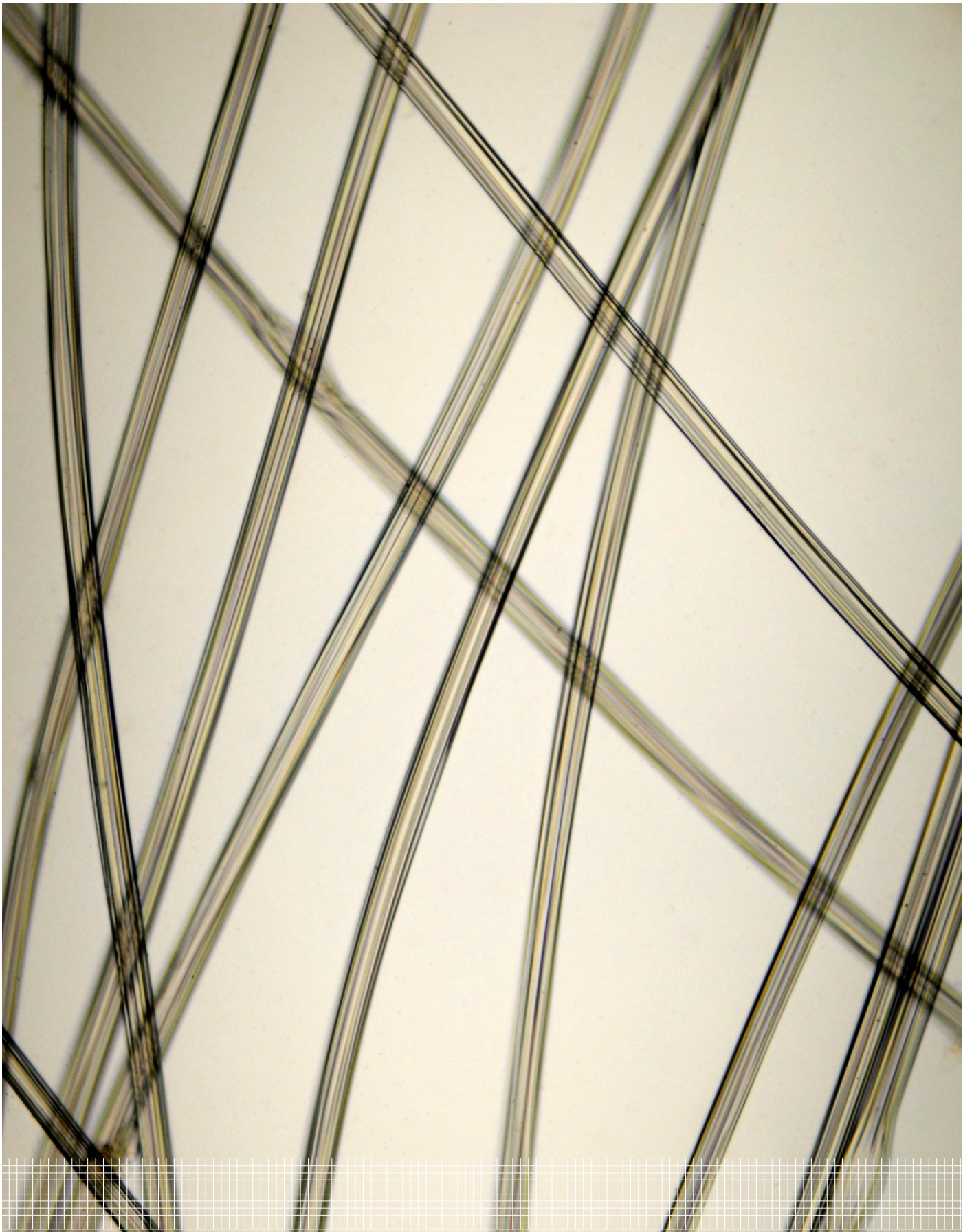
MAN-MADE FIBRES FOR TEXTILE SECTOR

PRODUCT CATEGORY CLASSIFICATION: UN CPC 262, 3551, 3554

PCR 2020:03
VERSION 1.0.3

VALID UNTIL: 2025-09-13



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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.

