DRAFT NBN/DTD

National Annex to NBN EN 15804+A1

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Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products – National annex to NBN EN 15804+A1

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Preface

The current technical document of the NBN is a national annex to the standard NBN EN 15804+A1:2014.

It can be used for the creation of environmental product declarations of construction products in a Belgian context.

The NBN/DTD follows the structure of the EN 15804:2012+A1:2013 and adds:

- Clarification and examples to facilitate the use of the standard NBN EN 15804+A1:2014.
- Additional requirements concerning life cycle stages, environmental indicators, etc.

The status of this document is “DTD” (*Document technique, technisch document, technical document*).

The list below gives an overview of additions compared to the EN 15804+A1:

1 Scope

This document, BE-PCR, provides complementary horizontal product category rules for Type III environmental declaration for construction products and construction services.

This complementary horizontal PCR document includes additional rules and requirements as well as clarifications of the European standard NBN EN 15804+A1:2014.

A 0 Relation horizontal and vertical PCR documents

It is possible to develop and to verify a Type III EPD directly to the present standard. If more detailed specifications and descriptions for a product group are needed, complementary vertical PCR (c-BE-PCR) in compliance with this BE-PCR may be developed.

The development of c-BE-PCR shall respect following principles

1. The grouping of products shall follow the grouping of the European Product TC's.

2. Any c-BE-PCR using the present standard as a normative reference needs to be compliant with specifications of this standard (and therefore also with specifications of NBN EN 15804+A1:2014). If there is no c-BE-PCR available, EPD for construction products are developed only according to the present standard. The EPD always states according to which standard it was made (EN ISO 14025:2011, 7.2.1, e).

3. Any c-BE-PCR using the present standard as normative reference shall also be compliant with the applicable European c-PCR for the concerned product group which are considered compliant with EN 15804:2012+A1:2013 by CEN/TC350

NOTE 1 CEN/TC 350 homepage lists c-PCR documents compliant with EN 15804:2012+A1:2013 prepared by product TC's

4. In order to develop a consistent set of principles and rules for the construction sector, the c-BE-PCR provided by national mirror committees of Product TC's shall[1]:

   a) use the following common title structure:

      "[title of Product TC] - Environmental product declarations – Product category rules complementary to BE-PCR [product group, depending on name]"

   b) use the same structure as the present document.

5. In the development of c-BE-PCR the following aspects are considered:

   a) Complementary specifications to the core rules provided by BE-PCR, particularly related to:

      1) the scope of the c-BE-PCR, related to the product group, product type, intended application and use of the product, type of EPD;

      2) the scope with respect to any required information modules A1-C4 and D;

      3) specification of the declared or functional unit;

      4) allocation rules;

      5) system boundary setting;

[1] May be adapted depending on the structure defined by the program operator (business plan)

6) application of the rules for the exclusion of inputs and outputs;

7) possible data sources.

NOTE 2 A c-BE-PCR should focus on aspects that are specific to its product group. Specifications that are common to other product groups are preferably considered for further revisions of the BE-PCR.

b) Guidance for the life cycle inventory specifically related to the product group and/or product type for the information modules covered by the type of EPD.

c) Selection of information modules for which more specific requirements and guidance are given.

d) Inclusion of default scenarios related to a specific application of the product including guidance on:

1) the specific content of all information modules of the life cycle and information module D, for default scenarios (e.g. use, typical waste processing, for energy recovery, recycling and reuse and disposal);

2) the definition of the end-of-waste status;

3) the technical scenario information for all information modules of the product system and information module D;

4) the determination of the RSL and related in-use conditions for a specific application of the product.

e) Selection of additional technical information to be declared (e.g. pertinent product characteristics and respective testing methods).

f) Guidance on provision of additional information on release of dangerous substances to indoor air, soil and water during the use stage.

The following aspects are not part of c-BE-PCR:

a) classes, benchmarks or threshold values for the indicators;

b) new indicators as part of the c-BE-PCR implementation.

NOTE 3 Additional LCA based indicators required or permitted by a c-BE PCR are communicated as additional information

NOTE 4 Rules contained in a c-BE-PCR that are also relevant for product groups that are not concerned by this c-BE-PCR, can be considered during revision of the BE-PCR.

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.

NBN EN 15804+A1:2014, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

FprCEN/TR 16970:December 2015, *Sustainability of construction works — Guidance for the implementation of EN 15804.*

ISO/DIS 21930:2015, *Sustainability in buildings and civil engineering works – Environmental declaration of building products*

3 Terms and definitions

INFORMATION The following terminology is used to indicate the requirements, the recommendations and options that companies may choose:

The term “shall” is used to indicate what is required in order for an EPD to be in conformance with this BE-PCR.

The term “should” is used to indicate a recommendation rather than a requirement. Any deviation from a “should” requirement has to be justified by the conductor of the study and made transparent.

The term “may” is used to indicate an option that is permissible.

A 1 Added definitions

For the purposes of this document, the terms and definitions included in NBN EN 15804+A1:2014 as well as the following terms and definitions apply:

3.36
average data
data based on a representative sample for a construction product, product group or construction service provided by more than one supplier or by one supplier from multiple plants or multiple similar products

NOTE 1 products can be similar on the basis of materials, manufacturing or function as relevant to the product category

[SOURCE: ISO 21930:2015]

3.37
average EPD
EPD based on average data

[SOURCE: ISO 21930:2015]

NOTE 1 an average EPD can represent: a specific product from various manufacturing plants of one company; similar products from one manufacturing plant; similar products from several manufacturing plants of one or more companies.

3.38
biogenic carbon
Carbon derived from/contained in biomass

[SOURCE: NBN EN 16485:2014]

3.39
biomass
material of biological origin, excluding material embedded in geological formations and material transformed to fossilised materials

[SOURCE: NBN EN 16485:2014]

3.40
complementary product category rules, c-PCR
product group specific or horizontal PCR, which provide additional, compliant and non-contradictory requirements to the core PCR

NOTE 1 c-PCR are meant to be used together with the core PCR they relate to.

NOTE 2 In this document *BE-PCR* is used to refer to the Belgian horizontal PCR document (this document) and *c-BE-PCR* is used to refer to Belgian product group specific PCR complementary to the BE-PCR.

3.41
collective EPD
average EPD representing similar products from various economic operators (e.g. EPD from trade associations)

NOTE 1 'economic operator' means the manufacturer, importer, distributor or authorised representative [2]

3.42
freshwater
water having a low concentration of dissolved solids

NOTE 1 Freshwater typically contains less than 1000 milligrams per litre of dissolved solids and is generally accepted as suitable for withdrawal and conventional treatment to produce potable water.

NOTE 2 The concentration of total dissolved solids can vary considerably over space and/or time.

