PRODUCT CATEGORY RULES (PCR)
DATE 2020-05-28

BASIC INORGANIC CHEMICALS NOT ELSEWHERE CLASSIFIED

PRODUCT CATEGORY CLASSIFICATION: UN CPC 342

2011:18
VERSION 2.12 2020-05-28

VALID UNTIL: 2021-03-01

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1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent information about the life cycle environmental impact for their goods or services.

The rules for the overall administration and operation of the programme are the General Programme Instructions, publicly available at www.environdec.com. A PCR complements the General Programme Instructions and the standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

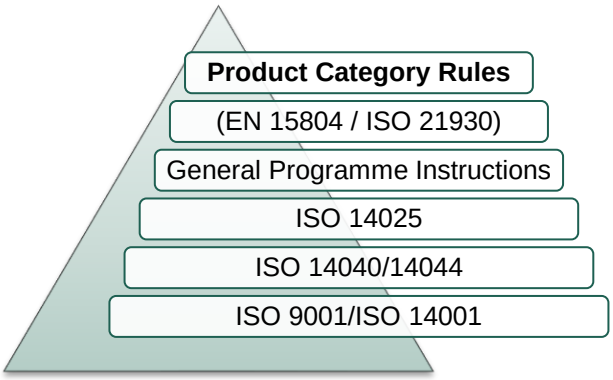

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible

For the definition of terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available via www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR document may be given via the PCR Forum at www.environdec.com or sent directly to the PCR moderator during its development or during the period of validity.

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

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update when necessary, and 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] Type III environmental declarations in the International EPD® System are referred to as EPD, Environmental Product Declarations.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Basic inorganic chemicals not elsewhere classified (n.e.c.)
Registration number and version:	2011:18, version 2.12
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR moderator:	*Currently no appointed PCR moderator. Please contact the Secretariat if you are interested in this role.*
PCR Committee:	AkzoNobel
Date of publication and last revision:	2020-05-28 (Version 2.11) Version 1.0 was published 2011-11-03. A version history is available in Section 7
Valid until:	2020-03-01
Schedule for renewal:	A PCR is valid for a pre-determined period of time 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 how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 3.0, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 34 Basic chemicals, version 3.01, dated 2018-11-06
PCR language(s):	This PCR was developed and is available in English. In case of translated versions the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Basic inorganic chemicals n.e.c. and the declaration of this performance by an EPD.

The product group refers to a subgroup of the larger chemical group inorganic chemicals, as defined by UN CPC group 342 and underlying classes and subclasses:

- Division: 34 - Basic chemicals
  - **Group: 342 - Basic inorganic chemicals (this PCR)**
    - Class 3421 - Hydrogen, nitrogen, oxygen, carbon dioxide and rare gases; inorganic oxygen compounds of non-metals n.e.c.
    - Class 3422 - Zinc oxide; zinc peroxide; chromium oxides and hydroxides; manganese oxides; iron oxides and hydroxides; earth colours; cobalt oxides and hydroxides; titanium oxides; lead oxides; red lead and orange lead; inorganic bases n.e.c.; metal oxides, hydroxides and peroxides n.e.c., except of mercury
    - Class 3423 - Chemical elements n.e.c.; inorganic acids; inorganic oxygen compounds of boron, silicon and carbon; halogen or sulphur compounds of non-metals; sodium hydroxide; hydroxide and peroxide of magnesium; oxides, hydroxides and peroxides of strontium or barium; aluminium hydroxide; hydrozine and hydroxylamine and their inorganic salts
    - Class 3424 - Phosphates of triammonium; salts and peroxysalts of inorganic acids and metals n.e.c.
    - Class 3425 - Salts of oxometallic or peroxometallic acids; colloidal precious metals and compounds thereof; inorganic and organic compounds of mercury; other inorganic chemicals n.e.c.; compressed air; amalgams
    - Class 3426 - Isotopes n.e.c. and compounds thereof (including heavy water)
    - Class 3427 - Cyanides, cyanide oxides and complex cyanides; fulminates, cyanates and thiocyanates; silicates; borates; perborates
    - Class 3428 - Hydrogen peroxide; phosphides; carbides; hydrides, nitrides, azides, silicides and borides

There are many more inorganic chemicals than listed above and inorganic chemicals not falling under any of the above CPC codes is not included in this product group but may fall under a different CPC division 34 CPC code or a different CPC division and are hence covered by a different PCR. The product group does e.g. not include products falling under CPC division 33: Coke oven products; refined petroleum products; nuclear fuel.

The product may be a pure basic inorganic chemical or a mixture of several of the basic inorganic chemicals listed above. The product may also be basic inorganic chemical(s) diluted in a solvent, e.g. water.

Basic inorganic chemicals produced from renewable feedstocks are also included.

The product group and CPC code shall be specified in the EPD.

Additional information can be seen at *http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25.*

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid from its registration and publication at www.environdec.com and for a five year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

During the validity period surveillance follow up shall be agreed with the verifier in order to evaluate if the content is still consistent with the current situation. It is not necessary to perform a full LCA, only the monitoring of main parameters is requested. The surveillance verification could be organised as documental check aimed to the evaluation of the main environmental aspects relevant for the LCA calculation.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

- an increase of 10% or more of any of the indicators listed in Section 5.4.5.1,

- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD.

3 PCR REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the process described in the General Programme Instructions of the International EPD® System, including PCR review and open consultation.

3.1 PCR REVIEW

3.1.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee, and were excused from the review.
Chair of the PCR review:	Lars-Gunnar Lindfors
Review dates:	2016-03-14 until 2016-04-12

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

This PCR was available for open consultation from 2010-12-01 until 2011-02-11, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

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.

