
**Sustainability in building construction —
Environmental declaration of building
products**

*Bâtiments et ouvrages construits — Développement durable dans la
construction — Déclaration environnementale des produits de
construction*



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

STANDARDSISO.COM : Click to view the full PDF of ISO 21930:2007



COPYRIGHT PROTECTED DOCUMENT

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	2
4 Units and abbreviated terms	4
4.1 Units	4
4.2 Abbreviated terms	4
5 General aspects of type III environmental product declarations (EPD) of building products.....	5
5.1 Objectives of EPD of building products	5
5.2 Involvement of interested parties	5
5.3 Responsibility for the EPD.....	5
5.4 Use of EPD of building products.....	6
5.5 Building products information modules	6
5.6 Comparability of EPD of building products	8
6 Methodological framework	8
6.1 General requirements.....	8
6.2 Product category rules (PCR).....	8
7 Reporting	14
7.1 General.....	14
7.2 Project report	15
7.3 Project documentation	15
7.4 Rules for data confidentiality	16
8 Content of the EPD	16
8.1 Declaration of general information	16
8.2 Declaration of environmental aspects.....	18
9 Verification	21
9.1 Review and verification procedures	21
Annex A (informative) Product chain of a building and information modules — Practical examples	22
Bibliography.....	26

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21930 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 17, *Sustainability in building construction*.

STANDARDSISO.COM : Click to view the full PDF of ISO 21930:2007

Introduction

Designers of buildings, manufacturers of building products, users of buildings, owners of buildings and others active in the building and construction sector are increasingly demanding information that enables them to make decisions to address environmental impacts of buildings and other construction works. These demands are currently being addressed only through various national initiatives applying a variety of approaches.

It is essential that there be uniformity in the means of expressing environmental product declarations. This includes having a consistent way of arriving at the declaration that is based on basic life-cycle inventory data and additional information not based on life-cycle assessment (LCA). The user expects non-biased information, which is expected to be consistent with the best current practice and understanding over the lifetime of the standard.

According to the set of four International Standards dealing with environmental labelling, (ISO 14020, ISO 14021, ISO 14024 and ISO 14025), environmental labels and declarations are divided into three principal types:

- General principles: ISO 14020;
- Self-declared environmental claims, type II environmental labelling (ISO 14021);
- Principles and procedures of environmental labels and declarations, types I and III environmental labelling (ISO 14024 and ISO 14025).

This International Standard is one in a suite of International Standards dealing with sustainability in building construction that includes the following:

- a) ISO 15392 Sustainability in building construction — General principles;
- b) ISO 21932 Buildings and constructed assets — Sustainability in building construction — Terminology;
- c) ISO/TS 21929-1 Sustainability in building construction — Sustainability indicators — Part 1: Framework for development of indicators for buildings;
- d) ISO 21930 Sustainability in building construction — Environmental declaration of building products;
- e) ISO/TS 21931-1 Sustainability in building construction — Framework for methods of assessment for environmental performance of construction works — Part 1: Buildings.

Unlike the International Standards listed in a), b), c) and e), ISO 21930 (this International Standard) deals only with environmental impacts and aspects and excludes consideration of the social and economic aspects of sustainability. The relationship among the International Standards is elaborated in Figure 1.

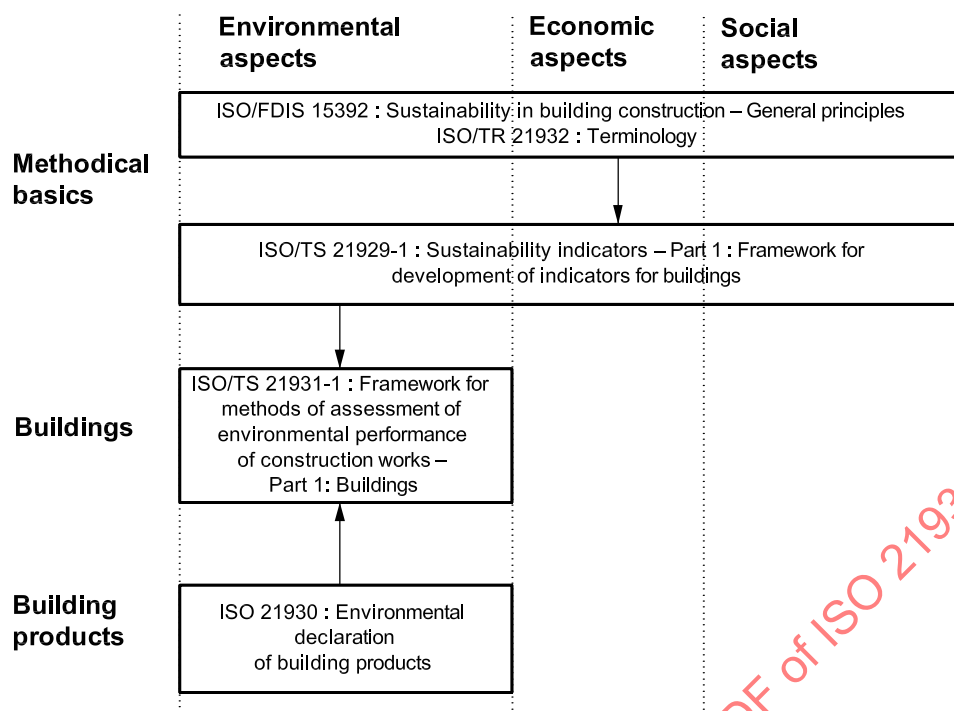


Figure 1 — Suite of related International Standards for sustainability in building construction and construction works

The purpose of this International Standard is to describe the principles and framework for environmental declaration of building products, including consideration of the reference service life of the building products, seen over a building's life cycle. This International Standard is expected to form the basis for type III environmental declaration programmes leading to type III environmental declarations of building products as described in ISO 14025.

Sustainability in building construction — Environmental declaration of building products

1 Scope

This International Standard provides the principles and requirements for type III environmental declarations (EPD) of building products.

This International Standard contains specifications and requirements for the EPD of building products. Where this International Standard contains more specific requirements, it complements ISO 14025 for the EPD of building products.

This International Standard provides a framework for and the basic requirements for product category rules (PCR) as defined in ISO 14025 for type III environmental declarations of building products. Type III environmental declarations for building products, as described in this International Standard, are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded.

This International Standard does not define requirements for developing type III environmental declaration programmes. Requirements for type III environmental declaration programmes are found in ISO 14025.

The working environment is not included in this International Standard because it is normally a subject for national legislation.

