HPDs can reduce noise using passive, electronic, or a combination of passive and electronic means.

HPD can be classified into two main categories, as described by ISO 4869:1-2018:

- Earplugs (in-ear): hearing protector worn within the external ear canal (aural) or in the concha against the entrance to the external ear canal (semi-aural), and
- Earmuffs (over-ear): hearing protector consisting of circumaural cups pressed or held against the head around each pinna

Many types of earplugs and earmuffs are available in various shapes, sizes, and styles. Also, different functions and features are available for some types of HPDs. Earplugs can be either reusable or disposable while earmuffs are always reusable.

The following table shows the HPDs classification with the main functions and features available on the market (non-exhaustive list).

Table 1 HPDs classification

CATEGORY	TYPE		USE	FUNCTION	PASSIVE FEATURE	ELECTRONIC FEATURE
Earplug (in-ear)	Custom moulded	Corded/ Uncorded	Disposable/ Reusable	Electronic/ Passive	Level dependent Uniform attenuation Metal detectable	Level dependent Communications Bluetooth® receiver Active Noise Reduction (ANR) Environmental listening microphones Integrated fit testing Intrinsically Safe/ATEX Rated
	Pre-formed					
	Banded					
	Push-to-fit					
	Formable					
	Foam					
Earmuffs (over-ear)	Head Band	on Head Protection and/or Face Protection	Reusable	Electronic/ Passive	Level dependent Uniform attenuation	Level dependent Communications Bluetooth® receiver ANR (Active Noise Reduction) Environmental listening microphones Intrinsically Safe/ATEX Rated
	Neck Band					
	Mounted					

[2] Some rules influencing EPD development are independent of the GPI version referred to in the PCR. For example, the latest rules on EPD verification procedures in the GPI shall be followed within 90 days of its publication. See Section 5.1 in the GPI for a description of the four categories of rules and when they shall be followed.

2.2.1.1 Legislative frameworks

HPDs are designed to protect wearers from noise and other loud acoustic stimuli. There are several legislative frameworks that govern the design and use of these devices. It's important to note that the specific legislative requirements for HPDs can vary depending on the jurisdiction, region, and industry. Products covered by this PCR should always refer to specific international or national standards which define the product as a hearing protector device and may include classification, technical characteristics, test methods, etc.

2.2.1.2 Terms and definitions

Below are the terms and definitions relevant to this PCR[3]:

- Hearing Protection Device (HPD): device worn by a person to prevent harmful effects from noise and other loud acoustic stimuli
- Earplug: Hearing Protection Device worn within the external ear canal (aural) or in the concha against the entrance to the external ear canal (semi-aural)
- Earmuff: Hearing Protection Device consisting of circumaural cups pressed or held against the head around each pinna
- Passive hearing protection: Hearing Protection Device that provides attenuation of external sounds not by means of electronics
- Electronic hearing protection: hearing protection that provides attenuation of external sounds through passive means and uses electronic circuitry to add functionality
- Disposable HPD: Hearing Protection Device intended for one fitting only
- Reusable HPD: Hearing Protection Device intended for more than one fitting
- Custom moulded earplug: earplug made using an impression of the individual concha and the outer ear canal of the user
- Banded earplugs: eartips linked by a headband designed to be used in at least one position
- Pre-formed earplugs: premoulded earplugs are formed from flexible materials into conical, bulbous, or other shapes, often with one or more flanges or sealing rings, which are typically affixed to or enshroud a flexible stem for handling, insertion, and removal
- Push-to-fit earplugs: push-to-fit earplugs are composed of similar foams to that used in the roll-down foam earplugs with that foam comprising a pod, dome, or conical shroud on the end of a flexible stem for handling, insertion, and removal
- Foam earplugs: foam earplugs (also called “roll-down foam earplugs” to emphasize the fact that such products need to be rolled and tightly compressed prior to insertion) are made from slow-recovery material
- Formable earplugs: formable earplugs usually, but not always, come in a single size and are manufactured from malleable materials such as Polysiloxane putty (exposed or encased in a bladder) or cotton/wax combinations
- Behind-the-head or Neck Band earmuffs: earmuffs designed to be worn with the band connecting the earcups behind the head
- Mounted earmuffs: also called cap-attached are earmuffs that have a means for attaching the earcups directly to a hard hat or helmet by short arms that are springloaded to press the cups snugly against the ears
- Over-the-Head earmuff: earmuff designed to be worn with the headband passing over the top of the head
- Band: earplug band, usually made of rigid material, typically plastic, designed to enable the earplugs to be held within (aural) or against (semi-aural) the entrance to the outer ear canals by exerting force against the earplug elements
- Level-dependent HPD: device that alters the amount of noise reduction non-linearly and can be accomplished either passively or with electronics

[3] most definitions were taken from the ISO or CEN framework.