3.2.2 VERSION 2.0

This PCR was available for open consultation from 2015-06-18 until 2015-08-18, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

A total of 226 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.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs were considered in order to avoid overlaps in scope. The existence of such documents was checked in the public PCR listings of the following programmes based on ISO 14025 or similar:

- International EPD® System. www.environdec.com.

No existing PCRs with overlapping scope were identified

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed in order to enable publication of Environmental Product Declarations (EPD) for this product category based on ISO 14025, ISO 14040/14044 and other relevant standards to be used in different applications and target audiences.

3.5 UNDERLYING STUDIES

To be added in future updates to the PCR.

4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

4.1 FUNCTIONAL UNIT/DECLARED UNIT

The functional unit shall be 1 000 kg of packaged product ready for delivery.

The functional unit shall be declared in the EPD. The environmental impact shall be given per functional unit.

It is not mandatory to declare quantitative information in the downstream module; however if quantitative downstream data is included in the EPD for a specified application a second functional unit should be defined and an extended environmental declaration for that functional unit should be included.

4.2 REFERENCE SERVICE LIFE (RSL)

Not applicable for this product category.

4.3 SYSTEM BOUNDARY

The International EPD® System uses an approach where all attributional processes from “cradle to grave” should be included using the principle of “limited loss of information at the final product”. This is especially important in the case of business-to-consumer communication.

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

4.3.1 LIFE CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of products is divided into three different life cycle stages:

- Upstream processes (from cradle-to-gate);
- Core processes (from gate-to-gate)
- Downstream processes (from gate-to-grave)

In the EPD, the environmental performance associated with each of the three life-cycle stages above shall be reported separately. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.2.

The lifecycle of a chemical product encompasses the following main stages:

- Extraction of natural resources
- Transportation of natural resources
- Processing and refinement of natural resources into chemical intermediates
- Distribution of chemical intermediates
- Manufacturing of the chemical product
- Distribution of the chemical product
- Use of chemical product
- Disposal and waste treatment of chemical product (end of life management)

These stages can be sorted into upstream, core and downstream modules according to Figure 2. The core module is defined by the organizational boundaries of the manufacturing organization. The operational control approach as defined in The Greenhouse Gas Protocol[2] defines the organizational boundaries.

In the EPD, the environmental performance associated with each of the three modules shall be reported separately[3], however if found relevant information aggregated over life cycle stages or the entire lifecycle can also be included (e.g. aggregated over the first five stages listed above to reflect the cradle-to-gate environmental performance). Below it is explained in more detail which activities each module includes.

4.3.1.1. Upstream processes

The following attributional processes are part of the product system and classified as upstream processes:

- Extraction of non-renewable resources (e.g. operation of oil platforms and pipelines)
- Growing and harvesting of renewable resources (e.g. agricultural planting)
- Refining, transfer and storage of extracted or harvested resources into feedstock for production
- The production processes of energy wares used in the extraction and refinement
- All relevant transportation processes (transport of materials, fuels and products at all stages), including transportation of refined raw materials to warehouse/distribution platform. (Unless specific transportation data is known, the transportation distance shall be set to 500 km. Transportation modes shall be the ones typically deployed for the material,)
- The manufacturing of the primary and secondary packaging
- Treatment of waste generated by the upstream module

Upstream processes not listed 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. Core processes

The scope of the core module is defined by the organizational boundaries and includes all activities which the manufacturing organization is in control of, with the exception of the transportation to customer for which a standard scenario is deployed as defined below for the downstream module. The following attributional processes are part of the product system and classified as core processes:

- Transportation of raw materials from warehouses to the core process
- Impacts generated by the production of the fuels burned in the core process
- Impacts due to the electricity production according the proper energy mix hypotheses.
- Recycling of waste or secondary materials for use in production
- Treatment of relevant waste streams generated by processes within the system boundaries of core processes even if they are handled by third parties
- Storage

Manufacturing processes not listed may also be included. The production of the raw materials used for production of all product parts shall be included. A minimum of 99% of the total weight of the declared product including packaging shall be included.

The technical system shall not include:

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[2] The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard. Revised edition. First published in 2001 by the World Business Council for Sustainable Development and the World Resource Institute. Operational control: A company has operational control over an operation if the former or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation.

[3] Such data for certain very specialized manufacturing processes might be controversial because it may indicate confidential information that an organization do not want to make public, and if so this will be respected, and data may be presented in a more aggregated format.

- Manufacturing of production equipment, buildings and other capital goods.
- Business travel of personnel.
- Travel to and from work by personnel.
- Research and development activities.
- Energy use (heating and electricity) of office spaces.

For additional information about system boundaries concerning waste, etc., see the General Programme Instructions.

4.3.1.3. Downstream processes

The following attributional processes are part of the product system and classified as downstream processes:

- Transportation from final manufacturing to customer.
- Use phase and end-of-life of the components in the basic inorganic chemical product.
- End-of-life processes of packaging waste

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

Boundaries to nature are defined as flows of material and energy resources from nature into the system. Emissions to air, water and soil cross the system boundary when they are emitted from or leaving the product system.

Soil used for cultivation is considered to be part of the technical system. Pesticides applied in cultivation should be reported separately.

4.3.2.2. Geographical boundary

The data for the core module shall be representative for the actual production processes and representative for the site/region where the respective process is taking place.

In the case of processes performed in different countries, this should be clearly stated and the method used for calculating the average environmental impacts shall be explained in the LCA.

4.3.2.3. Boundaries in the life cycle

See Section 4.3.1. The EPD may present the information divided into additional sub-divisions.

4.3.2.4. Boundaries towards other technical systems

See Section 4.6.2.