[ISO 14046:2014, 3.1.1]

3.43
intermediate products
products that are already processed but require further processing into a final product (e.g. cement)

3.44
offset
offsets are discrete greenhouse gas (GHG) reductions used to compensate for GHG emissions elsewhere

NOTE 1 The term "offset" is frequently used with reference to third-party greenhouse gas mitigation activities, e.g. regulated schemes in the framework of the Kyoto Protocol (CDM – Clean Development Mechanism, JI – Joint Implementation, ETS - Emissions Trading Schemes), or voluntary schemes. Examples of offset emissions are carbon off-setting by the Clean Development Mechanism, carbon credits, and other system-external off-sets.[3]

3.45
proxy data
approximate data used if no system *specific data* or *generic data* are available

NOTE 1 Data can be site specific or average

EXAMPLE Data for production of acetic acid used in lieu of data for production of formic acid, or selection of a generic data set of electricity from one region to represent another region.

[SOURCE: ISO 21930:2015]

3.46
water use
use of water by human activity

NOTE 1 Use includes, but is not limited to, any water withdrawal, water release or other human activities within the drainage basin impacting water flows and/or quality, including in-stream uses such as fishing, recreation, transportation.

[2] As in: Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC (Text with EEA relevance)

[3] As defined in PEF (2013), annex VI.

NOTE 2 The term “water consumption” is often used to describe water removed from, but not returned to, the same drainage basin. Water consumption can be because of evaporation, transpiration, integration into a product, or release into a different drainage basin or the sea. Change in evaporation caused by land-use change is considered water consumption (e.g. reservoir). The temporal and geographical coverage of the water footprint assessment are defined in the goal and scope.

[ISO 14046:2014, 3.2.1, modified as in Guidance document]

4 Abbreviations

A 2 Added abbreviations

BE-PCR	Belgian horizontal product category rules, complementary to NBN EN 15804+A1:2014
CF	Characterisation factor
c-PCR	Complementary product category rules
c-BE-PCR	Belgian product group specific PCR, complementary to BE-PCR
GHG	Greenhouse gas
EoW	End-of-waste status

5 General aspects

As in NBN EN 15804+A1 (2014)

5.1 Objective of the Core PCR

As in NBN EN 15804+A1 (2014)

5.2 Types of EPD with respect to life cycle stages covered

As in NBN EN 15804+A1 (2014)

5.3 Comparability of EPD for construction products

As in NBN EN 15804+A1 (2014)

5.4 Additional information

As in NBN EN 15804+A1 (2014)

5.5 Ownership, responsibility and liability for the EPD

As in NBN EN 15804+A1 (2014)

5.6 Communication formats

As in NBN EN 15804+A1 (2014)

6 Product Category Rules for LCA

As in NBN EN 15804+A1 (2014)

6.1 Product category

As in NBN EN 15804+A1 (2014)

6.2 Life cycle stages and their information modules to be included

As in NBN EN 15804+A1 (2014)

6.2.1 General

As in NBN EN 15804+A1 (2014), in addition:

A 3 Mandatory life cycle stages

The declaration of the product stage modules A1-A3, A4, C2, C3, C4 and D, is mandatory[4]. The declaration of the modules of the other life cycle stages is optional.

For raw materials and intermediate products only modules A1-A3 and A4 are mandatory.[5]

Figure 1 represents the different types of EPD that can be declared in the context of this BE-PCR, with indication of the mandatory and optional life cycle stages.

If individual information modules or entire life cycle stages are not declared, the corresponding fields in the table shall be marked as “MND” (module not declared).

If an indicator value has been calculated to be “zero” or if the value of “zero” is plausible for the indicator, then “0” shall be declared for this indicator. The declaration of “-” is not allowed.

[4] Requirement from KB.

[5] KB, Annexe1/Bijlage1.

Life cycle stages		**PRODUCT stage**			**CONSTRUCTION PROCESS stage**		**USE stage**							**END OF LIFE stage**				**Benefits and loads beyond the system boundary**
Modules		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
		Raw material supply	Transport	Manufacturing	Transport	Construction	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse / Recovery / Recycling potential
					Definition of SCENARIOS required for each declared module													
Type of EPD	Cradle to Gate	M	M	M	'Cradle to Gate' EPD not possible in the context of the Belgian EPD program (cfr. requirements from KB)													
	Cradle to Gate with option(s)[1,2,4]	M	M	M	M	O	O	O	O	O	O	O	O	O	M	M	M	M
	Cradle to Grave[3,4]	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

NOTES

1 Indication of the life cycle stages and information modules that are mandatory in the context of the KB Milieuboodschappen. Modules C2-C4 and D not mandatory for raw materials and intermediate products.

2 for a declared unit or functional unit

3 for a functional unit

4 Reference Service Life has to be included according to at least one scenario (being the most representative)

KEY

M : Mandatory / O : Optional

Figure 1: Representation of the different types of EPD with indication of mandatory life cycle stages (adapted from Figure 1 in NBN EN 15804+A1)

A 4 Clarification on the principle of modularity

The modularity principle implies that impacts are declared in the module where they occur.

EXAMPLE The production, necessary transport steps and the end-of-life impacts of material losses related to the installation of a floor finishing should be declared in module A5 (construction-installation process).

A 5 Use of nested information modules

The general rules for developing scenarios are described in NBN EN 15804+A1:2014, §7.3. A structured assessment of the information modules in the life cycle stage A4, A5, B and C1, C3 and C4 may make use of nested information modules as described in Figure 2.