- Active noise reduction (ANR): circuitry designed to provide additional attenuation of external sounds by means of a noise cancellation
- Uniform attenuation: attenuation which is constant (or nearly constant) across the frequencies
- Replaceable element: consumable part intended to be replaced during the use stage of the HPD
- Dispenser: a container capable of providing individual or pairs of earplugs to the user in an easy, safe and convenient way.

2.2.2 PRODUCT CATEGORY SCOPE

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Hearing Protection Device and the declaration of this performance by an EPD. The product category does not correspond to any UN CPC.

This PCR covers all the HPDs that have the purpose of preventing the harmful effects of noise, i.e. earmuffs and earplugs that can be worn in different ways and have specific technical characteristics, as described in section 2.2.1. There are several types of HPDs, including:

- Custom moulded earplugs
- Preformed earplugs
- Banded earplugs
- Push-to-fit earplugs
- Foam earplugs
- Formable earplugs
- Over-the-head earmuffs
- Behind-the-head or neck-band earmuffs
- Mounted or cap-attached earmuffs

Earplugs are always defined as 1 pair (2 plugs).

Each of the HPDs listed must reduce sound by means of passive attenuation mode. Some HPDs also have an electronic function and different features, based on the intended use of the product.

Disposable and reusable products are included. Other unlisted devices that fall within the definition of HPD provided in section 2.2.1.2 are included in the scope of this PCR.

Acoustic helmets and other products designed for improving listening, which do not have the primary function of harmful noise reduction such as noise cancelling headphones, amplification devices to restore hearing loss, products worn for comfort when sleeping or travelling and products designed to reduce water entering the ear canals are outside of the scope of this PCR.

2.2.3 GEOGRAPHICAL SCOPE

This PCR may be used globally.

2.2.4 EPD VALIDITY

An EPD becomes valid as of its version date (see Section 8.4.5 of the GPI). When an EPD is originally published, the validity period is normally five years starting from the version date or until the EPD has been de-registered from the International EPD System. Shorter validity periods are also accepted, for example if decided by the EPD owner.

For rules on when an EPD shall be updated and re-verified during its validity, see Section 6.8.1 of the GPI. For validity periods in case of updates of EPDs, see Section 6.8 of the GPI.

The version date and the period of validity shall be stated in the EPD.

Publication of a new version of the PCR or the GPI does not affect the validity of already published EPDs.

3 REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the PCR development process described in the GPI of the International EPD System, including open consultation and review.

3.1 OPEN CONSULTATION

3.1.1 VERSION 1.0.0

This PCR was available for open consultation from 2024-12-13 until 2025-02-11, during which any stakeholder was able to provide comments by contacting the PCR Moderator and/or the Secretariat.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation and agreed to be listed as contributors in the PCR and on www.environdec.com:

- *List of stakeholder names and affiliation (to be added after the open consultation).*

3.2 PCR REVIEW

3.2.1 VERSION 1.0.0

PCR review panel:	The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	*To be added by the Secretariat*
Review dates:	*To be added by the Secretariat*

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs and other internationally standardised methods that could potentially act as PCRs were considered to avoid unnecessary overlaps in scope and to ensure harmonisation with established methods of relevance for the product category. The existence of such documents was checked among the following EPD programmes and international standardisation bodies:

- International EPD System. www.environdec.com.
- The Norwegian EPD Foundation, www.epd-norge.no
- EPDItaly, www.epditaly.it
- IBU, www.ibu-epd.com
- PEP ecopassport®, www.pep-ecopassport.org

No existing PCRs or other relevant internationally standardised methods with overlapping scope were identified.

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed to enable publication of EPDs for the product category defined in Section 2.2.2 based on ISO 14025 and ISO 14040/14044. The PCR enables different practitioners to generate consistent results when assessing the environmental impact of products of the same product category, and thereby it supports comparability of products within a product category.