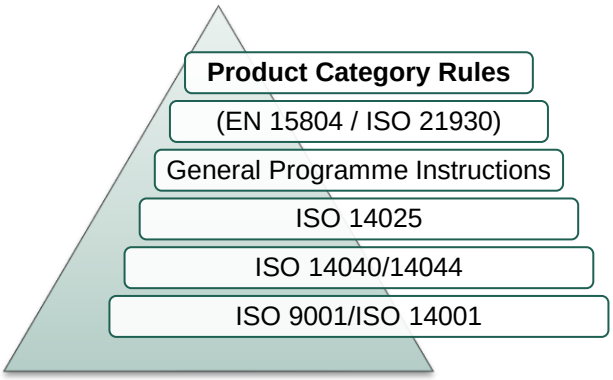

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

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:	Man-made fibres for textile sector
Registration number and version:	2020:03, Version 1.0.3
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:	Emre Can Çorumlu (ClimatePrime), ecorumlu@climateprime.com.tr
PCR Committee:	AKSA AKRİLİK KİMYA SANAYİİ A.Ş., SEMTRIO SUSTAINABILITY CONSULTING
Date of publication and last revision:	2025-04-11 (Version 1.0.3) The original version of the PCR was published 2020-05-13. A version history is available in Section 8.
Valid until:	2025-09-13
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 3.01, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 26 Yarn and thread, woven and tufted textile fabrics, 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 Man-made staple fibres, filaments and tows-tops processed for textile sector and the declaration of this performance by an EPD. The product category corresponds to UN CPC 262 Man-made textile staple fibres processed for spinning; UN CPC 3551 Synthetic filament tow and staple fibres, not carded or combed; UN CPC 3554 Artificial filament tow and staple fibres, not carded or combed.

The UN CPC classification of the product shall be presented in the EPD.

				CORRESPONDING		
GROUP	Class	Subclass	Description	HS 2007	CPC 2	ISIC 4
262			**Man-made textile staple fibres processed for spinning**			
	2621	26210	Synthetic staple fibres, carded, combed or otherwise processed for spinning	5506	26210	1311
	2622	26220	Artificial staple fibres, carded, combed or otherwise processed for spinning	5507	26220	1311
355			**Man-made fibres**			
	3551	35510	Synthetic filament tow and staple fibres, not carded or combed	5501, 5503	35510	2030
	3554	35540	Artificial filament tow and staple fibres, not carded or combed	5502, 5504	35540	2030

See, http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25 for additional information.

This PCR is intended to cover organic man-made (synthetic and/or artificial) staple fibres, filaments and tows-tops; processed and to be used for textile sector such as apparel, home textile and upholstery. Textile yarn or thread (CPC 264) or woven fabrics (CPC 265) regulation and filament yarns are not covered by this PCR. This PCR does not cover EN 15804 construction products' fibres (e.g. floor coverings) and other sectors' fibres (e.g. automotive).

The following product groups are covered: Textile fibres from synthetic polymers; Acrylic, Aramid, Chlorofibre, Elastane, Elastodiene, Elastolefin, Elastomultiester, Fluorofibre, Melamine, Modacrylic, Polyamide, Polyester, Polyethylene, Polyimide, Polylactide, Polypropylene, Vinylal. Textile fibres by transformation of natural polymers; Acetate, Algintate, Cupro, Elastodiene (rubber), Lyocell, Modal, Triacetate, Viscose.

For generic man-made fibre names and description please see ISO 2076:2013. For classification of man-made fibres given above please see ISO 11827:2012.

The EPD shall describe the considered product according to test methods given in Table 1 that is appropriate to the declared unit. A similar test may be used if the considered product does not comply with the test methods in Table 1. A description shall be provided in the EPD explaining/justifying the deviation.

PHYSICAL PROPERTIES	REFERENCE STANDARD
Count	ISO 2060 / TS 244 EN ISO 2060
Tenacity	ASTM D 1577-07, ISO 5079-1995
Density	ASTM D 3800-16
Elongation at break	ASTM D 1577-07, ISO 5079-1995
Moisture Regain (MR %)	BS EN ISO 3344:1997
Colour fastness	ISO 105
Weather fastness	ISO 105
Fibre length (if applicable)	ASTM D-1447

Table 1: Technology description.

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

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

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.