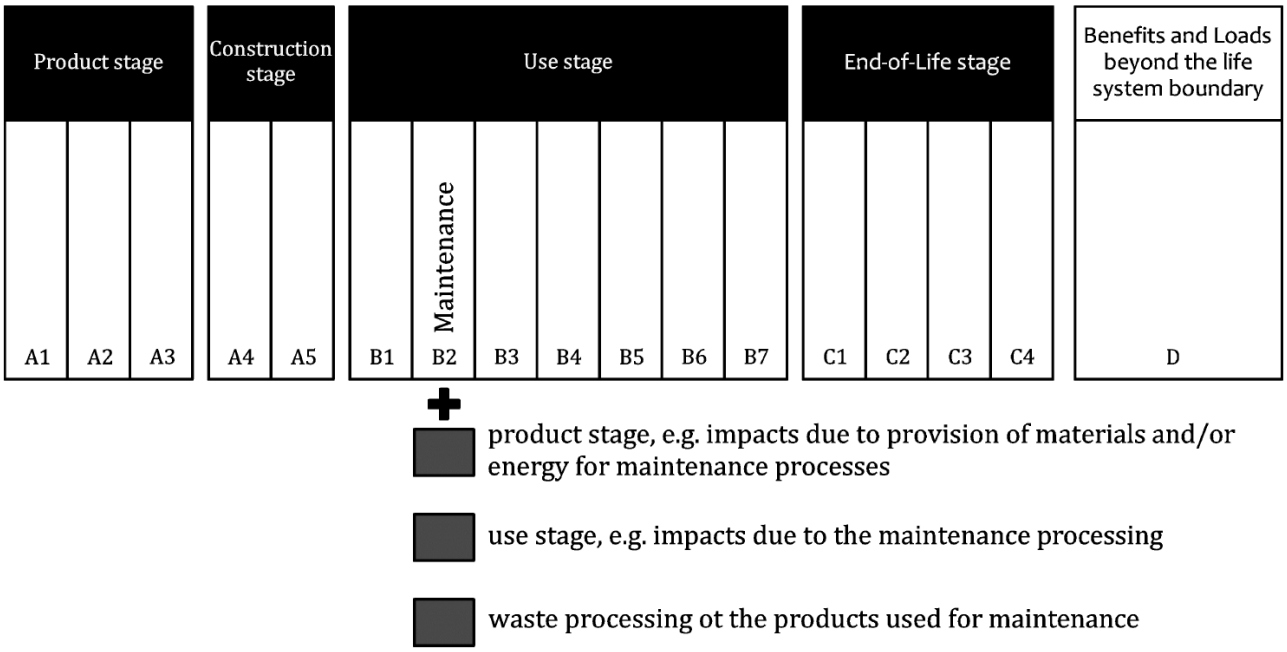

Figure 2: Example of an information module scenario B2, Maintenance (image from Guidance document Fpr CEN TC TR16970, p.15)

6.2.2 A1-A3, Product stage, information modules

As in NBN EN 15804+A1 (2014).

6.2.3 A4-A5, Construction process stage, information modules

As in NBN EN 15804+A1 (2014), in addition:

A 6 Clarification concerning the declaration of wastage, breakage and material losses

When setting system boundaries the general principle of NBN EN 15804+A1:2014 is to consider all processes in the modules where they occur. This also applies to losses (product waste from transport to site, storage on site and incorporation in construction). Such losses are not part of the input flows in modules A1-A3 but are calculated as additional input according to the rules of A1-A3 and declared in A4-A5.

All impacts and aspects related to the unloading of construction products (including any breakages during unloading) are declared in module A4 in case of unloading at a storage place, and in module A5 in case of unloading at the construction yard.

Breakage during transport is accounted for in module A4. Breakage during installation is accounted for in module A5.

All impacts and aspects related to the wastage of construction products (e.g. additional production to compensate for the loss of materials during cutting) are declared in module A5.

NOTE 1 The wastage of construction products includes upstream environmental impact from the production and transportation as well as downstream environmental impact from end-of-life. The environmental impact reported in A1 to A3 therefore only accounts for the impact related to the installed product and the wastage is reported in A5.

The impact related to breakages, material losses and wastage may be declared by use of nested information modules during the transport module A4 and the construction module A5.

NOTE 2 The use of nested information modules allows to separate the impact related to breakages, losses and wastage from the impact related to the transport of the product for A4 and from the impact related to the installation of the material in module A5. This distinction of information can be relevant when EPDs will be used for assessment at building scale.

EXAMPLE The impacts of transportation of a floor finishing to the construction site should be declared in module A4. The impact related to the production, transport and end-of-life impacts of material losses related to breakage during transport may be declared in A4 using nested information modules, e.g. “A4/product stage for material losses”, “A4/transport to construction for material losses” and “A4/waste processing for material losses”.

6.2.4 B1-B5, Use stage, information modules related to the building fabric

As in NBN EN 15804+A1 (2014)

6.2.5 B6-B7, use stage, information modules related to the operation of the building

As in NBN EN 15804+A1 (2014)

6.2.6 C1-C4 End-of-life stage, information modules

As in NBN EN 15804+A1 (2014), in addition:

A 7 Clarification concerning the allocation of impacts and benefits from incineration of waste and secondary fuels

Table 1 provides guidance on the assignment of impacts and benefits from incineration of waste and secondary fuels.

Specifications concerning the end-of-life scenarios and assumptions concerning the energy efficiency of incinerations plants are included in A 17, A 19 and A 36.

373 **Table 1 – Application of the "polluter pays" principle to the use of waste as substitute for primary fuels or materials [6]**

Reached end-of-waste state?*	**Energy recovery Efficiency rate**	**Use of waste considered as**	**System that generates waste**	**System that uses waste/*secondary fuel or material***
Yes — the substance or object is commonly used for specific purposes; — a market or demand, exists for such a substance or object; — the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; — the use of the substance or object will not lead to overall adverse environmental or human health impacts. (EN 15804:2012+A1:2013, 6.3.4.5)	*> = 60%*[7] *(or > 65%**)*	Use of secondary fuel, e.g. use of wood chips recovered from untreated wood.	Declare the — materials for recycling or *energy* recovery[8] in module where the waste is generated, or if at end-of -life in C3 (EN 15804:2012+A1:2013, 7.2.5, Table 6); and — impacts of recycling processes to achieve end of waste in C3; — impacts to achieve substitution*** and benefits**** in module D (EN 15804:2012+A1:2013, 6.3.4.6 and. 6.4.3.3).	Declare the — use of secondary material or secondary fuel; and — environmental impact from the use of secondary material or fuel in the module where it is used (usually in A1-A3; EN 15804:2012+A1:2013, 6.3.4.2).
	N/A	*Use of secondary material*		

6 Modified version from table 2 from the Guidance document. *Modifications are shown in italic*.

7 NBN EN 15804+A1:2014, section 6.3.4.5, bullet C3 waste processing…"Materials from which energy is recovered with an efficiency rate below 60% are not considered materials for energy recovery".

8 Table 6 from NBN EN 15804+A1:2014

Reached end-of-waste state?*	Energy recovery Efficiency rate	Use of waste considered as	System that generates waste	System that uses waste/*secondary fuel or material*
No, *not all criteria from above (from EN 15804:2012+A1:2013, 6.3.4.5) are met*[9]	> = 60% *(or > 65%**)*	Waste *disposal*[10]. Sometimes referred to as use of alternative or waste fuel, e.g. use of tyres as substitute for fossil fuels in the cement industry.	Declare the — environmental impact from waste processing (e.g. incineration) in the module where the waste is generated, or if end-of life in module *C4;*[11] — exported energy in the module where the waste is generated (EN 15804:2012+A1:2013, 7.2.5, Table 6 – Exported energy in MJ per energy carrier); — substitution benefits in module D (EN 15804:2012+A1:2013, 6.3.4.6 and 6.4.3.3).	Do not declare the — impacts from waste processing e.g. co-incineration of waste. Declare the — use of exported energy from the waste within "use of secondary fuel", as a more appropriate indicator does not currently exist. *This shall be noted* below the table.
	< 60% *(or < 65%**)*	Waste disposal	Declare the — environmental impact from waste disposal e.g. incineration in the module where the waste is generated, or if end-of life in module C4; — exported energy in the module where the energy is generated and the waste is disposed of (EN 15804:2012+A1:2013, 7.2.5, Table 6 – Exported Energy in MJ per energy carrier); — substitution benefits***** in module D (EN 15804:2012+A1:2013, 6.3.4.6 and 6.4.3.3).	