NOTE In this International Standard, EPD is an abbreviation used to represent both the single and plural full form designation of “environmental product declaration”, which is intended to be synonymous with the designation “type III environmental declaration”. In the practice of developing EPD, programmes or their declarations are referred to by various names such as eco-leaf, eco-profile, environmental declaration of product, environmental product declaration (EPD), and environmental profile.

2 Normative references

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

ISO 6707-1, *Building and civil engineering — Vocabulary — Part 1: General terms*

ISO 14001, *Environmental management systems — Requirements with guidance for use*

ISO 14020:2000, *Environmental labels and declarations — General principles*

ISO 14025:2006, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO 14050, *Environmental management — Vocabulary*

ISO 15392, *Sustainability in building construction — General principles*

ISO 15686-1, *Buildings and constructed assets — Service life planning — Part 1: General principles*

ISO 15686-8, *Buildings and constructed assets — Service life planning — Part 8: Reference service life and service-life estimation*

ISO/TS 21931-1, *Sustainability in building construction — Framework for methods of assessment for environmental performance of construction works — Part 1: Buildings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 14001, ISO 14025, ISO 14040 and ISO 14050, and the following apply.

NOTE The terms and definitions in ISO 21932, under preparation at the publication date of this International Standard, will apply when the document is available.

3.1
ancillary product
complementary product
building product (3.2) that enables another building product to fulfil its purpose in the intended application

EXAMPLE Fasteners used to attached structural panels to framing members.

3.2
building product
goods or services used during the life cycle of a building or other construction works

[Adapted from ISO 6707-1 and ISO 14021]

NOTE 1 In this International Standard, the term “product” used alone relates not only to goods or product systems but can also include service systems. In either case, the declaration is presented in a manner that clearly indicates whether the declaration applies to goods, or to only a part of the goods or packaging, or to an element of service. This is discussed in ISO 14025:2006, 7.2.2.

NOTE 2 The manufacturing or processing of goods used as building products can take place at the factory or on the construction site.

NOTE 3 The use of services can occur at any stage of the life cycle of the building or other construction works.

NOTE 4 It is possible to have an **EPD** (3.16) for a material, a building product, a component, an assembly and/or a building element. The EPD of a component, assembly or building element can incorporate the results of the EPD of all the assembled materials and building products. This is described in ISO 14025:2006, 5.4.

3.3
characterization factor
factor derived from a characterization model which is applied to convert an assigned life-cycle inventory analysis (LCI) result to the common unit of the category indicator

[Adapted from ISO 14044]

3.4
declared unit
quantity of a **building product** (3.2) for use as a reference unit in an **EPD** (3.16), based on LCA, for the expression of environmental information needed in **information modules** (3.7)

EXAMPLES Mass (kilogram), volume (cubic metre).

NOTE The declared unit is used where the function and the reference scenario for the whole life cycle, on the building level, cannot be stated.

3.5**functional unit**

quantified performance of a product system for a **building product** (3.2) for use as a reference unit in an **EPD** (3.16) based on **LCA**

[Adapted from ISO 14040]

3.6**gate**

point at which the **building product** (3.2) or material leaves the factory before it becomes an input into another manufacturing process or before it goes to the distributor, a factory or building site

3.7**information module**

compilation of data to be used as a basis for a **type III environmental declaration** (3.16), covering a unit process or a combination of unit processes that are part of the life cycle of a product

[ISO 14025]

3.8**non-renewable resource**

resource that exists in a fixed amount that cannot be replenished on a human time scale

3.9**PCR review**

process whereby a **third party** (3.15) verifies the **product category rules** (3.11)

[ISO 14025]

3.10**product category**

group of **building products** (3.2) that can fulfill equivalent functions

[Adapted from ISO 14025]

3.11**product category rules****PCR**

set of specific rules, requirements and guidelines for developing **type III environmental declarations** (3.16) for one or more **product categories** (3.10)

[ISO 14025]

3.12**reference service life**

service life of a **building product** (3.2) that is known or expected under a particular set, i.e., a reference set, of in-use conditions and that may form the basis of estimating the service life under other in-use conditions

[Adapted from ISO 15686-1]

NOTE The reference service life is applied in the **functional unit** (3.5)/**declared unit** (3.4).

3.13**renewable resource**

resource that is grown, naturally replenished or cleansed on a human time scale

EXAMPLES Trees in forests, grasses in grasslands and fertile soil.

NOTE A renewable resource is capable of being exhausted but can last indefinitely with proper stewardship.

3.14

secondary fuels

fuels or fuel products that are derived from primary fuels

EXAMPLES Gasoline, gasified coal and lubricants.

3.15

third party

person or body that is recognized as being independent of the parties involved with the issues in question

[ISO 14024]

NOTE "Parties involved" are usually supplier ("first party") and purchaser ("second party").

3.16

type III environmental declaration

environmental product declaration

EPD

environmental declaration providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information

NOTE 1 The predetermined parameters are based on ISO 14040 and ISO 14044.

NOTE 2 The additional environmental information may be quantitative or qualitative.

[ISO 14025]

3.17

waste

substances or objects which the holder intends or is required to dispose of

[ISO 14040]

NOTE The definition is taken from the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (22 March 1989) but is not confined in this International Standard to hazardous waste.

4 Units and abbreviated terms

4.1 Units

energy	mega joule or kilowatt hour
mass	tonne (metric ton) or kilogram or gram
surface	square metres
volume	cubic metres

4.2 Abbreviated terms

EPD	environmental product declaration
PCR	product category rules
LCA	life-cycle assessment

LCI	life-cycle inventory analysis
LCIA	life-cycle impact assessment

5 General aspects of type III environmental product declarations (EPD) of building products

5.1 Objectives of EPD of building products

The overall goal of environmental declarations is to encourage the demand for, and supply of, building products that cause less stress on the environment, through communication of verifiable and accurate information on environmental aspects of those building products that is not misleading, thereby stimulating the potential for market-driven, continuous environmental improvement.

This International Standard is provided to ensure the transparency of the methodology applied for developing the EPD for building products. The methodology should be consistent, scientifically robust and should ensure that all environmental impacts are completely accounted for without double counting.

In addition to the requirements of this International Standard, the principles and procedures set out in ISO 14025 and ISO 15392 shall apply. This International Standard contains additional specifications and requirements for the EPD of building products. Where this International Standard contains more specific requirements, it complements ISO 14025 for the EPD of building products. In addition, the environmental declaration principles as described in ISO 14020 apply.

The EPD of building products are intended to provide information for planning and assessing buildings. EPD can also be used by other interested parties, such as purchasers, architects, etc., to compare the environmental impacts of building products under certain conditions.