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:	Maurizio Fieschi
Review dates:	2020-01-07 until 2020-02-28

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

This PCR was available for open consultation from 2019-08-08 until 2019-10-08, 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. The following stakeholders provided comments during the open consultation, and agreed to be listed as contributors to the PCR and at www.environdec.com:

Contributors and comment providers during the open consultation:

Eva Martínez Herrero - Fundación Centro Tecnológico de Miranda de Ebro, CTME

Christian Schuster & Thomas Matiz - Lenzing AG

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.
- All programmes listed on www.environdec.com.

The following existing PCRs have been identified:

PCR NAME	PROGRAMME	REGISTRATION NUMBER	SCOPE
Artificial fibre textiles	Environment and Development Foundation (EDF)	Database does no longer appear to be maintained.	Database does no longer appear to be maintained.
Man-made fibres - synthetic	EPD International®	PCR 2013:03	Related PCR. No overlap in scope and the PCR has expired. This PCR is intended to be used for non-textile sector.

Textile yarn and thread of natural fibres, manmade filaments or staple fibres	EPD International®	PCR 2013:12	Related PCR but no overlap in scope. This PCR covers only textile yarn and thread, not fibres.

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

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

- Yacout, D. M. M., Abd El-Kawi, M.A., Hassouna, M.S., 2016. Cradle to gate environmental impact assessment of acrylic fibre manufacturing. The International Journal of Life Cycle Assessment, 21, p. 326–336.
- Shen, L., Worrell, E., Patel, M.K., 2010. Environmental impact assessment of man-made cellulose fibres. Resources, Conservation and Recycling, 55(2), p. 260–274.
- Muthu, S., 2015. Assessing the Environmental Impact of Textiles and the Clothing Supply Chain. Woodhead Publishing Series in Textiles: Number 157.
- Muthu, S., 2015. Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing. Cambridge: Woodhouse Publishing
- Beton, A., Dias, D., Farrant, L., Gibon, T., Le Guern, Y., Desaxce, M., Perwueltz, A., Boufateh, I., Wolf, O., Kougoulis, J., Cordella, M., Dodd, N., 2014. Environmental Improvement Potential of Textiles (IMPRO Textiles). Publications Office of the European Union, European Union, Luxembourg. https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/environmental-improvement-potential-textiles-impro-textiles.
- LCA studies conducted on acrylic fibre production at AKSA Akrilik manufacturing plant.

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 DECLARED UNIT

The declared unit is defined as 1 kg of fibres, packaged, leaving the factory gate.

The declared unit shall be stated in the EPD. The environmental impact shall be given per declared unit. A description of the function of the product should be included in the EPD®, if relevant.

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 4.3.1.1–4.3.1.3.

4.3.1.1. Upstream processes

The scope of the upstream processes is defined as production of the inputs (except electricity and fuels) to the core processes and other upstream activities which the manufacturing organization is not in control of over the supply chain (except production of electricity and fuels used in the core processes).

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

- Growing extraction or synthesis of the raw materials (e.g. pulp or petroleum)
- Production of polymers and monomers
- Production of main materials
- Production of electricity and fuels used in upstream processes
- Production of auxiliary products used such as detergents for cleaning, etc.
- Other ancillary materials (e.g. lubricants)
- Production of pigments and dyes used in the upstream and core processes
- Production of chemicals used in the upstream and core processes

- Manufacturing of primary and secondary packaging
- Plastic waste and scrap recovery/recycling processes
- End of life treatment of waste, if relevant
- Wastewater treatment, if relevant

Raw Materials entering the system shall be split into:

- Virgin raw materials
- Recycled raw materials

Secondary materials used in the production system shall be accounted adopting the following approach:

- The environmental impacts related to the “previous life cycle” shall not be considered.
- The processes needed to prepare a secondary material for new use shall be considered (see General Programme Instruction v.3.01, Annex A.7.2.1 for further information)

It is important to consider that internal scraps are not considered as secondary material. For additional clarifications about how to account internal recycling, please refer to ISO 14021.

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 processes is defined by the organizational boundaries and includes all activities which the manufacturing organization is in control of.