**** In case of incineration, the question should be interpreted as "reached the EOW state before incineration"***

***** For installations after 31st of December 2008*[12]**

****** e.g. impact from transport, processing after EOW (including combustion))***

******* e.g. avoided impact from electricity or heat production***

******** e.g. avoided impact from exported energy***

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9 EN 15804:2012+A1:2013, 6.3.4.5. + EN 15804:2012+A1:2013, 6.3.4.2: "Regardless of the geographical coverage of a product system the rules for defining the end-of-waste state of this European standard apply" + Guidance document, 6.3.4.5.2 : "A material or part thereof is considered a secondary material or fuel when all four specified EOW criteria are fulfilled. If it does not reach the status of secondary material or fuel, then it stays as waste"

10 NBN EN 15804+A1:2014, section 6.3.4.5, NOTE 2: "only when materials have reached the EOW state can they be considered as materials for energy recovery, provided the energy recovery process has an energy efficiency rate higher than 60% + NBN EN 15804+A1:2014, section 7.2.5, NOTE 4: " The parameter "materials for energy recovery" does not include materials for waste incineration.

11 EN 15804:2012+A1:2013, section 6.3.4.5, C3 :waste processing of material flows intended for reuse, recycling and energy recovery⇒as only materials that have reached EOW state can be considered for energy recovery, the impacts from waste processing (incl. incineration) do not belong in C3 but in C4 (C4= waste disposal including physical pre-treatment and management of the disposal site)

12 NBN EN 15804+A1:2014, 7.2.5, NOTE 4

6.2.7 D, Benefits and loads beyond the system boundary, information module

As in NBN EN 15804+A1 (2014), in addition:

A 8 Clarification concerning the output flows from the production stage and other life cycle stages, in relation to information module D

During the life cycle of the product or building it is possible that secondary material and energy flows leave the system boundary and have a new role to play in another product or building life cycle. In other words: a product can have a positive or negative environmental contribution beyond the product life cycle (or product system) under study. Reuse or recycling therefore can bridge two life cycles.

However the output flows from the production stage and from the other life cycle stages, i.e. construction, use and end-of life stage, are treated differently.[13]

— The information given for output flows from the construction stage to the end-of-life stage (A4-C4) of the life cycle under study and thus for potential input flows into a next life cycle is provided as potential benefits and loads connected to a product's life cycle beyond its system boundary. This information of potential benefits and loads is provided in information module D. Contributions to module D can only come from modules A4-C4 (see EN 15804:2012+A1:2013).

— Output flows coming from the production stage (A1-A3), are principally considered as co-products (when they are not waste), which themselves carry benefits or loads from their previous production history. This information is not provided in information module D. Co-products leaving one product system are treated like any other commodity when they become input into another product system.

6.3 Calculation rules for the LCA

As in NBN EN 15804+A1 (2014)

6.3.1 Functional unit

As in NBN EN 15804+A1 (2014), in addition:

A 9 Definition of the functional unit

The functional unit should be defined according to the following aspects[14]:

- The function(s)/service(s) provided: "what";
- The extent of the function or service: "how much";
- The expected level of quality: "how well";
- The duration/life time of the product: "how long";

NOTE The c-PCR and/or c-BE-PCR can provide more specific guidance or requirements concerning the definition of the functional unit.

EXAMPLE The functional unit of a thermal insulation material might be described as follows:

(WHAT) Thermal insulation material (i.e. reduction of heat transfer through the building elements against which it is installed), composed of a rigid thermoset modified resin insulated faced on both sides with a glass tissue based facing;

[13] Guidance document, §5.2.2, p10.

[14] As defined in PEF, Annex II, p.20.

(HOW MUCH) A surface of 1m² installed in a cavity wall, with a representative thickness of 100mm;
(HOW WELL) Providing an R-value of 5.0m².K/W.
(HOW LONG) Providing thermal insulation for a period of x years.

6.3.2 Declared unit

As in NBN EN 15804+A1 (2014)

6.3.3 Reference service life (RSL)

As in NBN EN 15804+A1 (2014), in addition:

A 10 Declaration of indicator results in relation to RSL

The RSL shall be declared according to at least one scenario, being the most representative.[15]

NOTE This requirement is not applicable to environmental product declarations for raw materials and intermediate products.

Further guidance for estimating the Reference Service life (RSL) might be included in vertical European c-PCR or c-BE-PCR.

Indicator results for the RSL shall be provided per information module. Annual values of indicator results for the use stage (B1-B7) may be given as additional information.

Annual values of indicator results shall not be declared for the production stage (A1-A3), construction process stage (A4-A5), end-of-life stage (C1-C4) and loads and benefits beyond the system boundary (D).

6.3.4 System boundaries

As in NBN EN 15804+A1 (2014)

6.3.4.1 General

As in NBN EN 15804+A1 (2014), in addition following general principles are valid for all life cycle stages (A to C and D):

A 11 Accounting of biogenic carbon during the life cycle

All bio-based materials originating from renewable sources (wood, linen, cork etc. or biogenic manufactured polymers) contain biogenic carbon that originates from living organisms. The mass flows to and from nature and inherent stored biogenic carbon throughout the product system shall be reported as flow of biogenic carbon expressed in CO_2 in the life cycle inventory. When entering the product system, i.e. a flow to technosphere from nature, this biogenic carbon flow shall be characterized with -1 kg CO_2 equiv/kg CO_2 of biogenic carbon in the calculation of the GWP, since it represents a carbon storage that is part of the carbon cycle of bio-based materials. This characterization factor is used for biomass coming from sustainably managed sources. For non-sustainably managed sources, a conservative approach shall be applied, e.g. by assuming that the biogenic carbon flow from non-sustainably managed sources is characterized with 0 kg CO_2 equiv/kg CO_2. In such cases, double counting needs to be carefully avoided when including GHG emissions from land use change (see *A 12 Greenhouse gas emissions from land use change*).

When the biogenic carbon within bio-based material – partly or as a whole – is converted to emissions (e.g. combustion or biodegradation), it shall then be accounted for as emitted biogenic CO_2 and other emissions such as biogenic CH_4 in the information module where they occur, depending on the end-of-life scenario. Emissions

[15] Requirement from KB, Annexe1/Bijlage1.

of biogenic CO_2 shall be characterized with +1 kg CO_2 equiv /kg CO_2 of biogenic carbon in the calculation of the GWP and emissions of CH_4 with 25 kg CO_2 equiv/kg CH_4. [16]

If a material containing biogenic carbon leaves the studied product system at the system boundary between product systems in module C (or any other module), this export of bio-based material and associated flow of biogenic carbon shall be reported as export of biogenic carbon expressed in CO_2 in the life cycle inventory and characterized with +1 kg CO_2 equiv/kg CO_2 of biogenic carbon in the calculation of the GWP in module C (or any other module). In analogy, any import of bio-based material to the product system as secondary fuel or secondary material is reported as input of stored biogenic carbon expressed in CO_2 in the life cycle inventory and shall be characterized with -1 kg CO_2 equiv/kg CO_2 of biogenic carbon in the calculation of the GWP.