EPD are based on LCA, LCI and/or information modules. Relevant environmental aspects that have not been covered by LCA are addressed as additional environmental information; see 8.2.4.

5.2 Involvement of interested parties

The process of developing EPD should include an open, participatory consultation with interested parties. Reasonable efforts should be made to achieve a consensus throughout the process; see ISO 14020:2000, 4.9.1, Principle 8.

The interested parties for type III environmental declaration programmes may include, but are not limited to, material suppliers, manufacturers, trade associations, purchasers, users, consumers, non-governmental organizations, public agencies and, when relevant, independent parties and certification bodies.

“Open consultation” is strongly recommended, but does not necessarily imply a public consultation. The programme operator has a responsibility for ensuring that appropriate consultations take place to ensure credibility and transparency in the operation of the programme; see ISO 14025:2006, 6.5. Open consultation may include competitors of the organization(s) developing the programme or the PCR.

5.3 Responsibility for the EPD

The manufacturer, or group of manufacturers, of the building product is the sole owner of the data and takes liability and responsibility for the EPD of the building product, according to the PCR. Apart from these manufacturers, no one is authorized to declare the environmental performance of the building product.

The development of type III environmental declarations is voluntary and is based on the type III environmental declaration programme; see ISO 14025:2006, Clause 6.

5.4 Use of EPD of building products

The environmental information on building products is intended mainly for business-to-business communication and its prime purpose is to provide measurable and verifiable input for the assessment of the environmental performance of buildings. However, some EPD may be used in the business-to-consumer marketplace and the user of this International Standard shall follow the provisions of ISO 14025:2006, Clause 9.

The users of this International Standard are both the information providers and information users, including those setting up type III environmental declaration programmes.

5.5 Building product information modules

An EPD of a building product provides information for the assessment of the environmental performance of buildings; see ISO/TS 21931-1. The way in which this information can be used for such an assessment is to combine the environmental impacts of the individual life-cycle stages from materials, products, components or services; see ISO 14025:2006, 5.4 and 7.2.5.

In many cases, EPD are prepared for building products for which specific stages of the life cycle are not considered. This can be the case for building materials or components where multiple functions in a building are possible and, therefore, stages of use and disposal are not known.

Where appropriate and justified, the environmental impact of the building product may be given for any part of the life cycle, [e.g. only the production stage, “*cradle to gate*” or as a “*cradle to gate with option*”; see Figure 2)]. In this case, the EPD is not based on a LCA but on one or more information modules; see ISO 14025:2006, 5.4.

When the EPD includes only certain life-cycle stages, the EPD becomes an information module. In this case, the EPD is expressed per declared unit; see 6.2.4.

However, where the EPD includes all life-cycle stages, such as production, installation into the building, use and maintenance, replacements, demolition, recycling and disposal, the EPD is said to be “*cradle to grave*” and becomes an EPD of building products based on LCA. The material and energy flows for an EPD based on LCA are expressed per functional unit; see 6.2.3.

If the information modules considered in a type III environmental declaration do not cover the life cycle, then it shall be stated.

NOTE 1 A modular build-up of the information sets from the life-cycle stages can be envisaged from the data in the building chain. This reflects the fact that a building or any other construction works is the end product of a project-based process that encompasses the construction and assembly of building products and/or customised building elements from various industries. An EPD of construction materials or components can be considered as information modules of an EPD of the finished building product. An EPD of a finished building product can be based on, but is not limited to, the combination of these information modules in order to achieve a complete EPD.

NOTE 2 It is possible to have an EPD for a material, for a building product and for a component, an assembly and/or a building element. The EPD of a component, assembly or building element can incorporate the results of the EPD of all the assembled materials and building products. This is described in ISO 14025:2006, 5.4.

NOTE 3 Annex A gives a practical illustration of a typical product chain for a building, including materials, intermediate products and final products. Annex A also gives the example of a window, illustrating how information modules related to different materials and parts of a building product and different stages of the life cycle can be combined in order to obtain the information for a product system for which LCA results can be determined.