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

- External transportation to the core processes
- Manufacturing of the final product:
  - Polymerisation
  - Dope making
  - Filtration
  - Spinning (e.g. melt spinning, wet spinning, dry spinning, gel spinning)
  - Solvent recovery
  - Washing
  - Bleaching
  - Drying
  - Dyeing
- Quality control
- Maintenance (e.g. of the machines)
- Waste treatment of waste generated during manufacturing
- Production of electricity and fuels used in core processes
- Other processes related to energy use in the ancillary facilities; if applicable (e.g. water utilization, pressure air production in the unit processes, water and solvent recovery)
- Packaging of the finished product

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:

- Manufacturing of production equipment, buildings and other capital goods.
- Business travel of personnel.
- Travel to and from work by personnel.
- Research and development activities.

4.3.1.3. Downstream processes

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

- Transportation from preparation to an average retailer/distribution platform.

Recycling or handling of packaging waste/materials after use (see section 4.10.3),

The use stage / processing of fibre (yarn and thread manufacturing and weaving, knitting and crocheting based on the fibre) shall not be included.

For downstream processes that are not mandatory, the following processes may be considered and presented in the LCA report and in the EPD.

- The consumer use of the product; the EDP may contain information about the environmental impact related to the usage: washing, drying, ironing of the garment, home textile and upholstery fabric and/or product. The use scenarios shall be based on country and consumer specific data where the products are used in (see section 4.10.3),
- The product's end of life (see section 4.10.3),

4.3.2 OTHER BOUNDARY SETTING

Concerning time boundaries, the data shall be representative for the year/time frame for which the EPD is valid (maximum five years).

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.

4.3.2.2. Boundaries in the life cycle

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

4.3.2.3. Boundaries towards other technical systems

See Section 4.6.2.