NOTE 1 The flows of biogenic carbon expressed in CO_2 in bio-based materials that are reused, recycled or combusted as the end-of-life scenario will result in zero net contribution to the GWP, when the GWP is added up over the whole life cycle (modules A-C), except for the part of biogenic carbon that is converted to CH_4 or other GHG emissions over the life cycle.

NOTE 2 This accounting approach is valid for all life cycle stages from A to C

Since there is not yet sufficiently robust LCI data available to enable a coherent automatic calculation of the biogenic carbon emissions and removals, emissions and removals of biogenic carbon may be calculated only for the amounts present in the biomaterial in the finished construction product and in its packaging, and not for the amounts of biomaterial input required to make the product (e.g. packaging of raw materials used in A1-A3, biogenic carbon emissions and removals from grid electricity production). Biogenic carbon contained in packaging of the finished product that would result in zero net contribution to the GWP over the life cycle (e.g. packaging made from wood from sustainable sources that is incinerated or recycled in module A5) may be omitted from the calculations.[17]

However, for all processes where biogenic carbon removals are reported, biogenic carbon emissions shall also be calculated and reported in the EPD Also, a mass and carbon balance shall be carried out to ensure that the biogenic carbon dioxide removals and emissions are coherently computed for the considered processes.

NOTE 3 NBN EN 16449:2004 *Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide* provides guidance on how to calculate the biogenic carbon content of wood and wood based products.

A 12 Greenhouse gas emissions from land use change

The impact of land use change on climate change results basically from a change in carbon stocks in land. Direct land use change occurs as the results of a transformation from one land use type into another, which takes place in a unique land cover, possibly incurring changes in the carbon stock of that specific land, but not leading to a change in another system.

When significant, GHG emissions occurring as a result of direct land use change should be included in the quantification of the GWP. They are assessed in accordance with internationally recognized methods in line with the provisions of the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories. These GHG emissions are included in the LCI and LCIA and documented separately in the project report. The project report shall include a dated reference to the underlying methodology, and an interpretation of the results reflecting the influence of data availability.

NOTE 1 This aspect is not restricted to bio-based materials, e.g. in the context of deforestation or conversion of grassland to energy crops, but applies also to other materials and processes, e.g. related to the conversion of land to quarries, infrastructure, production plants etc.

[16] Characterisation factor for GWP from Annex 1 of EN 15804

[17] Carbon sequestration in packaging is much shorter as carbon sequestration in the product itself. Calculating the carbon emissions and removals for packaging where the sum is zero over the life cycle does therefore provide less useful information to the EPD reader.

GHG emissions that occur as a result of direct land use change shall be allocated to products for (i) 20 years after the land use change occurs or (ii) a single harvest period from the extraction of the evaluated product (even if longer than 20 years) and the longest period shall be chosen.

NOTE 2 According to EN 16485 wood from sustainably managed forestry's is accounted for zero emission concerning land use change. The concept of sustainably managed forests is linked but not limited to respective certification schemes. Other evidence such as national reporting under the United Nations Framework Convention on Climate Change (UNFCCC) can be used to identify forests for which stable or increasing forest carbon stocks and thus zero emissions from land use change can be assumed.

A 13 Carbon offset schemes

Benefits associated with carbon offset schemes shall not be included in the LCA calculations of EPD's conducted to this PCR, but may be reported separately as "additional environmental information".

A 14 On-site (renewable) energy generation

Within the assessed system boundary, (renewable) energy may be produced on-site. If part of it is consumed on-site and part of it is exported outside the system boundaries (e.g. provided to the electricity grid), both energy flows should be treated as co-products and the impact from energy production should be allocated accordingly. This means that part of the impact from the energy generation (e.g. PV-panels) can be allocated to the energy leaving the system boundaries. However, benefits associated with net exports from onsite energy generation (e.g. avoided electricity production from national energy mix) shall NOT be attributed to products covered by the EPD.

A 15 Addition related to carbonation

Carbonation may be considered following the specifications of European or Belgian c-PCR relevant for the considered product group (e.g. concrete and concrete products, lime based mortars). The underlying methodology, and scenarios shall be included in the EPD (in "scenarios and technical information") and the contribution of carbonation to GWP shall be declared separately (see A 34).

6.3.4.2 Product stage

As in NBN EN 15804+A1 (2014), in addition:

A 16 Packaging waste in the product stage

Packaging waste from the production process shall be tracked to the end-of-waste state or final disposal. Where the fate is not known, national or European databases can be used as a source of typical percentages of packaging sent to different fates. [18]

For packaging waste from production processes that take place in Belgium the default scenarios provided in 7.3.4 shall be used when specific data is not available (see A 36).

NOTE This link provides information: http://ec.europa.eu/eurostat

NBN EN 15804+A1:2014 requires allocation for all net flows crossing the product system boundary from modules A1-A3 and becoming secondary materials and/or exported energy after they have reached the end of waste state. A conservative approach would be to omit such an allocation and leave benefits and loads to the system under study, as the effort of allocation may be disproportionate to any improvement in accuracy.[19]

[18] From Guidance document, §6.3.4.2.2, p. 16

[19] From Guidance document §6.3.4.2.2

6.3.4.3 Construction stage

As in NBN EN 15804+A1 (2014)

6.3.4.4 Use stage

As in NBN EN 15804+A1 (2014)

6.3.4.4.1 General

As in NBN EN 15804+A1 (2014)

6.3.4.4.2 B1–B5 Use stage information modules related to the building fabric:

As in NBN EN 15804+A1 (2014)

6.3.4.4.3 B6 – B7 use stage information modules related to the operation of the building:

As in NBN EN 15804+A1 (2014)

6.3.4.5 End-of-life stage

As in NBN EN 15804+A1 (2014) in addition:

A 17 Incineration of waste

If the efficiency of energy recovery is unknown, it shall be assumed that R1 < 0,6. Hence loads and MJ exported energy (EN 15804:2012+A1:2013, 7.2.5, Table 6 – Exported Energy in MJ per energy carrier) are declared where the waste is disposed of (module C4 if End-of-life), and the potential substitution benefits from exported energy are reported in module D[20] (see Table 1)

This rule is valid for all modules A to D.

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

As in NBN EN 15804+A1 (2014), in addition:

A 18 Clarification concerning the principle and calculation of benefits and loads beyond the product system boundary

Figure 3 provides graphical guidance on the principles related to the calculation of net impacts in module D.