3.5 UNDERLYING STUDIES USED FOR PCR DEVELOPMENT

The methodological choices made during the development of this PCR (declared unit, system boundary, allocation methods, impact categories, data quality rules, etc.) were primarily based on the following underlying studies:

- Brown, Jessica. Life Cycle Assessment (LCA) – 3M™ PELTOR™ WS LiteCom™ PMR446MHz Active Listening Headset, v. 1 – May 2019.
- Brown, Jessica. Life Cycle Assessment (LCA) – 3M™ PELTOR™ Kid Earmuffs, 27 dB, Neon Green, Headband, H510AK-442-GB, v. 1 – May 2019.

4 LCA METHOD

This section provides rules for the LCA method used to develop an EPD for the product category as defined in Section 2.2.2. The basic rules of the LCA method are set in Annex A of the GPI, and this section only includes additions, specifications and deviations to the rules set in the GPI. Guidance and examples of applying the LCA method are also available on www.environdec.com/methodology.

4.1 MODELLING APPROACH

See Section A.1 of the GPI.

4.2 DECLARED UNIT

The declared unit shall be defined as 1 (one) pair of earplugs (2 plugs) or 1 (one) pair of earmuffs. All the components, packaging and accessories[4] required to fulfil the hearing protection, the technical performances and the proper storage intended by the product design shall be considered in the declared unit. The reference flow corresponds to the declared unit and shall be defined at the point where the product arrives at the customer gate, i.e., any losses occurring before then shall be accounted for.

This PCR uses a declared unit instead of a functional unit. This is because the lifespan of HPDs and their components can vary widely as a result of differing use conditions (actual use modes throughout the work week, temperature and humidity conditions, storage conditions, etc.), with no internationally recognized standard tests available to objectively define it. This subsequently impedes setting a functional unit based on a Reference Service Life (RSL) at product group level. All relevant functional aspects shall, however, be considered when comparing EPDs based on this PCR.

4.2.1 TECHNICAL SPECIFICATION AND LIFESPAN

The following technical specification supports the declared unit definition and shall be reported in the EPD, if applicable:

- Category and type of HPDs (e.g. custom moulded earplugs or neck band earmuff)
- Functionality (Passive, Electronic) and main features (e.g. level dependent, communications)
- Type of use (Reusable or Disposable)
- Type of storage container
- Type of head strap or cord
- Type and main technical specification of disposable and/or rechargeable batteries
- Sound attenuation in accordance with the regulatory requirements for the jurisdiction to which the EPD owner is subject (e.g. NRR, SNR, OB, HML)
- Technical lifespan of the device, in operating hours, according to internal company tests
- Technical lifespan of the replaceable elements[5], in operating hours, according to internal company tests.

Although there are no internationally recognized standard tests for the assessment of the technical lifespan, an estimated value using company-internal methods shall be reported in the EPD, in accordance with the product's technical documentation (e.g. technical data sheet, public brochure). The estimation shall be carried out under standard conditions of 20°C of temperature and 60% of moisture as well as considering a proper storage of the reusable device when not in use.

[4] Accessories may include charging cables and power supply, disposable or rechargeable batteries, additional eartips, connecting cables, storage case or drawstring bag, etc., commonly included in the sales package of the device. Hygiene kits shall not be included. Examples of components and accessories to consider for each type of HPD are provided in Annex A – Product examples.

[5] The technical lifespan shall be provided for each type of element replaced during the use stage of the reusable device.

The technical lifespan shall be the same one applied to define the device use phase scenario for a reusable product and its replaceable elements.

Verifiers should take care when checking technical specification data, especially the technical lifespans of the device and replaceable elements, as these are critical to define the technical performances of the product and the use stage scenarios.

For more information on the definitions of lifespan see Section A.2.1 of the GPI.

4.3 SYSTEM BOUNDARY

The scope of this PCR and EPDs based on it is cradle-to-grave.

4.3.1 LIFE-CYCLE STAGES AND INFORMATION MODULES

Because of different data quality rules and the presentation of results, the product life cycle shall be divided into the following life-cycle stages and information modules. The division into information modules is adopted from EN 15804 but some modules of stages B (B1-B7) and C (C1-C4) are not applicable for this PCR.