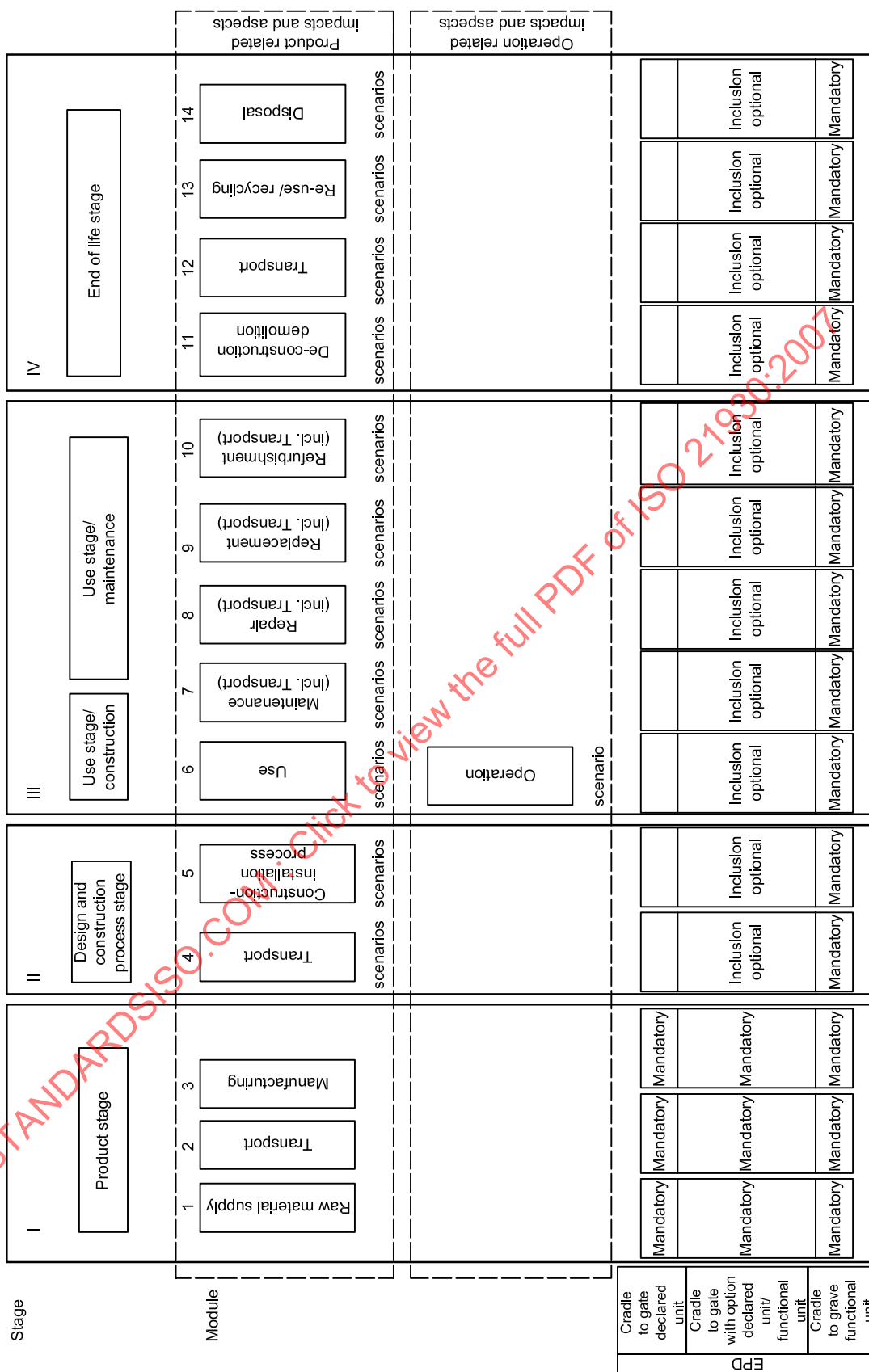


Figure 2 — Illustration of mandatory and optional elements and information modules in declared units and functional units

5.6 Comparability of EPD of building products

Comparison of building products using EPD shall be carried out only at the building level. This comparison requires a scenario and the PCR shall describe the rules and requirements for that scenario. Comparability of EPD of building products shall be in accordance with the requirements for comparability, as described in ISO 14025:2006, Clause 4 and 5.6.

6 Methodological framework

6.1 General requirements

This International Standard provides a framework of rules necessary for the declaration of environmental information of building products. It is intended that such EPD shall be used for the assessment of the environmental performance of buildings. However, the additional rules for the use of EPD for the assessment of the environmental performance of complete buildings are not detailed; see 8.2.5.

The EPD of a building product shall be based on an LCA, LCI and/or information modules conducted according to the guidance given in ISO 14040 and ISO 14044 and additional environmental information, as specified in 8.2.4. The guidelines, rules and requirements governing the preparation of an EPD are given in this International Standard in accordance with ISO 14025:2006, 6.7.

In the development of EPD, all significant environmental aspects of the building product shall be taken into consideration and become part of the EPD. If any of the necessary information is not available, the PCR shall state those aspects that are addressed and shall describe the means to deal with information gaps.

The EPD may also be based on average data if this is permitted by the PCR. The omission(s) of significant environmental aspects or life-cycle stages shall be justified and documented.

NOTE Guidance on the identification of significant environmental aspects can be found in ISO 14001 and ISO 14004.

Environmental information of an EPD covering all life-cycle stages ("*cradle to grave*") shall be subdivided into at least the four life-cycle stages below. In addition, the stages may be further subdivided; see Figure 2:

- product stage (including information modules from raw material supply, transport, manufacturing of products and all upstream processes from cradle to gate);
- design and construction process stage (information modules from transport to the building site and building installation/construction);
- use stage/operation [information module 6 contains information of the impact from the building product during its use and operation (e.g. installed services and appliances)]; use stage/maintenance (information modules 7, 8, 9, and 10 contain information on impacts from maintenance, repair, replacement and refurbishment, including all transport);
- end-of-life stage (information modules from deconstruction, reuse, demolition, recycling and disposal, including all transport).

6.2 Product category rules (PCR)

6.2.1 General

Aggregation of data from an EPD or from information modules for the assessment of the environmental performance of a building requires harmonized PCR.

The PCR shall identify and report the goal and scope of the LCA-based information for the product category and the rules on producing the additional environmental information for the product category. The PCR shall also determine the life-cycle stages for inclusion, the parameters to be covered and the way in which the parameters shall be collated and reported.

The programme operator shall be responsible for producing the PCR document by establishing an open consultation process that includes the involvement of interested parties; see 5.2. Information given by the manufacturers, (e.g., dealing with the state-of-the-art demolition and recycling) should be considered when developing the PCR. The rules shall address the following issues; see ISO 14025:2006, 6.7.1:

- a) product category definition and description (e.g. function, technical performance and use; see 6.2.2);
 - b) goal and scope definition for the LCA of the product, in accordance with ISO 14040 and ISO 14044, including
 - functional unit (see 6.2.4),
 - declared unit (see 6.2.3),
 - system boundary (see 6.2.5),
 - description of data (see 6.2.6),
 - criteria for the inclusion of inputs and outputs (see 6.2.7.2),
 - data quality requirements including coverage, precision, completeness, representativeness, consistency, reproducibility, sources and uncertainty (see 6.2.8),
 - units (see 6.2.9);
 - c) inventory analysis according to ISO 14044, including
 - data collection,
 - calculation procedures,
 - allocation of material and energy flows and releases (see 6.2.7.1);
- NOTE For materials that do not change their inherent properties during recycling, the actual end-of-life recycling rate is usually the environmentally more appropriate parameter to quantify the recycling aspect rather than the recycled content.
- d) impact category selection (see 8.2.2.1) and calculation rules (see 6.2.7), if applied;
 - e) predetermined parameters for reporting of LCA data (inventory data categories and impact category indicators; see Clause 8);
 - f) requirements for the provision of additional environmental information, including any methodological requirements (e.g. specifications for hazard and risk assessment); see ISO 14025:2006, 7.2.3, for information content;
 - g) materials and substances for declaration (e.g. information about product content, including specification of materials and substances that can adversely affect human health and/or the environment, in all stages of the life cycle; see 8.1 i);
 - h) instructions for producing the data required to develop the EPD [LCA, LCI, information modules (see 6.2.6), and additional environmental information; see 8.2.4];
 - i) instructions on the content and format of the type III environmental declaration; see 7.2;
 - j) information on which stages are not considered, if the EPD is not based on an LCA covering all life-cycle stages;
 - k) period of validity.

6.2.2 Product category

Within the established consultation process, the programme operator shall ensure that product categories are defined using a transparent procedure.

At the highest level, all building products belong to the same product category. More specific subcategories may be defined for certain groups of building products.

When building products have similar functions in a building or similar technical specifications, the basis for assigning a group of building products to a more specific subcategory shall be that the same functional or declared unit can be applied.

The definition of the product category should be valid over a reasonable time period to improve market acceptance; see ISO 14025.