[20] Guidance document : 6.3.4.2.2

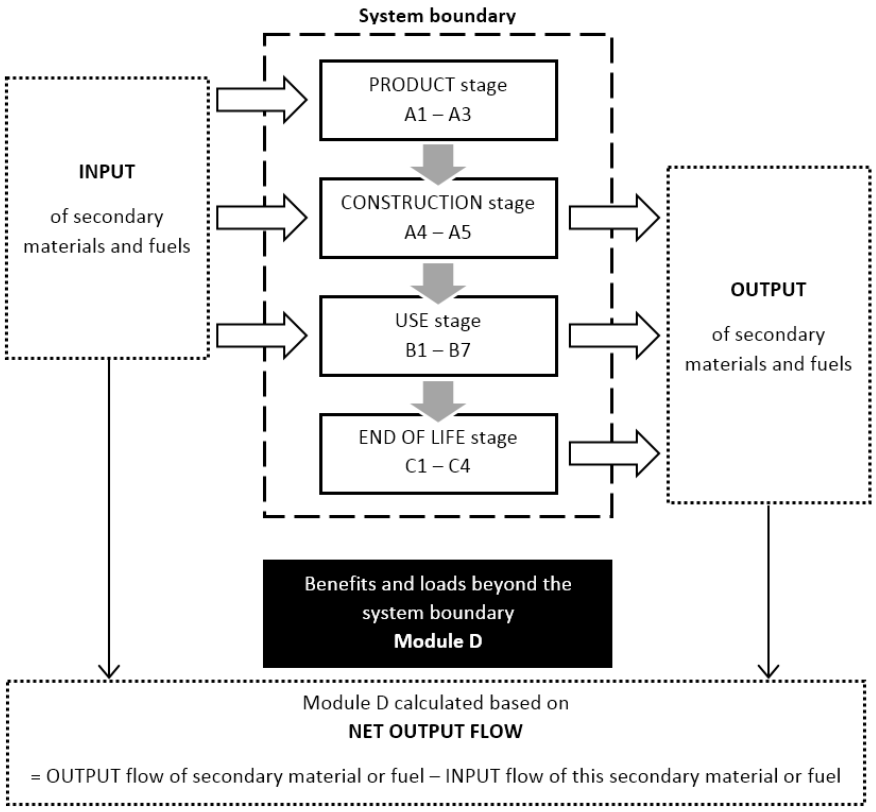

Figure 3: Graphical representation of module D principle (after NBN EN 15804+A1:2014).

EXAMPLE The method for calculating the net impacts is detailed in NBN EN 15804+A1:2014, § 6.4.3.3. An example of net output flow calculation for a secondary material is included below.

A product, e.g. metal, has an output at the end-of-life (C1) of 0.8kg material, which has reached an EOW state from module C3 activity. If the recycling rate is 90%, than recycling this scrap results in 0.72kg of scrap metal that can be used in another system with the impacts from disposing of 0.08kg to be reported in C4.

1. If the initial product has no scrap input per kg in its module A, the output flow of 0.72kg shall be considered for calculation of the associated loads and benefits.
   - Any further processing of the 0.72kg before being used in the new system shall be taken into consideration as a load in module D.
   - In this example a recycling yield of 95% is assumed which enables the replacement of virgin input in a new system with 0.68 kg (= 0.72kg * 0.95) of scrap metal. The (avoided) production of 0.68kg of virgin material shall therefore be taken into consideration as a benefit in module D.

2. If the initial product has a scrap input of 0.5kg per kg in its module A, then only a net output flow of 0.72-0.5 = 0.22kg shall be considered for calculation of the associated loads and benefits.
   - Any further processing of the 0.22kg before being used in the new system shall be taken into consideration as a load in module D.
   - Using the same recycling yield of 95% in the new system, enables the replacement of virgin input in a new system with 0.209 kg (= 0.22kg * 0.95) of scrap metal. The (avoided) production of 0.209kg of virgin material shall be taken into consideration as a benefit in module D.

As stated in NBN EN 15804+A1:2014, § 6.4.3.3 "[…] the potential benefits or avoided loads can be calculated based on a specific scenario which is consistent with any other scenario for waste processing and is based on current average technology or practice."

The reuse, recovery or recycling scenario shall clearly be stated in the EPD.

For transparency, impacts connected to the recycling or recovery processes from beyond the system boundary up to the point of functional equivalence (being the "loads") should be declared separately from the impacts

resulting from the substituted production of the product or substituted generation of energy from primary sources (being the “benefits”).

A 19 Quantification of benefits from exported energy

Unless more specific values are available, for waste incineration processes that take place in Belgium, following default scenarios shall be used for the quantification of the benefits from exported energy in module D:

- net energy efficiency of 20% for thermal energy and 10% for electric energy (using the Lower Heating Value of waste (LHV)

EXAMPLE If 1kg of waste with a LHV of 10MJ/kg is incinerated, benefits declared in module D are quantified based on the avoided production of 20%x10MJ=2MJ heat and 10%x10MJ=1MJ electricity

- substituting process for heat production: “Thermal energy from natural gas” (e.g. Heat, natural gas, at industrial furnace >100kW)

- substituting process for electricity production: Belgian electricity mix (including imports but excluding losses from transformation and distribution)

6.3.5 Criteria for the exclusion of inputs and outputs

As in NBN EN 15804+A1 (2014), in addition:

A 20 Exclusion of inputs and outputs

The following procedure shall be followed for the inclusion and exclusion of inputs and outputs:

- In general, all inputs and outputs to a (unit) process for which data are available shall be include in the calculations. Data gaps should be filled by conservative assumptions with average, generic or proxy data. Any assumptions for such choices shall be documented. When proxy data are used for data gaps, its influence on the overall results shall be mentioned in the EPD, if this contribution is assumed to be significant (e.g. more than 10% to any of the required impact-categories of this standard).

- In case of insufficient input data, or data gaps for a unit process, the cut-off criteria shall be 1% of renewable, 1% of non-renewable primary energy usage, 1% of the total mass input of that unit process.

- The total of neglected input flows per module (A (=sum of A1-A3), B (sum of B1-B7), C (sum of C1 to C4) and D) shall be a maximum of 5% of energy usage and mass.

- Materials and energy flows known to have the potential to significantly contribute to any of the environmental indicators of this standard (e.g. substances with hazardous and toxic properties, or from which the extraction, use or disposal causes significant effects or energy use) shall be included even when the given unit process is under the cut-off criteria of 1% of total mass or energy usage.

The procedure for inclusion and exclusion of inputs and outputs also applies to the impact of infrastructures (e.g. production facility, machinery used in production processes, transport infrastructure), consumables necessary for the functioning of the process (e.g. lubricating oil), production, maintenance and end-of-life of equipment (e.g. crane, truck for road transport).

Processes that can systematically be excluded from the inventory are:

- Employee transport and business travel

- Energy use, infrastructure and consumables from administrative departments (e.g. head offices and sales offices)

6.3.6 Selection of data

As in NBN EN 15804+A1 (2014), in addition:

A 21 Electricity use (including renewable energy purchases)

When calculating impacts associated with electricity consumed from the grid, the national energy models applicable in the country where the process occurs should be used, i.e.:

- Production facility in Belgium: use Belgian electricity mix (consumption mix including imports)
- Production facility outside of Belgium: use electricity mix representative of the country where the production takes place.