- Product stage, modules A1-A3:
  - A1: Raw material extraction and processing (e.g., mining, agricultural and forestry operations), production of intermediate materials and components (e.g., including transformation processes such as rolling, drawing and extrusion), processing of secondary material input (e.g., recycling processes), production of distribution and consumer packaging, etc.
  - A2: Transports to the manufacturer of the product
  - A3: Manufacturing of the product[6]
- Distribution stage, module A4-A5:
  - A4: Transport of the product from the production gate to the location of use
  - A5: Waste treatment of product packaging
- Use stage, modules B1-B7:
  - B1: Operation of the product
  - B2: Maintenance of the product
  - B6: Energy use in operation
- End-of-life stage, modules C1-C4:
  - C2: Transport to waste processing and/or disposal
  - C3: Waste processing for reuse, recovery and/or recycling
  - C4: Disposal

In addition, consequences of recovered material/energy beyond the product cycle may be reported in module D, if it is declared. Given that the manufacturer/EPD owner is generally not aware of the actual end-of-life treatments of the product in the various countries where it may be sold, and the end-of-life stage is often modelled using scenarios based on statistical data that rely on numerous assumptions—such as the recycling or recovery possibilities, the varying functional equivalence of secondary materials and the subjective determination of devaluation factors—it is not mandatory to declare the results of module D. These factors contribute to significant uncertainty in the results, making their declaration optional.

In the EPD, the environmental performance of each of the life-cycle stages and module D, if declared, shall be reported separately, and in aggregated form for the life-cycle stages (modules A-C). Furthermore, EPDs may present the environmental performance results of the product stage, modules A1-A3, divided into the information modules (A1, A2, A3).

[6] These are often, but not always, the processes under operational control of the EPD owner.

Section A.3.1 of the GPI outlines rules for how to assign generation of electricity and production of fuels, steam and other energy carriers used, and losses arising, in each information module.

Sections 4.3.1.1 - 4.3.1.3 further describe the processes to include or exclude for each life-cycle stage.

4.3.1.1 Modules A1-A3: Product stage

The following unit processes are part of the product system and shall be classified as product stage processes:

- Module A1:
  - extraction and processing of raw materials,
  - recycling processes of secondary materials from other product life cycles, if applicable, in accordance with section 4.6.2,
  - production of intermediate materials, input components and accessories for the HPD,
  - production of auxiliary products (e.g. cleaning chemicals) used in upstream and core processes of the HPD,
  - relevant services, such as transport of raw materials and components along the upstream supply chain to a distribution point (e.g. a stockroom or warehouse),
  - production of distribution and consumer packaging of HPD,
  - generation of electricity and production of fuels, steam and other energy carriers used in upstream processes, and
  - waste processing of waste generated in the module up to the end-of-waste state or final disposal.
- Module A2:
  - external transportation of intermediate materials, components and accessories to the manufacturing site of the HPD.
- Module A3:
  - manufacturing and/or assembly of the HPD,
  - internal transportation of intermediates at manufacturing site level,
  - waste processing of waste generated in the module up to the end-of-waste state or final disposal, even if carried out by third parties, including transportation, and
  - generation of electricity and production of fuels, steam and other energy carriers used in core processes.

Processes not listed here may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.2 Modules A4-A5: Distribution stage

The following unit processes are part of the product system and shall be classified as distribution processes:

- Module A4:
  - transportation of HPD to retailer/distribution platform/consumer, and
  - transportation to the location of use.
- Module A5:
  - waste processing of distribution and consumer packaging of HPD up to the end-of-waste state or final disposal, including transportation.

Processes not listed here may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.3 Modules B1-B7: Use stage

The following unit processes are part of the product system and shall be classified as use stage processes:

- Module B1:
  - production of additional accessories such as customized attachment adapters for mounted earmuffs or customized connecting cables, necessary for the proper functioning of the device,
  - transportation of accessories to the location of use.
- Module B2:

Maintenance covers the combination of all planned technical and associated administrative actions during the product technical lifespan to maintain the HPD in a state in which it can perform its required functional and technical performance, as well as preserve its aesthetic qualities. This will include preventative and regular maintenance activity such as cleaning and replacement of worn, damaged or degraded parts, in particular:

- cleaning activities, including the production of detergents or sanitizing products and the consumption of water,
- production of components and/or accessories for the replacement such as eartips, batteries, cushions and inserts, charging cables[7],
- transportation of components and/or accessories to the location of use,
- waste processing of replaced components and/or accessories and other waste generated in the module up to the end-of-waste state or final disposal, including transportation.

- Module B6:
  - energy use to charge the rechargeable battery from 0% to 100% power during the product technical lifespan.

Processes not listed here may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.4 Modules C1-C4: End-of-life stage

The following unit processes are part of the product system and shall be classified as end-of-life stage processes:

- Module C2:
  - transportation of the discarded product to a recycling or a disposal site.
- Module C3:
  - waste processing such as disassembly and/or separation of material flows intended for reuse, recycling and energy recovery.
- Module C4:
  - waste disposal such as incineration without energy recovery or landfill.