6.2.3 Declared unit

The declared unit provides a reference by means of which the material flows of the information module of a building material or component are normalized mathematically.

Information provided using a declared unit shall not be used for comparison.

The declared unit provides the reference for combining the material flows attributed to the building product and the relevant environmental impacts, taking into account the selected stages of the building product's incomplete life cycle; see Figure 2. It shall relate to the typical functions of products and their product categories. The following information is the minimum that shall be provided together with the declared unit for the building material or component:

- intended application;
- life-cycle stages that are included (information modules);
- reference service life of the building product (only required for “use” and “maintenance” information module);
- statement regarding the limitations of comparability.

The declared unit shall be defined and explained in the PCR as described in ISO 14025:2006, 6.7.

If a building product's performance in any of the omitted life-cycle stages is relevant for its overall environmental performance, the omission of this information shall be declared and justified. This approach is also shown in Figure 2.

6.2.3.1 Information modules

The selected life-cycle stages for information modules shall be documented and justified in accordance with the scenario used. For information modules 6 (“use” and “maintenance”) and 7 to 10, the scenario shall include information on reference service life.

NOTE When including additional information modules in a “cradle-to-gate” approach, it can be necessary to revise the declared unit; see 5.5.

Transportation is not considered a life-cycle stage. However to avoid data gaps or double counting, inclusion of transportation into any information module shall be documented.

Information module 6 (the boxes named “use” and “operation”) contains information on the environmental impacts resulting from building products during their application (e.g. environmental impacts from leaching of heavy metals from a cladding system into the local environment). For an EPD of services in a building (e.g. equipment supplying a service needed to operate the building), information module 6 (the box named

“operation”) contains information on the environmental impacts resulting from the operation of the installed equipment (e.g. environmental impacts resulting from energy use of an elevator).

6.2.4 Functional unit

Functional unit is defined as the quantified performance of a product system for a building product that is used as a reference unit in an EPD based on LCA. The functional unit of a building product is related to a building, or part of a building and its performance. The functional unit of a building product is expressed on the basis of the relevant technical performance characteristics of the building product when integrated into a building. The primary purpose of the functional unit is to provide a reference to which the material flows (input and output data) of a building product are normalized mathematically. That reference is necessary for the comparability of LCA data. For defining the functional unit, see ISO 14044:2006, 4.2.3.2.

The performance characteristics expressed by the functional unit of a building product can be complex and shall be defined and explained in the PCR, which is developed as described in ISO 14025:2006, 6.7.

The functional unit relates to the reference service life of a building product. Where the estimated service life of a building product is shorter than the design life of the building or part of the building, the number of replacements required to fulfil the required performance and functionality over the service life can be identified.

NOTE Rules governing the number of replacements are given in ISO 15686-1.

The functional unit provides the reference for adding up material flows and the connected environmental impacts for each of the life-cycle stages of the building product, which are described in 6.1 and in Figure 2.

6.2.5 System boundaries

System boundaries shall be established in accordance with the provisions of ISO 14044:2006, 4.2.3.3 and 4.3.3.4, and documented in the PCR.

Factors determining the system boundaries include the intended application of the EPD, the assumptions made, the cut-off criteria, data and cost constraints, and the intended audience.

The selection of inputs and outputs, the level of aggregation within a data category, and the modelling of the system shall be consistent with the goal of the EPD. The system shall be modelled in such a manner that all inputs and outputs at its boundaries are described.

NOTE The technical information on energy saving, water saving etc. is taken into account when assessing the environmental performance of the building; see ISO/TS 21931-1.

Information shall be provided as to whether the EPD is based on a full life cycle, and, if not, information about which stage(s) is/are not considered.

System boundaries shall also be documented when reporting the EPD project; see 7.2 and 7.3.

Transportation is needed for the movement of raw materials, other materials and building products between most of the stages of a building product's life cycle. The environmental impacts from transportation are dependent upon the transport form (trains, boats, trucks), distances and quantities to be transported. All transportation occurring during the life cycle of the building product shall be included and be allocated to the appropriate information modules; see 5.5 and Figure 3. When the EPD is based on information modules, the system boundary shall state which transports are included.

Figure 3 illustrates an example of system boundaries and life-cycle stages of building products.

The inclusion or exclusion of ancillary products/complementary products shall be described in the PCR.