4.4 SYSTEM DIAGRAM

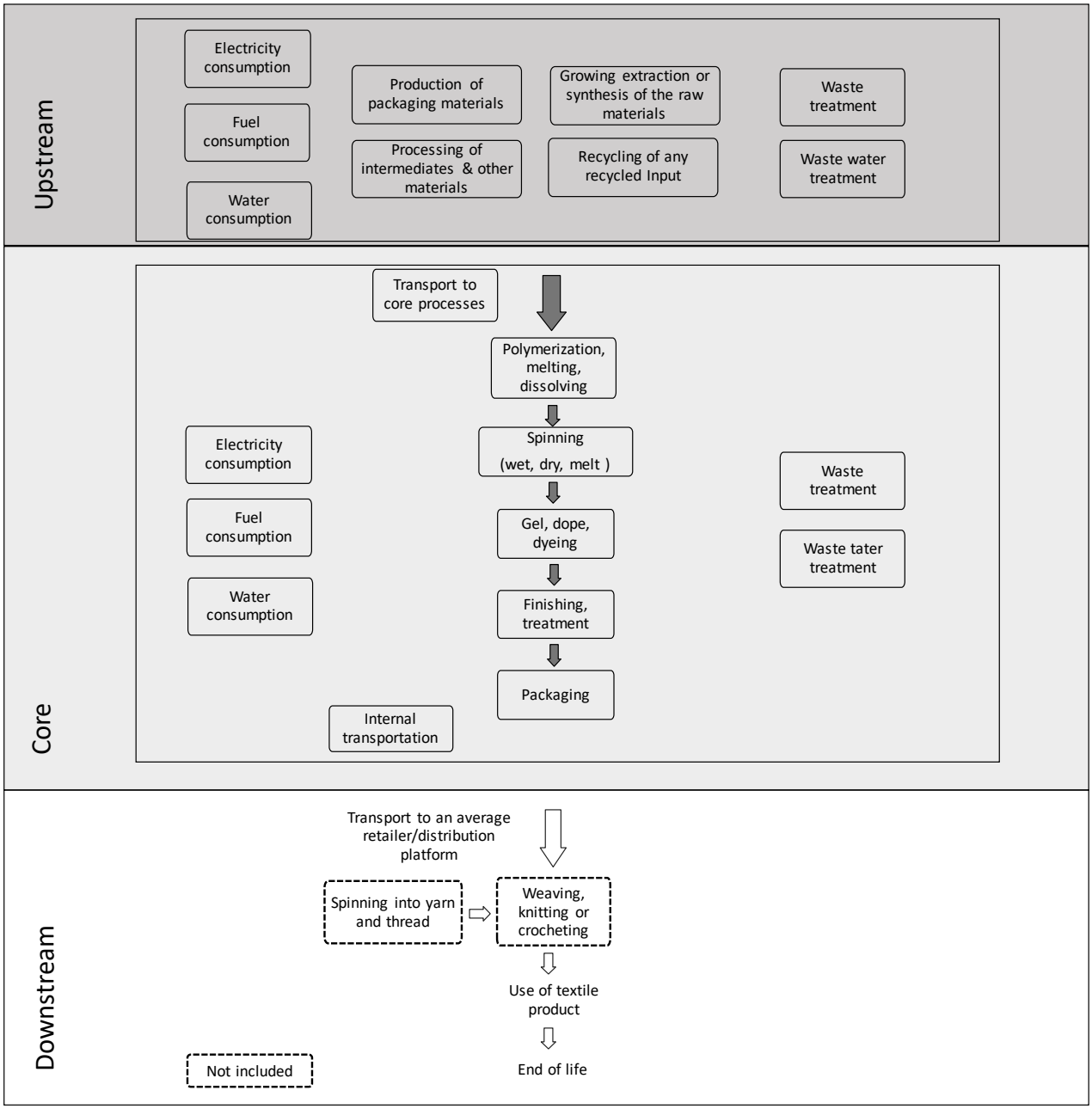

Figure 2 *System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.*

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), Table 1 shall be consulted for key processes. For processes not listed the most suitable allocation procedure shall be used and documented in the LCA report and in the EPD.

PROCESS	MAIN PRODUCT AND CO-PRODUCTS	ALLOCATION INSTRUCTION
Fibre Manufacturing	Fibre waste considered as by-product	Consult General Programme Instruction, Annex A.7.3, Figure 5
Viscose Manufacturing	Viscose and process-related co-products	If step 1 and 2 are not possible economic allocation may be used.
Pulp production facility with energy recovery from pulping process	Pulp & Co-products, and exported energy	The environmental burden related to the production of co-products (e.g. lignin products, acetic acid, xylose, furfural, etc.) shall be allocated based on the economic values.
Integrated pulp and fibre production facility with energy recovery from pulping process	Pulp & Co-products, partly used as fuels	In an integrated pulp and fibre production facility, biofuels, consisting of thick liquor and other biomass (e.g. bark), are recovered and combusted to fuel the pulp mill and the fibre plant. These biofuels shall be (virtually) subdivided between the pulp and fibre production modules. The environmental burden related to the production of these biofuels and other by-products not incinerated (e.g. lignin products, acetic acid, xylose, furfural, etc.) shall be allocated based on the economic values.
Water and Solvent Recovery	Water and Solvent	For water and solvent recovery process economic allocation shall not be used. Allocation problems for solvent and water recovery shall be solved by partitioning the system inputs and outputs using the mass criteria.
Combined heat and power (all technologies)	Electricity, heat, cooling	Alternative Generation Method. Consult PCR: Electricity, steam and district heating/cooling.

Table 1 Allocation procedure for key processes in the product system, if steps 1 and 2 are not possible.

Economic allocation shall be based on a minimum of three years of recent average prices. If economic allocation is conducted, a sensitivity analysis shall be carried out and the results shall be available to the verifier and shall be presented in the EPDs.

One-at-a-time (OAT) sensitivity analysis approach may be used as well as other sensitivity analysis approaches, when appropriate. - OAT sensitivity analysis approach determines how much an individual input parameter value needs to change, all other parameters held constant, in order for output parameter values to change by a certain percentage to see how much influence it has on the result. The result can be finalized once the change on the results between +/- 10%.

Ancillary activities (e.g. office or plant heating, lighting, etc.) shall be allocated to the overall service production. Environmental burden shall be allocated to the whole production based on the actual production. Any other allocation procedures based on physical or chemical characteristics must be specified in the EPD.

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 the General Programme Instructions 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.

Generic data should be used in cases in which they are representative for the purpose of the EPD, e.g. for bulk and raw materials on a spot market, if there is a lack of specific data on the final product or if a product consists of many components.

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/datasets 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.