Processes not listed here may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.5 Excluded processes

See Section A.3.1.1 of the GPI.

In addition, environmental impacts related to tests conducted on the device, which are mandatory only at the regional level[8], as well as any transport to external testing centres, shall be excluded.

[7] Other examples of repleceable components and accessories to consider for each type of HPDs are provided in Annex A – Product examples.

[8] For example, in some countries, a leakage test is mandatory for custom-made earplugs to verify the quality of the seal.

4.3.1.6 Infrastructure and capital goods

See Section A.3.1.2 of the GPI.

4.3.2 OTHER BOUNDARY SETTING RULES

See Section A.3.2 of the GPI for rules on setting boundaries to nature as well as geographical and temporal boundaries. See Section A.4 of the GPI and Section 4.6 below for rules on setting boundaries to other product systems.

4.4 PROCESS FLOW DIAGRAM

The process flow diagram changes depending on the type of HPD covered by this PCR and, for that reason, a detailed diagram is not reported in this section. Figure 2. *General diagram illustrating the life-cycle stages and modules included in the product system.* shows life cycle stages and information modules that are included in the product system.

A process flow diagram for the specific HPD, divided into the life-cycle stages and modules, showing the main processes included and the system boundary of the LCA, shall be reported in the EPD.

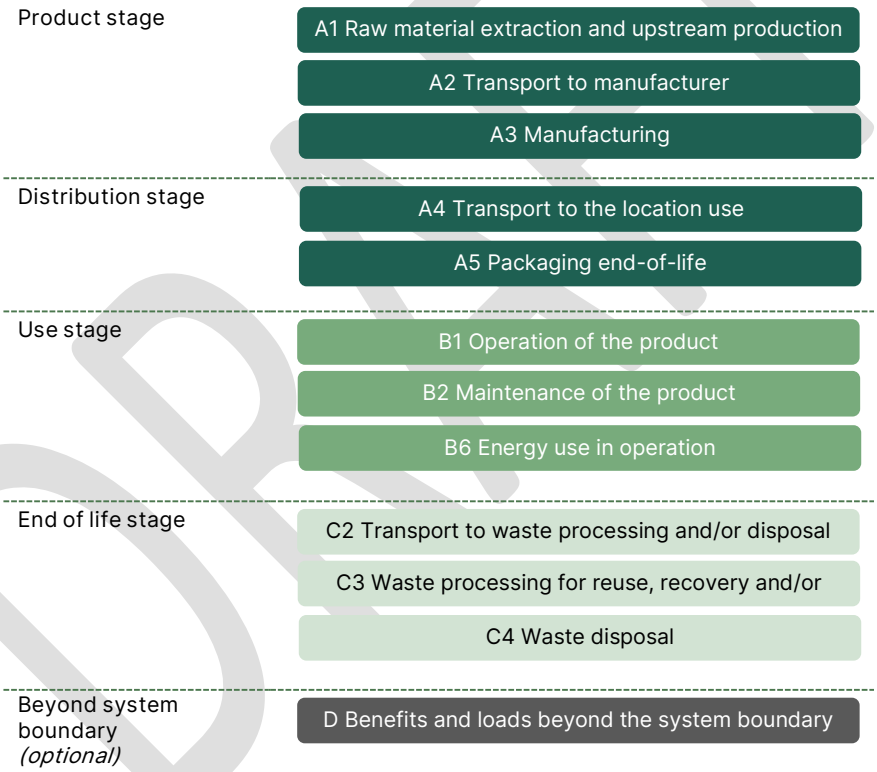

Figure 2. General diagram illustrating the life-cycle stages and modules included in the product system.

4.5 CUT-OFF RULES

See Section A.3.3 of the GPI.

4.6 ALLOCATION RULES

See Section A.4 of the GPI.

4.6.1 ALLOCATION OF CO-PRODUCTS

See Section A.4.1 of the GPI.

4.6.2 ALLOCATION OF WASTE

See Section A.4.2 of the GPI.

4.7 DATA AND DATA QUALITY RULES

See Section A.5 of the GPI.

See Section 4.8 for further rules related to data and data quality per life-cycle stage and module D.

4.7.1 DATA CATEGORIES

See Section A.5.1 of the GPI.

4.7.2 DATA QUALITY REQUIREMENTS FOR PRIMARY DATA

See Section A.5.2 of the GPI.

4.7.3 DATA QUALITY REQUIREMENTS FOR REPRESENTATIVE SECONDARY DATA

See Section A.5.3 of the GPI.