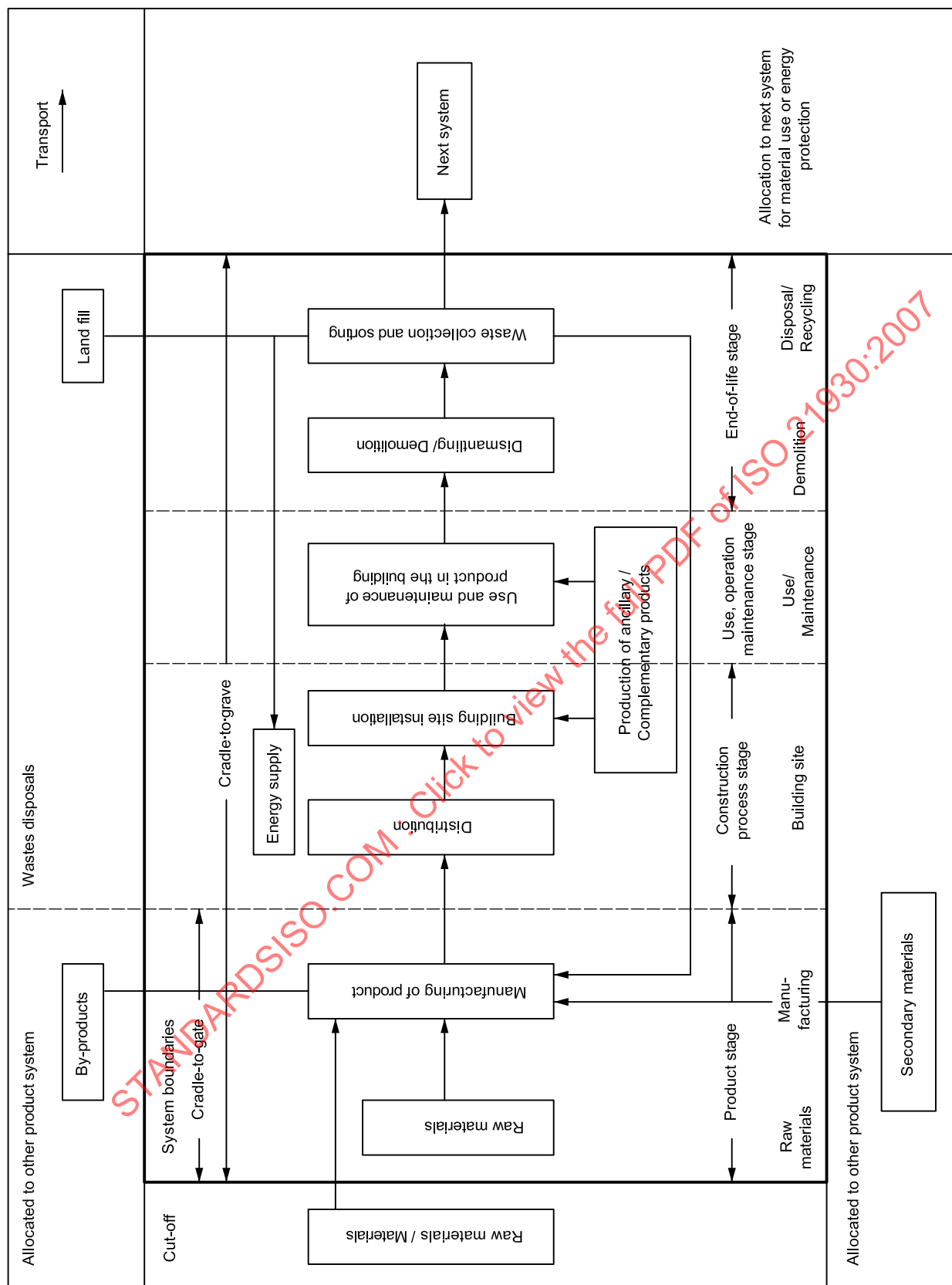


Figure 3 — Example of system boundaries, information modules and life-cycle stages of building products

Impacts resulting from the installation of the building product in the building (e.g. energy and materials used) shall be identified and included in the report. If not included, because data is not available, this fact shall be stated in the project report; see 7.2.

Activities connected to maintenance, replacement and refurbishment of the building product that contributes to environmental impacts in the “use” stage (“operation” and “maintenance”) shall be identified and included in the report.

Reuse and recycling shall be treated in accordance with provisions of ISO 14044:2006, 4.3.4.3.

The end of life processes and associated environmental impacts allocated to a building product resulting from the dismantling/demolition of a building shall be considered in the PCR. Where such information is not included, because data are not available, this fact shall be stated.

6.2.6 Description of data

Data quality should be characterized by both quantitative and qualitative aspects, as well as by the methods used to collect and integrate those data; see ISO 14025.

For the purpose of transparency, the source of all data shall be documented in the verification procedure of the EPD.

For an EPD based on average data within a building product category, the representativeness of the data shall be justified. For an EPD of the environmental aspect of a specific building product, the use of generic data shall be justified.

6.2.7 Data calculation

6.2.7.1 Allocation of material flows

Data calculation is a part of the life-cycle inventory process and the question of allocation is of special importance. Allocations, including those dealing with systems involving multiple building products, shall be treated in accordance with the provisions of ISO 14044. The materials and energy flows, as well as associated emissions, shall be allocated to the different products according to clearly stated procedures, which shall be documented as part of the PCR.

Rules for allocation across product systems (e.g. recycling processes) shall be described in the PCR.

6.2.7.2 Criteria for the inclusion of inputs and outputs

The inclusion of inputs and outputs is determined by cut-off rules as defined in ISO 14044 to allow the inventory to be simplified. The cut-off rules for inputs and outputs shall be based on environmental relevance, which can be expressed by mass, energy or other values.

Cut-off rules shall be defined in a way that has the minimum influence on the result obtained. For material flows, a cut-off rule of 5 % by mass (i.e. inclusion of at least 95 % of the total mass of inputs), energy or environmental relevancy shall be a maximum starting point. When impacts are assessed and reported, the cut-off rules shall be based on the environmental impacts related to the respective material flows. The cut-off rules shall be justified and documented in the PCR.

All hazardous and toxic materials and substances shall be included in the inventory and the cut-off rules do not apply.

6.2.8 Data quality requirements

The data quality has an influence on the content of an EPD. Depending on the goals, the data quality requirements shall be formulated with regard to accuracy, precision, completeness and representativeness.

Data quality requirements shall be treated according to the provisions of ISO 14025 and ISO 14044:2006, 4.2.3.6.

6.2.9 Units used for inputs and outputs

- energy: megajoules or kilowatt hours;
- mass: tonne or kilogram or gram.

7 Reporting

7.1 General

The manufacturer and/or practitioner shall provide the EPD project documentation and the EPD to the verifier. The project documentation contains basic data and supporting information necessary for the EPD project as specified in Clause 8.

The sequence of documents from the PCR document to the EPD project is shown in Figure 4.