4.4 SYSTEM DIAGRAM

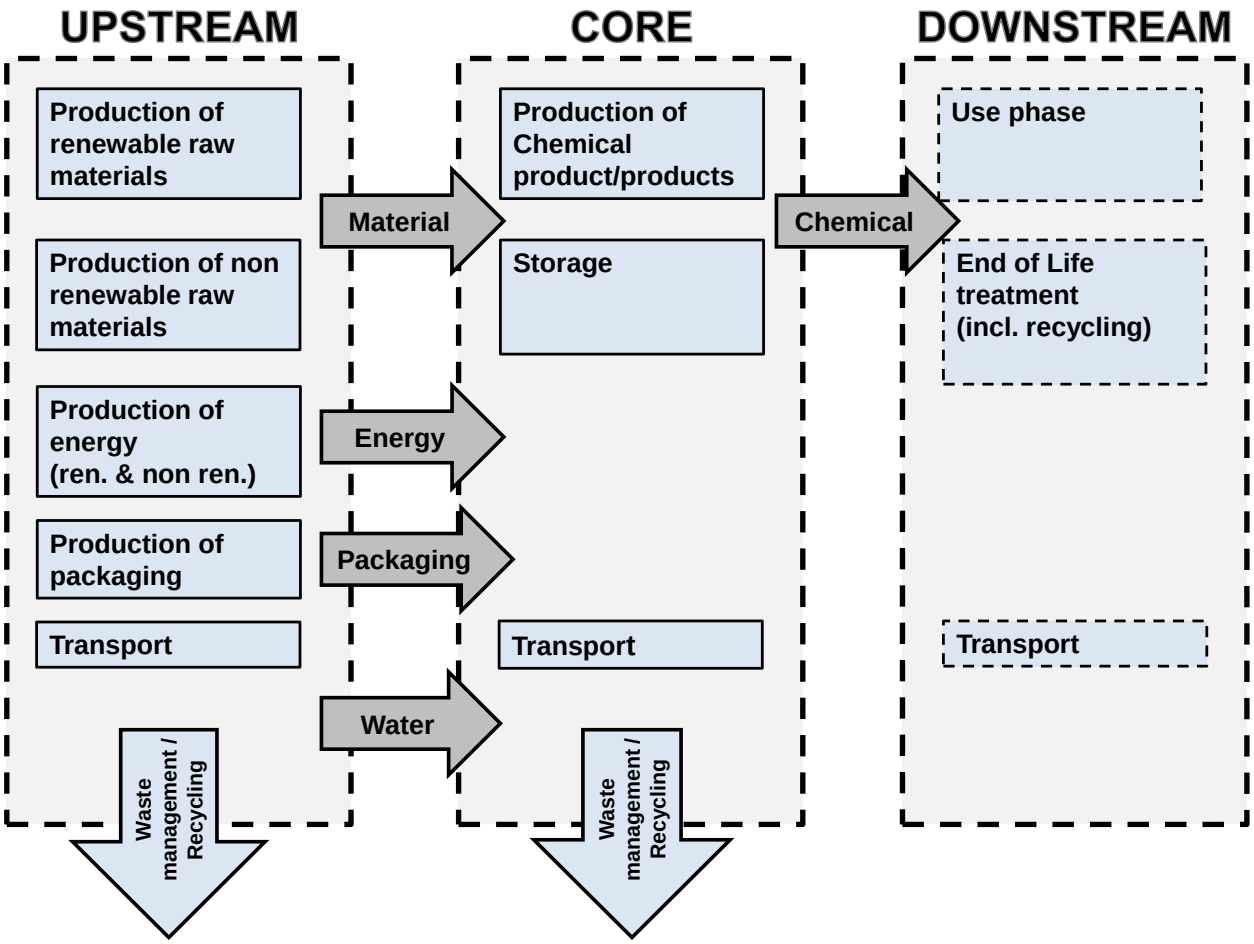

Figure 2 *System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.*The figure illustrates that all relevant unit processes taking place in the upstream-, core- and downstream processes shall be included. The arrows denote transportation and distribution processes. The dotted boxes for the use and end-of-life phases denote that no quantitative information needs to be included for these stages of the lifecycle. To identify the relevance of including upstream and downstream infrastructure the commonly defined cut-off rules shall be applied.

4.5 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in Section 4.3).

The check for cut-off rules in a satisfactory way is through the combination of expert judgment based on experience of similar product systems and a sensitivity analysis in which it is possible to understand how the un-investigated input or output could affect the final results.

4.6 ALLOCATION RULES

4.6.1 CO-PRODUCT ALLOCATION

The following step-wise procedure shall be applied for multifunctional products and multiproduct processes:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.

2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. Where physical relationships alone cannot be established or used as the basis for allocation (or they are too time consuming), the most suitable allocation procedure shall be used and documented.

Allocation of benefit and environmental burdens for combined heat and power (CHP) generation shall be made with the Alternative Generation Method, see Appendix1. The environmental burdens of combined heat and power generation are distributed between the two products – electricity and steam/hot water– in proportion to the fuel needed for separate electricity and heat generation, i.e. according to the best efficiency of each of the two processes with the same fuel. For calculation of the allocation factors see Appendix1.

The electricity used, internally, in the CHP shall also be split between the products according to the Alternative Generation Method, which means that the net electricity generation is calculated as the gross electricity generation minus the – to electricity allocated - portion of the internally used electricity.

4.6.2 REUSE, RECYCLING, AND RECOVERY

In the framework of the International EPD® System, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in the "earlier" life cycles. See General Programme Instruction for further information and examples.