4.7.4 DATA QUALITY ASSESSMENT AND DECLARATION

See Section A.5.4 of the GPI.

4.7.5 EXAMPLES OF DATABASES FOR SECONDARY DATA

No recommended databases for generic data have been identified for the product category since the PCR includes a large variety of HPD types and consequently a wide range of relevant databases. All commercial or publicly available datasets that fulfil the data quality requirements may be used. The specifications and the version of the database shall be reported in the EPD.

4.8 OTHER LCA RULES

See Section A.6 of the GPI.

For specific LCA rules per life-cycle stage, see Section 4.9.

4.8.1 MASS BALANCE

See Section A.6.1 of the GPI.

4.8.2 ELECTRICITY MODELLING

See Section A.6.2 of the GPI.

4.8.3 BIOGAS MODELLING

See Section A.6.3 of the GPI.

4.9 SPECIFIC RULES PER LIFE-CYCLE STAGE AND MODULE D

See Section A.7 of the GPI.

Below are further data quality requirements and other LCA rules per life-cycle stage, and for module D, of relevance for the product category.

The description of scenario(s) used in the modelling of downstream stages and module D, if declared, shall be reported in the EPD.

4.9.1 PRODUCT STAGE, A1-A3

This PCR does not provide any additions to the rules and guidance in the GPI on the modelling of the product stage.

4.9.2 DISTRIBUTION AND INSTALLATION STAGE, MODULES A4-A5

This PCR does not provide any additions to the rules and guidance in the GPI on the modelling of the distribution/installation stage.

The installation stage is not applicable to this product category; therefore, the specific rules for this stage outlined in the GPI shall be disregarded.

4.9.3 USE STAGE, MODULES B1-B7

The maintenance activity scenario as well as the electricity consumption for battery charging shall be consistent with the technical lifespan of the device and replaceable elements declared as technical specifications in EPD. The battery life shall be considered in accordance with the technical documentation of the product.

This PCR does not provide any other additions to the rules and guidance in the GPI on the modelling of the use stage.

Some modules of the use stage such as repair are not applicable to this product category; therefore, the specific rules for these modules outlined in the GPI shall be disregarded.

4.9.4 END-OF-LIFE STAGE, MODULES C1-C4

This PCR does not provide any additions to the rules and guidance in the GPI on the modelling of the end-of-life stage.

De-construction/demolition/deinstallation module (C1) is not applicable to this product category; therefore, the specific rules for this module outlined in the GPI shall be disregarded.

4.9.5 CONSEQUENCES FOR RECOVERED MATERIAL/ENERGY BEYOND THE PRODUCT LIFE CYCLE (MODULE D)

Module D is optional for this product category.

This PCR does not provide any additions to the rules and guidance in the GPI on the modelling of module D.

4.10 ENVIRONMENTAL PERFORMANCE INDICATORS

See Section A.8 of the GPI.

In the EPD, the environmental performance of each of the life-cycle stages and module D, if declared, shall be reported separately, and in aggregated form for the life-cycle stages (modules A-C). Furthermore, EPDs may present the environmental performance results of product stage, modules A1-A3, divided into the information modules (A1, A2, A3).

4.11 SPECIFIC RULES PER EPD TYPE

4.11.1 MULTIPLE PRODUCTS FROM THE SAME COMPANY

See Section A.9.1 of the GPI.

4.11.2 SECTOR EPD

See Section A.9.2 of the GPI.

4.11.3 EPD OWNED BY A TRADER

See Section A.9.3 of the GPI.

4.11.4 EPD OF PRODUCT NOT YET ON THE MARKET

See Section A.9.4 of the GPI.

4.11.5 EPD OF PRODUCT RECENTLY ON THE MARKET

See Section A.9.5 of the GPI.

5 CONTENT OF LCA REPORT

Data for verification shall be presented in the form of an LCA report – a systematic and comprehensive summary of the project documentation that supports the verification of an EPD. The LCA report is not part of the public communication.

See Section 8.3.1 of the GPI for rules on the content of the LCA report.

Note that there may be rules on the content of the LCA report elsewhere in the GPI or in this PCR.

6 CONTENT AND FORMAT OF EPD

See Section 7 of the GPI.

6.1 EPD LANGUAGES

See Section 7.1 of the GPI.

6.2 UNITS AND QUANTITIES

See Section 7.2 of the GPI.

6.3 USE OF IMAGES IN EPD

See Section 7.3 of the GPI.