Supplier specific data may be used when available. However, if the energy is renewable, the supplier shall guarantee that the electricity supplied to the organisation to produce the product is effectively generated using renewable sources and is not put into the grid to be used by other consumers (e.g. Guarantee of origin for production of renewable electricity), If proof cannot be provided for the full period of validity of the EPD, proof for the 5 preceding years shall be provided to the program operator.

For electricity consumed during installation (module A5), use (modules B1-B7) and end-of-life (modules C1-C4 and D), the Belgian average electricity mix should be used. Any deviations hereof should be clearly motivated in the project report and declared as scenario information in the EPD (e.g. end-of-life scenario assuming that the waste is treated outside of Belgium because no treatment facility is available in Belgium).

A 22 Selection of data with regard to average EPD's

Ideally, an average EPD will provide the impact of an average product, for example by weighting impacts by production volume of all or a representative sample of the products it covers.

NOTE a representative sample can be established e.g. based on representation in terms of production method and/or market share. One product could also be chosen as representative for the product group covered by the EPD.

The selection of products to be covered in one average EPD should be done in such a way that the resulting average EPD is reasonably descriptive of the product group represented by the EPD in view of the use of the EPD in a construction works assessment.

The homogeneity (in terms of environmental impact) of the product group covered by the EPD should be evaluated based on a sensitivity analysis. The latter should identify the main contributors to the environmental impact of the considered product, how those vary amongst the different products/manufacturers represented by the EPD (or amongst the representative samples of the product group) and based hereupon what is the expected range of LCIA results (for all declared modules). If the variability between the products within the group is too high for the main environmental indicators (selection of at least 3 indicators out of the indicators listed in §7.2.3 of NBN EN 15804+A1:2014 and BE-PCR based on relevance for the considered product (e.g. based on normalised results) and including at least GWP), it may be necessary to adjust the product group. This sensitivity analysis should be documented in the project report provided to the verifier.

In cases where a representative value is chosen for each of the environmental indicators for a product group, the value reported may either be the average performance within a defined range of variation within the group or the worst-case result within the variation of the product group.

6.3.7 Data quality requirements

As in NBN EN 15804+A1 (2014), in addition:

A 23 Using generic data from the ecoinvent database

Whenever using generic data from Ecoinvent v3, the *"allocation, cut-off by classification"* system model should be used.

A 24 Time period for collection of inputs and outputs

On unit process level the time period over which inputs to and outputs from the system shall be accounted for is 100 years. The years are counted from the time when the material, pre-product or product enters the relevant process, e.g. landfill.

If relevant (e.g. landfill of hazardous waste), long-term emissions (i.e. that occur beyond 100 years) should be inventoried in a separate dataset as “long-term” elementary flows. Corresponding LCIA results should be declared separately from the 100 years results.

6.3.8 Developing product level scenarios

As in NBN EN 15804+A1 (2014), in addition:

A 25 Waste treatment scenarios

Indicator results presented in the EPD shall be representative of the average waste flows. However, when different scenarios are developed for information modules C1-C4 the most relevant scenarios (and corresponding results) may be provided as 100 % version in the additional technical information. For example when 20% of a product is recycled, 50% is incinerated and 30% is deposited, declared values on aspects and impacts for modules C1-C4 and module D may be declared as additional technical information for 100% of incineration, 100% of recycling and 100% of deposition. This allows the building assessor to choose and calculate the correct scenario on building level as actual waste management practices vary in different member states.

Table 2 — Waste treatment scenarios

Waste flow	**100 %**					**Actual % waste flows (U+V+W+X+Y+Z =100%)**	**Calculated values in the building assessment acc. to** EN 15978				
	C1	C2	C3	C4	D		C1	C2	C3	C4	D
Re-use (specify scenario)	[a_i = declared values for modules C_i or D on aspects and impacts for 100% Re-use]					U %	U % · [a_i]				
Recycling (specify scenario)	[b_i = declared values for modules C_i or D on aspects and impacts for 100% Recycling]					V %	V % · [b_i]				
Use as secondary fuel	[c_i = declared values for modules C_i or D on aspects and impacts for 100% energy recovery]					W %	W % · [c_i]				
Disposal by incineration	[e_i = declared values for modules C_i or D on aspects and impacts for 100% incineration]					Y %	Y % · [e_i]				
Disposal to landfill	[f_i = declared values for modules C_i or D on aspects and impacts for 100% landfill]					Z %	Z % · [f_i]				

6.3.9 Units

As in NBN EN 15804+A1 (2014)

6.4 Inventory analysis

As in NBN EN 15804+A1 (2014)

6.4.1 Collecting data

As in NBN EN 15804+A1 (2014)

6.4.2 Calculation procedures

As in NBN EN 15804+A1 (2014), in addition:

A 26 Biogenic carbon

Biogenic carbon flows are inventoried in accordance with the specifications set in *A 11 Accounting of biogenic carbon during the life cycle*. Those fluxes should be inventoried separately from fossil carbon fluxes expressed in CO_2 equiv and shall be documented separately in the project report.

6.4.3 Allocation of input flows and output emissions

As in NBN EN 15804+A1 (2014)

6.4.3.1 General

As in NBN EN 15804+A1 (2014), in addition:

A 27 Allocation of biogenic carbon and GHG emissions from land use change

As material inherent property, biogenic carbon content are allocated reflecting the physical flows, irrespective of the allocation chosen for the process.

As GHG emissions associated with land use change are not a material inherent property, in case of co-product allocation they shall be allocated according to the allocation chosen for the process (e.g. economic or physical allocation).

6.4.3.2 Co-product allocation

As in NBN EN 15804+A1 (2014)

6.4.3.3 Allocation procedure of reuse, recycling and recovery

As in NBN EN 15804+A1 (2014)

6.5 Impact assessment

As in NBN EN 15804+A1 (2014), in addition:

A 28 Characterization factors

Characterization factors stated in Annex C are based on CML-IA version 4.1, dated October 2012. More accurate characterization factors (with more significant figures) from CML-IA version 4.1 may also be used.[21]

[21] Interpretation of EN 15804 from http://portailgroupe.afnor.fr/public_espacenormalisation/CENTC350/table_questions_and_answers_EN_15804_june_2015.pdf

7 Content of the EPD

As in NBN EN 15804+A1 (2014)

7.1 Declaration of general information

As in NBN EN 15804+A1 (2014), in addition

A 29 Additional requirements regarding the declaration of information in the case of average EPD's

In the case of average EPD, the following information shall at least be provided in the EPD for transparency and to give the user the necessary information to use the EPD correctly:

a) The range of products for which the EPD is relevant, even if data from some products has not been used directly in producing the EPD, including the technical description of the product group covered by the EPD (such as density or a property as a U-value)