4.7.2 RULES FOR USING SPECIFIC OR GENERIC DATA REGARDING TO MANUFACTURING OF CELLULOSIC FIBERS

The following data procedure shall be used for pulp production:

1. Specific data shall be obtained from the pulp manufacturer,
2. If no specific data is provided by the manufacturer, selected generic data can be used if only the generic data for the pulp is classified to use for cellulosic fibre manufacturing.
3. If no specific data or generic data is available, conservative assumptions should be made, i.e. one shall tend to overestimate (rather than underestimate) the environmental impacts. The assumptions shall be cross-checked by the supplier or relevant industrial experts. A sensitivity analysis shall be carried out to show a certain range of effects for assumptions made.

4.8 RECOMMENDED DATABASES FOR GENERIC DATA

All commercial or publicly available databases that meet the data quality requirements may be used. The specifications and the version of the database shall be reported in the EPD.

The EPD may include a data quality declaration to demonstrate how large share of the impact assessment results that specific data, selected generic data and proxy data contributes to, respectively.

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 at http://www.environdec.com/impact-categories 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.

The EPD shall also declare the below impact categories.

Mandatory impact categories not described in the General Programme Instructions:

- Ozone layer depletion (expressed as kg CFC-11 eq. (CML non-baseline may be used)).

Mandatory impact categories not described in the General Programme Instructions, only for man-made cellulosic fibres:

- Land use (expressed as m^2a crop eq. (ReCiPe 2016 Midpoint (H) may be used)).

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.[2]
    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.
- If selected generic data or proxy data is to be used in the upstream processes water scarcity indicator shall not be included in the upstream processes unless the water withdrawal is extrapolated for the specific geography in the dataset.

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.[3]
    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

The following requirements apply to the downstream processes:

[2] 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.

[3] 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.

- Data for the use stage are usually based on scenarios, but specific data should be used when available and relevant.
- Data on the pollutant emissions from the use stage should be based on documented tests, verified studies in conjunction with average or typical product use, or recommendations concerning suitable product use. Whenever applicable, test methods shall be internationally recognised.
- The use of electricity in the region/country where the product is used (as specified in the geographical scope of the EPD) shall be accounted for in the following priority:

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

  The mix of electricity used in the downstream processes shall be documented in the EPD, where relevant.
- The transport of the product to an average retailer/distribution platform may be documented in the EPD, which should reflect the actual situation to the best extent possible. The following priority should be used:

  1. Actual transportation distances and types.
  2. Calculated as the average distance of a product of that product type transported by different means of transport modes.
  3. Calculated as a fixed long transport, such as 1 000 km transport by lorry or 10 000 km by airplane, according to product type.
- 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.

  - The product's end of life: Product end of life scenarios should be based on the country specific waste treatment ratios. Landfill and incineration ratio should be taken into consideration per country where the products exported to. Benefits beyond the system boundary may be evaluated, if relevant; reuse and recycling of the fibres. The scenario and data sources should be reported in the EPD.
- The use stage / processing of fibre (yarn and thread manufacturing and weaving, knitting and crocheting based on the fibre) shall not be included in the EPD.
- The consumer use of the product: Country-specific consumer behaviours and transportation habits should be considered. The service life of the product, consumer water uses for washing, consumer wash frequency, washing water temperature, country specific electricity mix, drying techniques shall be specified in the EPD. Also, data sources regarding to country and customer behaviours and use patterns should be reported in the EPD.
- Recycling or handling of packaging waste/materials after use: Packaging materials and benefits beyond the system boundary may be evaluated. Country specific legislation regarding to packaging waste treatment should be used for developing the scenario. The scenario and data sources should be reported in the EPD.

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.

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[4] 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.[5]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).

[4] 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 $1.2*10^{-2}$.

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

- 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:

- 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[6],
- *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*.”

[6] 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.

- 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[7] and reference PCR in a table with the following format and contents:

Product category rules (PCR): *<name, registration number, version and UN CPC code(s)>*
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),

[7] 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.

- 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,
- 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,
- 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.

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.

5.4.4 CONTENT DECLARATION

The content declaration shall have the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of material shall be declared in the EPD at a minimum of 99 % of one unit of product.