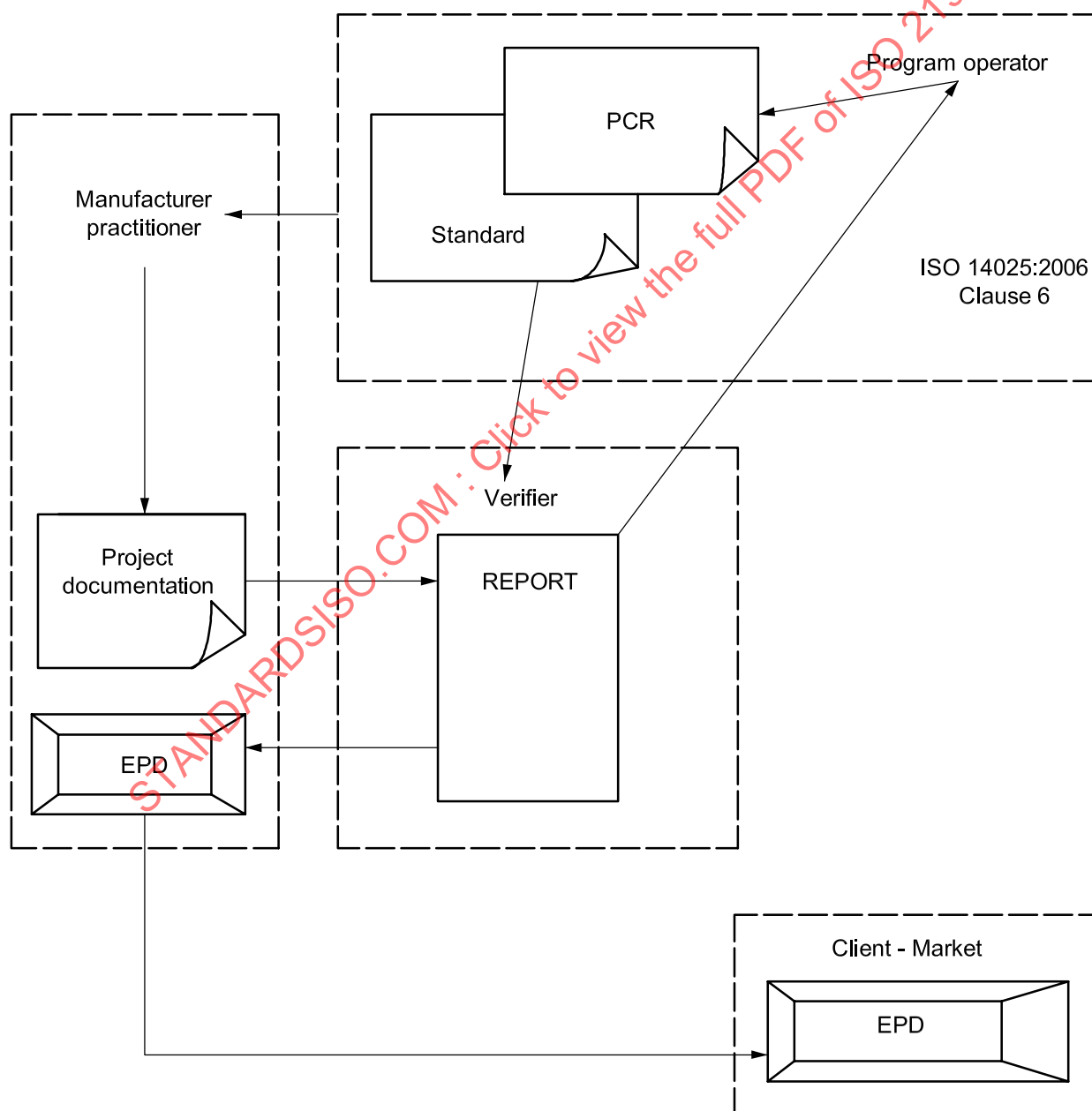


Figure 4 — Linkage of EPD-project documentation to the other procedures for developing an EPD

7.2 Project report

The project report shall document that the LCA study and the additional environmental information meet the requirements in Clause 6 and 8.1. The project report summarizes the project documentation (see 7.3) in a systematic and comprehensive way in order to support an effective verification of the EPD. The project report shall be prepared in accordance with the requirements and guidance of ISO 14044:2006, Clause 6, for third-party reports.

The project report shall contain any data and information of importance for the data published in the EPD and as required in the respective PCR. Special care is necessary to demonstrate in a transparent way that the data and information declared in the EPD result from the LCA study.

7.3 Project documentation

The EPD-project documentation may be a part of the project report and addresses the LCA study and other environmental information used to produce the EPD. It shall be made available to the verifier in order to demonstrate that the requirements of this International Standard have been met; see ISO 14025:2006, 7.2.2, 7.2.3 and 7.2.4. The summary of the EPD-project documentation becomes the project report.

The project documentation shall contain any supporting information of importance for the EPD, (i.e. the information required to establish the content of the EPD; see Clause 8). This should include

- a) input and output data of the unit processes that are used for the LCA calculations;
- b) documentation (measurements, calculations, estimates, sources, correspondence, traceable references to origin, etc.) that provides the basis from which the process data for the LCA is formulated;
- c) specification used to create the manufacturer's building product;
- d) data that demonstrate that the information is complete; in specific cases, for example, reference can be made to standards or quality regulations;
- e) referenced literature and databases from which data have been extracted;
- f) documentation demonstrating that the building product can fulfil the intended use;
- g) documentation that demonstrates that the chosen processes and scenarios satisfy the requirements set in this International Standard;
- h) documentation that substantiates the chosen life-cycle stages of the building product;
- i) data used to carry out the sensitivity analyses; see ISO 14044:2006, 4.5.3.3;
- j) documentation that substantiates the percentages or figures used for the calculations in the end of life scenario;
- k) documentation that substantiates the percentages and figures (number of cycles, prices, etc.) used for the calculations in the allocation procedure, if it differs from the PCR;
- l) information showing how averages of different reporting locations have been calculated in order to obtain generic data;
- m) documentation that substantiates how the additional environmental information is determined; see ISO 14025:2006, 7.2.4;
- n) procedures used to carry out the data collection (questionnaires, instructions, informative material, confidentiality agreements, etc);

- o) criteria and substantiation used to determine the system boundaries;
- p) documentation used to substantiate any other choices and assumptions;
- q) documentation that demonstrates consistency when using information modules.

7.4 Rules for data confidentiality

Product-specific data are very often confidential, because of

- competitive business issues,
- intellectual property rights, or
- similar legal restrictions.

It is not required to make such confidential data publicly available.

Normally, the EPD present only data that have been aggregated over the four stages of the life cycle or relevant portions of it and the aggregation obscures the underlying competitive information.

Confidential business data provided for the independent verification process can be kept confidential upon request of the body supplying the data and with the approval of the programme operator, in accordance with programme operational rules; see ISO 14025:2006, 8.3.

8 Content of the EPD

8.1 Declaration of general information

All type III environmental declarations in a product category shall follow the format and include the parameters as identified in the PCR provided by the programme operator.

The manufacturer of the building product that is the subject of the EPD is responsible for the provision of all necessary information.

The following shall be declared:

- a) name and address of the manufacturer(s);
- b) description of the building product's use and the functional or declared unit of the building product to which the data relates;
- c) building product identification by name (e.g. including production code) and a simple visual representation of the building product to which the data relates;
- d) name of the programme and the programme operator's address and, if relevant, the logo and website;
- e) PCR identification;
- f) date the declaration was issued and period of validity;
- g) data from LCA or LCI or information modules; see 8.2.2 and 8.2.3;
- h) additional environmental information; see 8.2.4;

- i) content of the product as identified in c) above, covering materials and substances to be declared (e.g. information about product content, including specification of materials and substances that can adversely affect human health and the environment, in all stages of the life cycle).

NOTE With appropriate justification, this requirement does not apply to proprietary information relating to materials and substances covered by intellectual property rights or similar legal restrictions. It also might not be appropriate for information concerning intangible products.

- j) information on which life-cycle stages are not considered, if the declaration is not based on an LCA covering all stages;
- k) statement that environmental declarations from different programmes might not be comparable;
- l) statement that this declaration represents an average performance, where an EPD declares an average performance for a number of products; in addition, information on the deviation of the products' performance with respect to the average shall be stated;
- m) site(s), manufacturer or group of manufacturers, or those representing them, for whom the results of the LCA are representative;
- n) information on where explanatory material can be obtained;

In addition to the above, a statement as given in Figure 5 shall be completed and included in the type III environmental declaration.