6.4 SECTIONS OF THE EPD

See Section 7.4 of the GPI.

6.4.1 COVER PAGE

See Section 7.4.1 of the GPI.

6.4.2 GENERAL INFORMATION

See Section 7.4.2 of the GPI.

In addition, the following statement shall be reported under "Ownership and limitations on use of EPD" subsection: "The environmental impacts of EPDs resulting from this PCR may not be directly comparable, as they may refer to products that are either disposable or reusable or have significantly different technical lifespans and technical performances."

6.4.3 INFORMATION ABOUT EPD OWNER

See Section 7.4.3 of the GPI.

6.4.4 PRODUCT INFORMATION

The EPD shall include the following information about the product:

- Product identification by name, and an unambiguous identification of the product by standards, concessions, or other means.
- Visual representation (e.g., an image) of product.
- Identification of the product (name and code) according to relevant codes for product classification, if applicable, for example:
  - Common Procurement Vocabulary (CPV),
  - UN Standard Products and Services Code (UNSPSC),
  - Classification of Products by Activity (NACE/CPA),
  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or

- Global Trade Item Number (GTIN)[9,10]. Note that if the GTIN used when ordering a product is different from the GTIN used when delivering a product, the GTIN used in the ordering system is preferable in an EPD.

Note that the product category of this PCR does nor correspond to any UN CPC code and therefore it is not required to declare the UN CPC in this PCR.

- Description of the product in accordance with the product classification system(s) used (see above), and description of the technical performance of the product, including its application/intended use and key functionalities. In particular, the technical specifications required in section 4.2.1 shall be included.
- Brief description of main processes of manufacturing.
- Location of the production site(s), including, as a minimum, the city (or municipality, if not located in a city).
- References to any relevant websites for more information or explanatory materials.

This section may also include:

- List of products (see GPI, section 7.4.1)
- Name of manufacturer(s) and site(s)

6.4.5 CONTENT DECLARATION

See Section 7.4.5 of the GPI.

6.4.6 LCA INFORMATION

See Section 7.4.6 of the GPI.

6.4.7 ENVIRONMENTAL PERFORMANCE

See Section 7.4.7 of the GPI.

The EPD shall declare the environmental performance indicators listed or referred to in Section 4.10, per declared unit, per life-cycle stage and module D, if declared.

6.4.8 ADDITIONAL ENVIRONMENTAL INFORMATION

See Section 7.4.8 of the GPI.

6.4.9 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

See Section 7.4.9 of the GPI.

6.4.10 INFORMATION RELATED TO SECTOR EPDS

See Section 7.4.10 of the GPI.

6.4.11 VERSION HISTORY

See Section 7.4.11 of the GPI.

[9] GTINs need to be verified and accessible here: https://www.gs1.org/services/verified-by-gs1/results.

[10] If a Global Model Number (GMN) is established on the market, which groups several producer-specific GTINs to a common product type, GMN may be used instead of GTIN, or as a complement.

6.4.12 ABBREVIATIONS

See Section 7.4.12 of the GPI.

6.4.13 REFERENCES

See Section 7.4.13 of the GPI.

7 LIST OF ABBREVIATIONS

CPC	Central product classification
EPD	Environmental product declaration
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life cycle assessment
PCR	Product category rules
RSL	Reference service life
UN	United Nations
HPD	Hearing Protection Device
ANR	Active Noise Reduction
NRR	Noise Reduction Rating
SNR	Single Number Rating
OB	Octave Band
HML	High Medium Low

8 REFERENCES

CEN (2021) EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International (2024) General Programme Instructions for the International EPD System. Version 5.0.0 dated 2024-06-19. Available on www.environdec.com.

ISO (2006a) ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO (2006b) ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c) ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines.

ISO (2015a) ISO 14001:2015, Environmental management systems – Requirements with guidance for use.

ISO (2015b) ISO 9001:2015, Quality management systems – Requirements.

ISO (2017) ISO 21930:2017, Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.

ISO (2018b) ISO/TS 14067:2018, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication.

ISO (2018) ISO 4869:1-2018, Acoustics — Hearing protectors, Part 1: Subjective method for the measurement of sound attenuation

Brown, Jessica. Life Cycle Assessment (LCA) – 3M™ PELTOR™ WS LiteCom™ PMR446MHz Active Listening Headset, v. 1 – May 2019.

Brown, Jessica. Life Cycle Assessment (LCA) – 3M™ PELTOR™ Kid Earmuffs, 27 dB, Neon Green, Headband, H510AK-442-GB, v. 1 – May 2019.