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)[8], 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

		RECYCLED CONTENT [9],	
MATERIALS	% OF MATERIAL BY WEIGHT	% PRE-CONSUMER	% POST-CONSUMER
Main Materials (e.g. monomers, co-monomers, cellulose ester)			
Pigments and Dye Stuff			

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

[9] See Global Recycled Standard on https://textileexchange.org/wp-content/uploads/2017/06/Global-Recycled-Standard-v4.0.pdf

Other materials (e.g. finishing oil)			

Table 2 Materials content in the end product

It is not mandatory to declare any information regarding to mixtures, compositions and chemicals considered as 'Confidential Business Information' by the reporting company in the EPD. All those information shall be available to the verifier in the LCA report.

5.4.4.1. Information about recycled materials

When a product is made in whole or in part with recycled materials, the provenience of the materials (pre-consumer or post-consumer) shall be presented in the EPD as part of the content declaration.

To avoid any misunderstanding about which material may be considered "recycled material", the guidance given in ISO 14021 shall be taken into account. In brief, the standard states that:

- only pre-consumer or post-consumer materials (scraps) shall be considered in the accounting of the recycled materials, and
- materials coming from scrap reutilisation (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) shall not be considered as recycled content.

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:

- 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 shall be declared per declared unit, and per life cycle stage. The characterisation models and factors that shall be used for the mandatory impact categories according to the General Programme Instructions are available on www.environdec.com/impact-categories. Table 3 lists additional impact categories required by this PCR.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Ozone layer depletion	kg CFC-11 eq				
Land Use *(for cellulosic fibres only)*	m^2a crop eq				

Table 3 Indicators describing potential environmental impacts required in addition to the mandatory indicators of the General Programme Instructions.

5.4.5.2. Use of resources

The indicators for resource use based on the life cycle inventory (LCI) listed in Table 4 shall be declared per 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 4 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[10].
  - 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.

[10] It may be relevant to include seawater if it is used to obtain energy from it, or it is the only source of water in a definite site. This may be displayed separately, e.g. as “seawater for desalinization”.

5.4.5.3. Waste production and output flows

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 5 and Table 6 shall be reported per 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 5 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 6 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

The EPD may contain other environmental indicators to include for the products covered in the EPD from the inventory or impact assessment. Such indicators should be based on international standards or similar methodologies developed in a transparent procedure. References to the chosen indictors and methodologies shall be reported.

The following potential environmental impacts may be calculated and reported in the EPD®:

- Toxic emissions, Freshwater ecotoxicity (expressed as PAF.m3.day (USEtox 2 (recommended + interim) may be used),
- Human Toxicity cancer and non-cancer (expressed as cases (USEtox 2 (recommended + interim) may be used),
- Specific indicators for cellulosic fibres may be declared such as; Sulphur emissions according to a balance gap calculation; reference to criteria in "Changing Markets" roadmap (http://changingmarkets.org/wp-content/uploads/2018/03/Roadmap-towards-responsible-viscose-and-modal-fibre-manufacturing.pdf)

5.4.6 ADDITIONAL INFORMATION

An EPD may contain additional information not derived from the LCA-based calculations. The part of the EPD describing additional information may include various issues. Examples of these are:

- Toxic emissions may be reported in the EPD considering air, soil and water. Attention shall be paid to all materials/substances hazardous to health and the environment, being allergenic, carcinogenic, mutagenic or toxic to reproduction if present in such a

concentration in the product that it meets requirements for being subjects to labelling according to the legislation in force, such as REACH, or other private initiatives (e.g.: the ZDHC MRSL and PRSL guidance).

- instructions for proper use of the product, e.g. to minimise energy or water consumption or to improve the durability of the product,
- by-product generated by the production process, by specifying the quantity, the typology and the destination
- instructions for proper maintenance and service of the product,
- information on key parts of the product that determine its durability,
- information on recycling including, e.g. suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained,
- information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle,
- information regarding disposal of the product, or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts, and
- a more detailed description of an organisation's overall environmental management, such as:
  - the existence of a quality or environmental management system or any type of organised environmental activity,
  - any activity related to supply chain management, social responsibility, etc., and
  - information on where interested parties may find more details about the organisation's environmental work.

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

A list of references shall be included, including references to 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.

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.