4.7 DATA QUALITY REQUIREMENTS

An LCA calculation requires two different kinds of information:

- data related to the **environmental aspects** of the considered system (such materials or energy flows that enter the production system). These data usually come from the company that is performing the LCA calculation.
- data related to the **life cycle impacts** of the material or energy flows that enter the production system. These data usually come from databases.

Data on environmental aspects shall be as specific as possible and shall be representative of the studied process.

Data on the life cycle of materials or energy inputs are classified into three categories – specific data, selected generic data, and proxy data, defined as follows:

- **specific data** (also referred to as "primary data" or "site-specific data") – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under study, e.g. materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.,
- **generic data** (sometimes referred to as "secondary data"), divided into**:**
  - **selected generic data** – data from commonly available data sources (e.g. commercial databases and free databases) that fulfil prescribed data quality characteristics for precision, completeness, and,
  - **proxy data** – data from commonly available data sources (e.g. commercial databases and free databases) that do not fulfil all of the data quality characteristics of "selected generic data".

As a general rule, specific data shall always be used, if available, after performing a data quality assessment. It is mandatory to use specific data for the core processes as defined above. For the upstream processes, downstream processes, and infrastructure, generic data may also be used if specific data are not available.

Any data used should preferably represent average values for a specific reference year. However, the way these data are generated could vary, e.g. over time, and in such cases they should have the form of a representative annual average value for a specified reference period. Such deviations should be declared.

4.7.1 RULES FOR USING GENERIC DATA

The attributional LCA approach in the International EPD® System forms the basic prerequisites for selecting generic data. To allow the classification of generic data as "selected generic data", they shall fulfil selected prescribed characteristics for precision, completeness, and representativeness (temporal, geographical, and technological), such as:

- the reference year must be as current as possible and preferably assessed to be representative for at least the validity period of the EPD,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of the impact categories, and
- the representativeness of the resulting inventory in the given temporal, technological, and geographical reference should, as a general principle, be better than ±5% of the environmental impact of fully representative data.

Section 4.8 provides a list of recommended databases/data sets to be used for generic data.

If selected generic data that meets the requirements of the International EPD® System are not available as the necessary input data, proxy data may be used and documented. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact from the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data for the environmental impacts.

4.8 RECOMMENDED DATABASES FOR GENERIC DATA

Table 1 lists recommended databases for generic data. Please note that this listing does not imply that other data that fulfil the data quality requirements may not be used and that data quality assessment shall also be performed for the data sets in the recommended database by an LCA practitioner.

PROCESS	GEOGRAPHICAL SCOPE	RECOMMENDED DATASET [4]	DATABASE
Miscellaneous	Global	-	Ecoinvent
Miscellaneous	Europe	-	(The Swiss centre for Life Cycle Inventories)
Packaging	Europe	-	European Reference Life Cycle Data System (ELCD)
Plastics	Europe	-	FEFCO
Miscellaneous	Global	-	Plastics Europe
Transports	Global	-	thinkstep

Table 1 Recommended databases for generic data.

To manage the quality of generic/secondary data, the data quality scoring system presented in the "Life Cycle Metrics for Chemical Products" (WBCSD Chemicals, 2014) may be used.

In addition the following applies to data quality upstream:

- Data referring to processes and activities upstream in the supply chain, over which an organisation has a direct management control, shall be specific and collected on site
- Transport of main materials along the supply-chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place is included in upstream and may be based on the actual transportation mode, distance from the supplier and vehicle load if available.

[4] Most relevant and updated dataset is recommended.

4.9 IMPACT CATEGORIES AND IMPACT ASSESSMENT

The EPD shall declare the default impact categories as described in the General Programme Instructions. The characterisation models and factors to use for the default impact categories are available on www.environdec.com and shall be updated on a regular basis based on the latest developments in LCA methodology and ensuring the market stability of EPDs. The source and version of the characterisation models and the factors used shall be reported in the EPD. Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

4.10 OTHER CALCULATION RULES AND SCENARIOS

4.10.1 UPSTREAM PROCESSES

The following requirements apply to the upstream processes:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- The transport of main parts and components along the supply chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place based on the actual transportation mode, distance from the supplier, and vehicle load.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the upstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream processes:

    1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[5]
    2. National residual electricity mix or residual electricity mix on the market
    3. National electricity production mix or electricity mix on the market.

    The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.
- Packaging: specific data shall be used for the consumer packaging production if it is under the direct control of the organization or if the environmental impact related to the consumer packaging production is more than 10% of the total product environmental indicators. In other cases, generic data may be used. When consumer packaging shows the organization's logo, the LCA report should report the exerted/non exerted direct control on the production of consumer packaging by the organization.

4.10.2 CORE PROCESSES

The following requirements apply to the core processes:

- Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- For the electricity used in the core processes, electricity production impacts shall be accounted for in this priority:

    1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[6]

[5] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

2. National residual electricity mix or residual electricity mix on the market
3. National electricity production mix or electricity mix on the market.

The mix of electricity used in the core processes shall be documented in the EPD, where relevant.

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.10.3 DOWNSTREAM PROCESSES

It is not mandatory to declare any quantitative information about the use and end-of-life phases[7]. However a short description of the main applications and associated disposal scenarios should be declared together with a qualitative description of key environmental aspects associated with the use and end-of-life fate of all components of the basic inorganic chemical product. The carbon content of the product can be used to calculate climate impact at end of life.

As described in Section 4.1, if quantitative downstream data is included in the EPD for a specified application a second functional unit should be defined and an extended environmental declaration for that functional unit should be included.

The following applies if quantitative data for transportation downstream is included. Unless specific downstream transportation data is known, the transportation distance shall be set to 1000 km. Transportation modes shall be the ones typically deployed for the product.