PCR ^a review ^b , was conducted by <organization and name of the chair, and information on how to contact the chair through the programme operator>
Independent verification of the EPD and data, in accordance with ISO 21930: ☐ internal ☐ external
(Where appropriate ^c) Third-party verifier: <name of the third party verifier>
^a Product category rules in accordance with 6.2. ^b PCR review in accordance with 9.1. ^c Optional for business-to-business communication, mandatory for business-to-consumer communication (see 5.4).

Figure 5 — Demonstration of verification

8.2 Declaration of environmental aspects

8.2.1 General

In 8.2 are described the environmental aspects that are mandatory and that shall be included in an EPD, and those aspects that are optional for inclusion in an EPD. All environmental aspects of the declaration shall be prescribed in the PCR.

When the EPD includes replacement and maintenance, necessary processes and ancillary products shall be included. The EPD may not be used to compare building products. The basis of a comparison shall include the whole building performance in accordance with ISO/TS 21931-1 and other normative references.

Environmental information reported in the EPD of a building product that does not use energy to operate during the use stage shall not be aggregated into more than four groups of life-cycle stages. Environmental information reported in the EPD of a building product using energy to operate during the use stage shall not be aggregated into more than five groups of life-cycle stages; see 6.1. To illustrate the product system studied, as an option, the EPD may contain

- a diagram of the life-cycle stages included in the LCA subdivided into product stage, construction process stage, use/operation and maintenance stage and end of life stage, and including system boundaries; the stages may be further subdivided;
- a description of the nature of the processes and ancillary products/complementary products that are required for installing the building product in the building works and their replacement and maintenance according to the criteria in the PCR.

8.2.2 Declaration of environmental impacts, use of resources and generation of waste

The following environmental information shall be included in the EPD.

8.2.2.1 Environmental impacts expressed in terms of the impact categories of LCIA

- climate change (greenhouse gases);
- depletion of the stratospheric ozone layer;
- acidification of land and water sources;
- eutrophication;
- formation of tropospheric ozone (photochemical oxidants).

8.2.2.2 Use of resources and renewable primary energy — Data derived from LCI and not assigned to the impact categories of LCIA)

- depletion of non-renewable energy resources;
- depletion of non-renewable material resources;
- use of renewable material resources;
- use of renewable primary energy;
- consumption of freshwater.

8.2.2.3 Waste to disposal — Data derived from LCA and not assigned to the impact categories of LCIA)

The waste allocated to the building product during its life cycle shall be classified in the EPD as

- hazardous waste, or
- non-hazardous waste.

The division between the various categories shall be expressed in percentage terms or as mass per functional or declared unit.

8.2.3 Emissions to water, soil and to indoor air

Releases to ground- and surface water, as well as emissions to indoor air, shall be declared in accordance with national standards and practice. Information on human health and comfort due to chemical, biological and physical emissions is required for further evaluation on the building level of human health and comfort.

8.2.4 Additional environmental information

An EPD shall include, where relevant, additional information, such as given in a) to j), related to environmental issues, other than the environmental information derived from LCA, LCI or information modules (see 8.2.1.) and other than emissions to water and to indoor air. This information shall be separated from the information described in 8.2.2 and 8.2.3. The manufacturers shall report this information according to the provisions in the PCR document.

- a) information on environmental issues, such as
 - 1) impact(s) and potential impact(s) on biodiversity,
 - 2) toxicity related to human health, the environment or both, and
 - 3) geographical aspects relating to any stages of the life cycle (e.g. a discussion on the relation between the potential environmental impact(s) and the location of the product system);
- b) data on building product performance, if environmentally significant;
- c) organization's adherence to any environmental management system, with a statement on where an interested party can find details of the system;
- d) any other environmental certification programme applied to the building product and a statement on where an interested party can find details of the certification programme;
- e) other environmental activities of the organization, such as participation in recycling or recovery programmes, provided details of these programmes are readily available to the purchaser or user and contact information is provided;
- f) information that is derived from the LCA but not communicated in the typical LCI- or LCIA-based formats;
- g) instructions and limits for efficient use;
- h) hazard and risk assessment on human health and the environment;
- i) information on absence or level of presence of a material in the building product that is considered of environmental significance in certain areas; see ISO 14021:1999, 5.4 and 5.7 r);
- j) preferred waste management option for used building products;

- k) potential for incidents that can have impact(s) on the environment, such as
 - the end-of-life stage, from deconstruction, reuse, demolition, recycling and disposal,
 - energy-, water-saving etc. and other improvements, such as acoustical improvements,
 - energy content of the building product for energy recovery in the end of life,
 - recycled content (see ISO 14021:1999, 7.8.1.1) or recycling rates.

8.2.5 Scenarios and technical information

Scenarios and technical information are necessary for the application of EPD in building assessment. Therefore, EPD should, when relevant, include information for the building product about

- reference service life of the building product, with reference in-use conditions according to ISO 15686-8;
- transportation, construction, use, operation, maintenance and replacements based on the reference service life.

8.2.6 Differentiation of use of material and energy resources

The use of resources for all stages of the life cycle of the building product should be differentiated into the following list:

- hydro/wind power;
- fossil energy;
- bio-energy;
- nuclear energy;
- other energy;
- secondary fuels;
- non-renewable resources;
- renewable resources;
- recycled materials; see ISO 14021:1999, 7.8.1.1;
- secondary raw materials;
- land;
- water;
- hazardous substances.

Tables and charts shall provide summaries of the findings.

9 Verification

9.1 Review and verification procedures

With regard to review and verification procedures, the following provisions given in ISO 14025:2006, Clause 8, shall apply:

- PCR review including a review of the LCA, LCI, information modules and additional environmental information on which the PCR are based; see ISO 14025:2006, 8.1.2;
- independent verification of data from LCA, LCI and information modules, and of additional environmental information; see ISO 14025:2006, 8.1.3;
- independent verification of the EPD; see ISO 14025:2006, 8.1.4;
- the independent verifier shall generate a verification report stipulating the conclusion of the verification process, while adhering to the obligations of ISO 14025:2006, 8.3, covering rules for data confidentiality; this report shall be available to any person upon request;
- competence of third-party PCR review panel, according to provisions given in ISO 14025:2006, 8.2.3, and independent verifier of the EPD, according to provisions given in ISO 14025:2006, 8.2.2.