9 VERSION HISTORY OF PCR

VERSION 1.0.0, 20YY-MM-DD

Add description of the PCR version, e.g. "Original version of the PCR".

10 ANNEX A – PRODUCT EXAMPLES

Table 2 Product examples with indication of possible components, accessories, materials and replaceable elements of HPD (non-exhaustive).

PRODUCT GROUP	PRODUCT TYPE			USE	DEVICE COMPONENTS/ACCESSORIES[11]	POSSIBLE MATERIALS	REPLACEABLE ELEMENTS[12]
Earplugs	Passive	Corded /Uncorded	Custom moulded	Reusable	Earplug, Neck Cord, Recloseable packaging or Storage Case	Silicone, Textile Cord PVC, Acrylic	Acoustic Filter, Neck Cord
			Pre-formed	Reusable	Earplug, Neck Cord, Recloseable packaging or Storage Case, Stem	PVC, Polysiloxane, Rubber	Acoustic Filter, Neck Cord, Eartips
			Banded	Reusable	Band, Eartips, Recloseable packaging or Storage Case	Polyurethane, PVC, TPE, POM, ABS	Eartips
			Push to fit	Disposable/Reusable	Earplug, Neck Cord, Stem	Polyurethane, PVC, TPE, Polycarbonate	Neck Cord, Eartips
			Formable	Disposable/Reusable	Earplug, Neck Cord, Recloseable packaging or Storage Case	Putty, Wax, Polysiloxane	Neck Cord, Eartips
			Foam	Disposable	Earplug, Neck Cord	Polyurethane, PVC, Biobased polymers	N/A
	Electronic		Various Eartips	Reusable	Earplug, Interconnecting Functional Cord, Neck Cord, Eartips, Earplug encasing unit, Batteries (Disposable or Rechargeable), Charging cable and/or case, Stem	Thermoplastic elastomer (TPE), PVC, Rubber, ABS, Polycarbonate, PU Foam, Polysiloxane, Textile Cord PVC, Acrylic, POM Electronics: Copper, Silicon, Disposable or Rechargeable Batteries	Eartips, Batteries, Replacement Charging Cord, Charging Case, Neck Cord, Microphone Wind Shield, Cables
Earmuffs	Passive		Head Band	Reusable	Earcups, solid Headband, Storage Case or Bag	Cup: ABS, polypropylene, polyamide Liner: PU Foam, Polyethylene foam Cushion: PU Foam, PVC, TPU, Polysiloxane, PVC foam	Cushions, Earcups, Inserts, Headband
			Neck Band	Reusable	Earcups, solid Neckband, Head strap, Storage Case or Bag		Cushions, Earcups, Inserts, Head strap, Neckband
		On Head and/or Face Protection	Mounted	Reusable	Earcups, Standard Attachment Adapter, Storage Case or Bag		Cushions, Earcups, Inserts and Attachment Adapters

[11] Some of the components/accessories may not be applicable for the specific HPD covered by the EPD

[12] Some of the replaceable elements may not be applicable for the specific HPD covered by the EPD

						Headband: Stainless Steel, POM, PVC, TPE Head Strap: Fabric (e.g.: Cotton braided) and PVC Attachment Adapter: Acetal, polyamide	
	Electronic		Head Band	Reusable	Earcups, solid Headband, Batteries (Rechargeable or Alkaline), Charging Station, Charging cable, Standard Connecting Cables, Storage Case or Bag	Cup: ABS, polypropylene, polyamide Liner: PU Foam, Polyethylene foam Cushion: PU Foam, PVC, TPU, Polysiloxane, PVC foam Headband: Stainless Steel, POM, PVC, TPE Head Strap: PVC, Braided material Attachment Adapter: Acetal, polyamide Electronics: Silicon, Disposable or Rechargeable Batteries	Cushions and Inserts, Batteries, Microphones, Wind shields (for microphone), Charging Station, Charging Cables or Connecting Cables, Attachment Adapters
			Neck Band	Reusable	Earcups, solid Headband, Head strap, Batteries (Rechargeable or Alkaline), Charging Station, Charging cable, Standard Connecting Cables, Storage Case or Bag		
		On Head and/or Face Protection	Mounted	Reusable	Earcups, Standard Attachment Adapter, Batteries (Rechargeable or Alkaline), Charging Station, Charging cable, Standard Connecting Cables		

THE INTERNATIONAL EPD® SYSTEM

HEARING PROTECTION DEVICES