If the product is used as input to a larger product system and has a significant impact on the environmental performance of this product system, this may also be described. Relevant quantitative information, such as downstream benefits, may be provided for the use and end-of-life phase, however, this optional information shall be reported separately from the mandatory downstream information (to make comparisons between EPDs possible). Recommendations for recycling of packaging materials shall be given, as well as recommendations for other waste treatment of product parts if relevant. The potential environmental impact and benefit of recycling and waste treatment may be presented in the EPD.

Scenarios for the end-of-life stage shall be technically and economically practicable and compliant with current regulations in the relevant geographical region based on the geographical scope of the EPD. Key assumptions regarding the end-of-life stage scenario shall be documented.

5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available via www.environdec.com

As a general rule the EPD content:

- shall be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations - General principles),
- shall be verifiable, accurate, relevant and not misleading, and
- shall not include rating, judgements or direct comparison with other products.

An EPD should be made with a reasonable number of pages for the intended audience and use.

[6] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

[7] Most basic inorganic chemical products have many different applications and are often used as input materials to other production processes. Typically it is difficult to allocate an environmental burden from the use phase to the chemical input. Also the end-of-life management depends on the application and location of the use and disposal of the chemical. Furthermore the chemical may be used in a conversion process in which part of the chemical is incorporated in a new product and part of the chemical is disposed of as waste or as an emission.

5.1 EPD LANGUAGES

EPDs should be published in English, but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and thus subject to the same verification procedure.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
- Three significant figures[8] should be adopted for all results, The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.
- The result tables shall:
  - Only contain values or the letters “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.[9]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).
  - Use the value 0 only for parameters that have been calculated to be zero.
  - Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains, wildlife that are not related to the declared product should therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

[8] Significant figures are those digits that carry meaning contributing to its precision. For example with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as $1.2*10^2$ and $1.2*10^{-2}$.

[9] This requirement does not intend to give guidance on what indicators are mandated (“shall”) or voluntary.

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section 5.4.4)
- Environmental performance (see Section 5.4.5)
- Additional environmental information (see Section 5.4.6)
- References (see Section 5.4.9)

The following information shall be included, when applicable:

- Information related to Sector EPDs (see Section 5.4.7)
- Differences versus previous versions (see Section 5.4.8)
- Executive summary in English (see Section 5.4.10)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image,
- Name and logotype of EPD owner,
- The text “Environmental Product Declaration” and/or “EPD”
- *Programme: The International EPD® System, www.environdec.com,*
- *Programme operator: EPD International AB*
- Logotype of the International EPD® System,
- EPD registration number as issued by the programme operator[10],
- *Date of publication (issue): 20XX-YY-ZZ,*
- *Date of revision: 20XX-YY-ZZ*, when applicable,
- *Date of validity; 20XX-YY-ZZ*
- A note that “*An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*.”
- A statement of conformity with ISO 14025,

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following mandatory statement from ISO 14025: “*EPDs within the same product category but from different programmes may not be comparable*.”
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[11] and reference PCR in a table with the following format and contents:

[10] The EPD shall not include a “registration number” if such is provided by the certification body, as this may be confused with the registration number issued by the programme operator.

Product category rules (PCR): Basic Inorganic Chemicals nec, Version 2.1, UN CPC 342.
PCR review was conducted by: *<name and organisation of the review chair, and information on how to contact the chair through the programme operator>*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification
Third party verifier: *<name, organisation and signature of the third party verifier>* *In case of certification bodies:* Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☐ No

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Address and contact information to EPD owner,
- Description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- Name and location of production site,
- Product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- Identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),
  - Classification of Products by Activity (NACE/CPA) or
  - Australian and New Zealand Standard Industrial Classification (ANZSIC),
- Description of the product, its application/intended use and technical functions, e.g. expected service life time,
- Geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- Functional unit or declared unit,
- Reference service life (RSL), if applicable,
- Declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- Reference to the main database(s) for generic data and LCA software used, if relevant,
- System diagram of the processes included in the LCA, divided into the life cycle stages,

[11] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

- Description if the EPD system boundary is “cradle-to-gate”, “cradle-to-gate with options” or “cradle-to-grave”,
- Information on which life cycle stages are not considered (if any), with a justification of the omission,
- Relevant websites for more information or explanatory materials.
- Eco-labelling, e.g. ISO Type I.

If the EPD represents a product group or product(s) from several manufacturing sites, this should be clearly stated and the method used for calculating the average environmental impacts shall be explained.

This section may also include:

- Name and contact information of organisation carrying out the underlying LCA study,
- Additional information about the underlying LCA-based information, such as assumptions, cut-off rules, data quality and allocation.
- Specific aspects regarding the production
- Environmental policy

5.4.4 CONTENT DECLARATION

The gross weight/volume of material shall be declared in the EPD at a minimum of 99 % of one product unit[12]. The product components shall be declared by IUPAC[13] names, CAS numbers and GHS phrases[14] (if applicable)[15].An exception to the 99% rule is that all materials/substances hazardous to health and the environment, being carcinogenic, mutagenic or toxic to reproduction (CMR), allergic, PBT[16] or vPvB[17] shall be listed as such. Even if a substance does not have a classification, but is suspected to fall under any of these categories, it shall be listed as well.

Information on the hazardous properties of materials and chemical substances should follow the requirements given in the latest revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)[18], issued by United Nations or national or regional applications of the GHS.

As an example, the following regulations should be used for EPDs intended to be used in the European Union:

- Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures

5.4.4.1. Information about recycled materials

Not relevant for this product category.