MAN-MADE FIBRES FOR TEXTILE SECTOR
PRODUCT CATEGORY CLASSIFICATION: UN CPC 262, 3551, 3554

6 GLOSSARY

AP	Acidification potential
B2B	Business to business
C_2H_4	Ethene
CEN	European Committee for Standardization
CFC	Chlorofluorocarbons
CO_2	Carbon dioxide
CPC	Central product classification
EN	European norms
EP	Eutrophication potential
EPD	Environmental product declaration
GPI	General programme instructions
GWP	Global warming potential
ISO	International Organization for Standardization
kg	kilogram
LCA	Life cycle assessment
LCI	Life cycle inventory
MJ	Megajoules
MRSL	Manufacturing Restricted Substances List
NMVOC	Non-methane volatile organic compounds
OAT	One-at-a-time
PAF	Potentially affected fraction
PCR	Product Category Rules
PO_4^3	Phosphate
POFP	Photochemical oxidant formation potential
PRSL	Product Restricted Substances List
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
Sb	Antimony
SI	The International System of Units
SO_2	Sulphur dioxide
UN	United Nations
ZDHC	Zero Discharge of Hazardous Chemicals

7 REFERENCES

ASTM D1577 - 07(2018) - Standard Test Methods for Linear Density of Textile Fibers

ASTM D3800 - 16 - Standard Test Method for Density of High-Modulus Fibers

ASTM D1447 – 07 - Standard Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement

Beton, A., Dias, D., Farrant, L., Gibon, T., Le Guern, Y., Desaxce, M., Perwueltz, A., Boufateh, I., Wolf, O., Kougoulis, J., Cordella, M., Dodd, N., 2014. Environmental Improvement Potential of Textiles (IMPRO Textiles). Publications Office of the European Union, European Union, Luxembourg. https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/environmental-improvement-potential-textiles-impro-textiles.

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

Environment and Development Foundation (EDF) - http://www.edf.org.tw/English/index.asp

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

EPD International – PCR Man-made fibres - synthetic

EPD International – PCR Textile yarn and thread of natural fibres, manmade filaments or staple fibres

ISO (1994), ISO 2060:1994, Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method

ISO (1995) ISO 5079:1995, Textile fibres — Determination of breaking force and elongation at break of individual fibres

ISO (1997), ISO 3344:1997, Reinforcement products — Determination of moisture content

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 (2012), ISO/TR 11827:2012, Textiles — Composition testing — Identification of fibres

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

ISO (2013), ISO 2076:2013, Textiles — Man-made fibres — Generic names

ISO (2013), ISO 105-E01:2013, Textiles — Tests for colour fastness — Part E01: Colour fastness to waterISO (2014), ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines

ISO (2016), ISO 14021:2016, Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)

ISO (2016), ISO 21067-1:2016, Packaging — Vocabulary — Part 1: General terms

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

ISO (2017), ISO 105-B03:2017, Textiles — Tests for colour fastness — Part B03: Colour fastness to weathering: Outdoor exposure

Muthu, S., 2015. Assessing the Environmental Impact of Textiles and the Clothing Supply Chain. Woodhead Publishing Series in Textiles: Number 157.

Muthu, S., 2015. Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing. Cambridge: Woodhouse Publishing

Shen, L., Worrell, E., Patel, M.K., 2010. Environmental impact assessment of man-made cellulose fibres. Resources, Conservation and Recycling, 55(2), p. 260–274.

Yacout, D. M. M., Abd El-Kawi, M.A., Hassouna, M.S., 2016. Cradle to gate environmental impact assessment of acrylic fibre manufacturing. The International Journal of Life Cycle Assessment, 21, p. 326–336.

8 VERSION HISTORY OF PCR

VERSION 1.0, 2020-05-13

Original version of this PCR.

VERSION 1.0.1, 2024-01-29

Validity period updated with 10 months following the initiation of the development of a new PCR on fibres that will replace this PCR.

VERSION 1.0.2, 2025-01-24

An update with the following changes:

- New PCR Moderator appointed.
- Validity period updated with six more months following a delay in the development of the new PCR on fibres.

VERSION 1.0.3, 2025-04-11

- Updated with a new affiliation and contact information of the PCR Moderator.

MAN-MADE FIBRES FOR TEXTILE SECTOR
PRODUCT CATEGORY CLASSIFICATION: UN CPC 262, 3551, 3554