5.4.4.2. Information about packaging

As packaging is strongly connected with the product, the producer shall provide information about packaging in the EPD, when applicable. Packaging may be classified as:

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[12] If the applicant considers such information to be confidential business information, generic material names or chemical family name may be provided

[13] International Union of Pure and Applied Chemistry

[14] Globally Harmonized System of Classification and Labelling of Chemicals

[15] Other standards may be used that allow unequivocally identifying the product. If the applicant considers such information to be confidential business information, generic product name or chemical family name may be provided.

[16] Persistent, bioaccumulative and toxic

[17] Very persistent and very bioaccumulative

[18] The GHS document is available on www.unece.org.

- Distribution Packaging: packaging designed to contain one or more articles or packages, or bulk materials, for the purposes of transport, handling and/or distribution (ISO 21067-1:2016, Par. 2.2.6)
- Consumer Packaging: packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail (ISO 21067-1:2016, Par. 2.2.7).

Consumer packaging is generally the outcome of eco-design processes, or other activities, under direct control of the organisation. Many critical categories with strict legal requirements belong to consumer packaging category like food contact packaging and pharmaceutical packaging.

The type and function of packaging shall be reported in the EPD.

A statement of the source of the materials (pre-consumer or post-consumer) shall be presented in the EPD when the packaging is made in whole or in part by recycled materials.

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The indicators related to potential environmental impact listed in Table 2 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER		UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.				
	Biogenic	kg CO_2 eq.				
	Land use and land transformation	kg CO_2 eq.				
	TOTAL	kg CO_2 eq.				
Acidification potential (AP)		kg SO_2 eq.				
Eutrophication potential (EP)		kg PO_4^{3-} eq.				
Formation potential of tropospheric ozone (POCP) [19]		kg C_2H_4 eq. and SO_2 eq				
Abiotic depletion potential – Elements		kg Sb eq.				
Abiotic depletion potential – Fossil fuels		MJ, net calorific value				
Water scarcity potential		m^3 eq.				

Table 2 Indicators describing potential environmental impacts[20].

Notes:

- Abiotic depletion potential is calculated and displayed as two separate indicators. ADP-fossil fuels include all fossil resources, while ADP-elements include all non-renewable material resources.
- Please check www.environdec.com for the latest list of default impact categories, units and characterisation factors as they may have been updated compared to this table.

[19] Emissions of gases that contribute to the creation of ground level ozone (expressed as the sum of ozone-creating potential, POCP), in C2H4 (ethylene) equivalents. Two models, namely POCP (high NOx) CML 2001 Baseline, version April 2013 , and LOTOS-EUROS model (kg ethylene-eq) shall be used.

[20] Please check www.environdec.com for the latest list of default impact categories, units and characterisation factors as they may have been updated compared to this table.

5.4.5.2. Use of resources

The indicators for resource use based on the life cycle inventory (LCI) listed in Table 3 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER		UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Secondary material		kg				
Renewable secondary fuels		MJ, net calorific value				
Non-renewable secondary fuels		MJ, net calorific value				
Net use of fresh water		m^3				

Table 3 Indicators describing use of primary and secondary resources.

Notes:

- In order to identify the primary energy used as an energy carrier (and not used as raw materials), the parameter may be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.
- Energy content of biomass used for feed or food purposes shall not be considered.
- The net use of fresh water does not constitute a “water footprint” as potential environmental impacts due to the water use in different geographical locations is not captured. For this indicator:
  - Evaporation, transpiration, product integration, release into different drainage basins or the sea, displacement of water from one water resource type to another water resource type within a drainage basin (e.g. from groundwater to surface water) is included.
  - In-stream water use is not included.
  - For water used in closed loop processes (such as cooling system) and in power generation only the net water consumption (such as reintegration of water losses) should be considered.
  - Seawater shall not be included
  - Tap water or treated water (e.g. from a water treatment plant), or wastewater that is not directly released in the environment (e.g. sent to a wastewater treatment plant) are not elementary water flows, but intermediate flows from a process within the technosphere.
  - Additional transparency in terms of geographical location, type of water resource (e.g. groundwater, surface water), water quality and temporal aspects may be included as additional information.

5.4.5.3. Waste production and output flows

The calculation of the environmental impacts due to the management of the product and its packaging at the end of the useful life could be quite variable depending mainly on the destination of the product (if it is B2B or B2C) and on the waste treatments chains available where the product and or the packaging have to disposed. For these reasons, the end of life could be evaluated using the scenario approach showing the results for different possible options.

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the General Programme Instructions. When the amount of waste or the output flows is from the life cycle inventory (LCI) are declared, the indicators in Table 4 and Table 5 shall be reported per functional unit or declared unit, and per life cycle stage.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Hazardous waste disposed	kg				
Non-hazardous waste disposed	kg				
Radioactive waste disposed	kg				

Table 4 Indicators describing waste production.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for reuse	kg				
Material for recycling	kg				
Materials for energy recovery	kg				
Exported energy, electricity	MJ				
Exported energy, thermal	MJ				

Table 5 Indicators describing output flows.

Notes:

- The parameters are calculated on the gross amounts leaving the system boundary of the product system in the LCI. If e.g. there is no gross amount of “exported energy, electricity” leaving the system boundary, this indicator is set to zero,
- The parameter “Materials for energy recovery” does not include materials for waste incineration. Waste incineration is a method of waste processing, when R1<60% (European Guideline on R1 energy interpretation), and is allocated within the system boundary.
- In case there are never any flows of these types leaving the system boundary for a product category, the indicators may be removed by the PCR.

5.4.5.4. Other environmental indicators

Human toxicity and ecotoxicity. USEtox **may** be used (CTUh and CTHe).

Any other important environmental indicators related to the chemical product should be listed in the EPD. Examples of additional indicators can be found in the “Life Cycle Metrics for Chemical Products” (WBCSD Chemicals, 2014).

Other environmental indicators shall be based on international standards or similar methodologies developed in a transparent procedure. Reference to the chosen indictors and methodologies shall be reported.

In the EPD it shall be declared that information about other emissions, or other environmental aspects, can be retrieved from the company that has performed the LCA.

5.4.6 ADDITIONAL INFORMATION

If biotic matter is used as feedstock (i.e. ends up in the chemical), information regarding the typical crop shall be included. If this information is not known, this shall be stated and explained in the EPD. The typical location of the growing of the crop may also be provided in the EPD.

Additional information related to environmental and health issues other than derived from LCA may be optionally provided, e.g. information regarding biodegradability or biodiversity issues.

Material Safety Data Sheet (MSDS) information may be used as a basis for risk communication.

5.4.7 INFORMATION RELATED TO SECTOR EPDS

For sector EPDs, the following information shall also be included:

- a list of the contributing manufacturers that the Sector EPD covers,
- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market.

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall also be included:

- a description of the differences versus previously published versions, e.g. a description of the percentage change in results and the main reason for the change;
- a revision date on the cover page

5.4.9 REFERENCES

This section shall include a list of references, including the General Programme Instructions (including version number), standards and PCR (registration number, name and version). The source and version of the characterisation models and the factors used shall be reported in the EPD.

- The underlying LCA
- The name, CPC code and version number of the PCR used
- Other documents that verify and complement the EPD®
- Instruction for recycling, if relevant
- The General Programme instructions of the International EPD® System

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

For EPDs published in another language than English, an executive summary in English shall be included.

The executive summary should contain relevant summarised information related to the programme, product, environmental performance, additional information, information related to sector EPDs, references and differences versus previous versions.

6 GLOSSARY

AP	The Acidification Potential is an index for the emissions of acid-forming substances whereby the acidification of soil and water results through the forming of acids by oxygen. The unit is indicated in SO2 equivalents.
CO_2	Carbon dioxide
CPC	Central product classification
EP	The Eutrophication Potential is an index which describes the enrichment of nutrients in soil and water; thus it is an indicator of overfertilization. The unit is indicated in PO4 3 equivalents.
EPD	Environmental product declaration
GWP100	The Global Warming Potential is an index for the calculation of the anthropogenic part of the global greenhouse effect. The unit is indicated in kg CO_2 equivalents. Due to the fact that gases only stay for a time in the atmosphere, the GWP is calculated for a period of 100 years.
ISO	International Organization for Standardization
kg	kilogram
LCA	Life cycle assessment
ODP	The **Ozone Depletion Potential** evaluates the reduction of the ozone layer through anthropogenic emissions. The unit of the index is indicated in R11 equivalents (CCl3F-eq. = trichlorofluoromethane equivalents).
PCR	Product Category Rules
POCP	The Photochemical Ozone Creation Potential is an index for ozone creation in the troposphere (summer smog). The unit is indicated in ethene equivalents.
SI	The International System of Units
SO_2	Sulphur dioxide
UN	United Nations

7 REFERENCES

CEN (2013), EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com

Goedkoop, M., Heijungs, R., Huijbregts, M.A.J., De Schryver, A., Struijs, J., Van Zelm, R. (2009): ReCiPe 2008 A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level. Report I: Characterisation factors, first edition. 6 January 2009, http://www.lcia-recipe.net.

Guinée, J.B.; Gorrée, M.; Heijungs, R.; Huppes, G.; Kleijn, R.; Koning, A. de; Oers, L. van; Wegener Sleeswijk, A.; Suh, S.; Udo de Haes, H.A.; Bruijn, H. de; Duin, R. van; Huijbregts, M.A.J. Handbook on life cycle assessment. Operational guide to the ISO standards. I: LCA in perspective. IIa: Guide. IIb: Operational annex. III: Scientific background. Kluwer Academic Publishers, ISBN 1-4020-0228-9, Dordrecht, 2002, 692 pp.

ISO (2000), ISO 14020:2000, Environmental labels and declarations – General principles

ISO (2004), ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times

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 (2013), ISO/TS 14067:2013, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication

ISO (2014), ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines

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

PCR 0708, v3.0: Electricity, steam and hot/cold water generation and distribution

WBCSD Chemicals (2014). Life Cycle Metrics for Chemical Products. A guideline by the chemical sector to assess and report on the environmental footprint of products, based on life cycle assessment.

8 VERSION HISTORY OF PCR

VERSION 1.0, 2011-11-03

Original version.

VERSION 1.1, 2012-06-28

Minor editorial changes (Section 5 and Section 6.1 in version 1.0).

VERSION 2.0, 2016-05-02

- Compliance with General Programme Instructions, version 2.01
- Use of the latest template
- Updated validity
- Editorial changes
- Update of Figure 1
- Updates in line with the WBCSD Life Cycle Metrics for Chemical Products:
  Addition of impact categories_
  - Abiotic Depletion Potential (element) (expressed as kg antimony (Sb) equivalents) CML 2002
  - Resource depletion (fossil fuels). CML2002
  - Human toxicity and ecotoxicity. USEtox (CTUh and CTHe)
  - Additional impact assessment methods for POCP and EP.
- Update of Allocation section (Section 8.3), including allocation for CHP (Appendix 1)
- Update of generic data sources
- Addition of Appendix 2.

VERSION 2.01, 2016-05-11

Corrected cross-references in document.

VERSION 2.1, 2019-04-09

Updated in accordance with GPI 3.0 and new PCR basic module by the Secretariat.

VERSION 2.11, 2019-09-06

- Clarified terms of use
- Editorial changes

VERSION 2.12, 2020-05-28

- Updated validity of the PCR by the Secretariat in accordance with the General Programme Instructions version 3.0, Section 5.5.2.1. The development of a new PCR, on basic chemicals (covering inorganic as well organic chemicals), which will replace this PCR, is in progress.

APPENDIX 1 – ALLOCATION BY THE "ALTERNATIVE GENERATION METHOD"

This Appendix is from PCR0708, v3.0, and provides a description of the allocation method for the distribution of the environmental impact associated with the generation of electricity and heat in a combined heat and power plant. The facility parameters to be used for this allocation are also specified. The "efficiency method" is another name for the "alternative generation method", which is the method that WBCSD advice to use after system expansion has been applied to electricity sold to the grid "Life Cycle Metrics for Chemical Products" (WBCSD Chemicals, 2014).

DESCRIPTION OF THE "ALTERNATIVE GENERATION METHOD"

The Finnish District Heating Association originally developed this allocation method as a proposal for a new and uniform reporting method for European combined heat and power plant generation statistics. The method is still being discussed within Euroheat, Eurostat and Eurelectric. At present there is no uniform standard for the selection of facility parameters.

The method is available in different versions, with varying degrees of complexity of the calculation process. The simplest version is used in this application.

The allocation method is based on the fact that benefits gained from improved fuel utilisation as well as the environmental impacts connected to combined heat and power generation, are distributed between the two products – electricity and heat – in the same proportion as the fuel needed for separate electricity and heat generation processes. The relationship of distribution is expressed as percentage of the fuel needed for each alternative process with respect to the total quantity needed. The principle behind the allocation method is illustrated below:

EXAMPLE

Existing combined heat and power generation plant for which the allocation is to be made:
Electricity generation, net 30 units
Heat generation, net 60 units

Alternative generation facilities:
Heat generation $\eta_h = 90\%$ *(no flue gas condensation)*
Electricity generation $\eta_e = 40\%$

Fuel used by alternative electricity generation 30/0.4 = 75
Fuel used by alternative heat generation 60/0.9 = 67
Total fuel used by alternative generation 142

Allocate to electricity: 75/142 => 53%
Allocate to heat: 67/142 => 47%

Allocate total emissions and divide by the kWh produced of electricity and heat respectively to get specific emissions.

The choice of parameters for the alternative generation facilities has a direct impact on how the environmental impact is distributed. Various alternative approaches exist for the selection of facility data for alternative generation. The following principle shall apply to allocations upon which Environmental Product Declarations are to be based:

- Facility data for the best possible facility performance
- For the same type of technology and fuel as the facility studied.

In the case of co-combustion of several fuels in a facility, it is up to the author of the Life Cycle Assessment to select facility data and to provide justification for the allocation calculations.

BASIS FOR ALLOCATION – FACILITY PARAMETERS FOR ALTERNATIVE FACILITIES

Harmonised efficiency reference values for separate production of electricity and heat are found in Annex 4 of PCR0708, v3.0.

As a basic rule the average values 2006-2011 shall be used.

APPENDIX 2 – IMPACT ASSESSMENT MODELS

This PCR prescribes two different impact assessment models for the Eutrophication Potential (EP) and Photochemical Ozone Creation Potential (POCP) indicators. Below, the models are explained in more detail.

EP:

EP, CML Baseline, version April 2013

Eutrophication covers all potential impacts of excessively high environmental levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). Nutrient enrichment may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. It may also render surface waters unacceptable as a source of drinking water. The areas of protection are the natural environment, natural resources and the man-made environment. The unit of indicator result is kg (PO_4 eq). For characterisation factors, see table 4.3.11.1 in "LCA - An operational guide to the ISO-standards - Part 2b: Operational annex" (Guinée et al. final report, May 2001).

EUTREND model

The model measures the fraction of nutrients reaching freshwater end compartment or marine end compartment. It only considers P emissions in freshwater systems and N emissions in marine systems. The indicator units hence are kg P-eq for freshwater and kg N-eq for marine water. For characterisation factors, see Goedkoop et. al 2009.

POCP:

POCP (high NOx) CML 2001 Baseline, version April 2013

Photo-oxidant formation is the formation of reactive compounds such as ozone by the action of sunlight on certain primary air pollutants. These reactive compounds may be injurious to human health and ecosystems and may also damage crops. The relevant areas of protection are human health, the man-made environment, the natural environment and natural resources. For characterisation factors, see table 4.3.9.1 in "LCA - An operational guide to the ISO-standards - Part 2b: Operational annex" (Guinée et al. final report, May 2001).

The LOTOS-EUROS model

The Long Term Ozone Simulation (LOTOS) European Operational Smog (EUROS) model is a regional chemical transport model (CTM) designed for the assessment of gaseous and particulate air pollutants. The model is used for a wide range of scientific and regulatory supporting applications. LOTOS-EUROS is built, maintained, continuously improved by developers and researchers at TNO, RIVM, KNMI and PBL. The standard model resolution is approximately 25 x 25 km2 and the model offers the scope to zoom in on specific urban and industrial areas. The model makes the connection between emissions and the occurrence of concentrations and deposition. The result unit is kg ethylene-eq. Originally designed to investigate the atmospheric ozone circulation, today's LOTOS-EUROS:

- simulates air quality over regional and sub-regional scale;
- covers an extensive number of inert and chemically active constituents (ozone, NO2, inorganic and organic PM2.5/PM10 a.o.);
- includes data-assimilation (satellite data and ground measurements).

More information about the model can be found at http://www.lotos-euros.nl/.