EXAMPLE For an average EPD for a declared unit of R-Value of a specific type of insulation material, the representation of the EPD could be described by the relevant technical properties such as the range of density, thermal conductivity and thickness for which the EPD is representative

b) Sites, manufacturer, or group of manufacturers or those representing them for whom the EPD is representative

c) In case of collective EPD, identification of the market players that can use the collective EPD.

d) When there is a selection of sites or products assessed,

- description on how the selection of the sites/products was done
- the number of manufacturing plants included in the EPD; and the relative production volume covered by the sample (in relation to the product group represented by the EPD)

e) how the declared value has been determined (e.g. worst case value or weighted average of results from the various products based on production volume)

f) information on the most influencing parameters in the LCA

g) Description of the range of variability of the LCIA results (preferably quantitative)

h) Qualitative description of the main differences between the products / production sites covered by the EPD (e.g. similar composition but different production process, or same composition except for the coloring agent or finishing layer);

i) information on restrictions to the use of the EPD;

j) geographical coverage;

7.2 Declaration of environmental parameters derived from LCA

As in NBN EN 15804+A1 (2014)

7.2.1 General

As in NBN EN 15804+A1 (2014)

7.2.2 Rules for declaring LCA information per module

As in NBN EN 15804+A1 (2014)

7.2.3 Parameters describing environmental impacts

As in NBN EN 15804+A1 (2014), in addition:

A 30 Significant figures

All results shall be reported to 3 significant figures.

A 31 Parameters describing additional environmental impacts

In addition to the parameters described in NBN EN 15804+A1:2014 the following additional parameters are required and shall be included in the EPD as follows:

Impact category	Impact assessment model, unit and characterisation factors
Ecotoxicity for aquatic fresh water	Impact assessment model and units as specified in EN 15804. If lacking, specifications from the *Product Environmental Footprint* of DG Environment will be followed. If specifications are lacking in both references, it is not mandatory to declare the impact category. In case of declaration, the selected assessment model will be clearly stated in the project report.
Human toxicity (carcinogenic effects)	
Human toxicity (non-carcinogenic effects)	
Particulate matter	
Resource depletion (water)	
Ecotoxicity (land)	
Ecotoxicity (marine)	
Land use (soil quality and biodiversity)	

7.2.4 Parameters describing resource use

As in NBN EN 15804+A1 (2014), in addition:

A 32 Net fresh water use

This indicator is calculated in compliance with ISO 14046.

NBN EN 15804+A1:2014 uses the term “net” as opposed to "gross" in relation to freshwater use, to show both: the intention that use of water, which it is not consumed (e.g. water used for river transport, used to power hydroelectric turbines or used as coolant and returned to the original source), is not considered within the indicator.

That water which would have been lost from the original, natural system, e.g. from evaporation of rainwater or from a body or water is not considered within the losses from the studied technical system.

Evaporated fresh water is considered consumption unless it is demonstrated otherwise. For each process, the water flows are identified, in terms of volume extracted, volumes discharged and the source or the destination, e.g. surface water, ground water, sea water.

Where tap water (water from the public grid) is used, the water treatment and distribution systems are considered as an upstream process, which will have its own resource use and discharges.

Similarly, where water is discharged to the sewer, then the sewer and water treatment system are considered as a downstream process with its own resource use and discharges.

Other water flows, for example water which evaporates or water, which is incorporated into the product, are ideally be itemised in the process inventory so that a full water balance can be made.

For each process, the water consumed is the sum of the water, which is lost from a drainage basin. This can be more easily calculated as the sum of water, which evaporates, transpires from biomass, is incorporated into products or is discharged to a different drainage basin. This also, as mentioned, does not need to account for water, which would have been lost from the drainage basin in the natural system before the technical system was implemented.

EXAMPLE 1 Rainwater would normally be expected to drain to surface or ground water. If a factory or building is placed on the site, then water could instead be directed to the sewer and could be discharged, after treatment, to the sea, surface or ground water. Water, which is diverted through the water treatment system from its original drainage basin is consumed. If rainwater is used in the building before discharging it into the sewer then this will be considered no differently than if the water was discharged directly to the sewer. However, if rainwater is used for cleaning and evaporates, then this water is consumed.

EXAMPLE 2 For an agricultural process, water that evaporates or transpires from the plants as a result of human activity (irrigation) is considered as consumption. Water such as rainwater, which evaporates or goes to the drainage basin in the same way as if it would, were there no agricultural process, is not consumption. The assumption is that natural vegetation would have the same effect.

EXAMPLE 3 Additional water evaporation from reservoirs and as a result of the hydro-generation process downstream occurring in addition to that from the original natural system is considered water consumption.

EXAMPLE 4 For a quarry, where de-watering takes place, if this water is returned to the same drainage basin it would naturally have drained to, then it is not consumption. If however, it is used in a process and evaporates, then it is consumption.

7.2.5 Other environmental information describing different waste categories and output flows

As in NBN EN 15804+A1 (2014)

7.3 Scenarios and additional technical information

As in NBN EN 15804+A1 (2014)

7.3.1 General

As in NBN EN 15804+A1 (2014), in addition:

A 33 Declaration of technical scenario information for bio-based materials

The amount of biogenic carbon contained in bio-based material leaving the product system shall be declared as technical scenario information in the module where the material is leaving the product system, irrespective of whether the environmental impacts and aspects of this module are declared. As a default for biobased packaging material, the quantity of biogenic carbon (expressed in kg CO_2 equiv) within the packaging for the declared unit shall be documented in module A5 as technical scenario information. For construction products, the quantity of stored biogenic carbon (expressed in kg CO2 equiv) at the end-of-life per declared unit of the product (excluding packaging) shall be declared in module C3/C4 as technical scenario information.

NOTE 3 The quantity of biogenic carbon within packaging and/or product provided as technical scenario information in module A5 and/or modules C3/C4 will allow the correct calculation of end-of-life scenarios for the packaging and product where the module is not declared or the scenario is not appropriate for a particular construction works level assessment.[22]

Table 3 – Declaration of biogenic carbon contained in bio-based material leaving the product system

Construction works life cycle information within the system boundary																		
		Production stage				**Construction stage**		**Use stage**							**End of life stage**				Optional supplementary information beyond the life cycle
		A1	A2	A3	Total	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Uptake and emissions associated with biogenic carbon content of the biobased product	kg CO2 eq.																		
Uptake and emissions associated with biogenic carbon content of the biobased packaging	kg CO2 eq.																		

A 34 Declaration of technical scenario information for CO_2 removals from carbonation

The impact of CO_2 removals from carbonation (e.g. carbonation of concrete products) on GWP shall be declared separately as $GWP_{carbonation}$ in the technical scenario information. This parameter is also expressed in kg CO_2 equiv.

7.3.2 Construction process stage

As in NBN EN 15804+A1 (2014)

7.3.2.1 A4, Transport to the building site

As in NBN EN 15804+A1 (2014), in addition:

A 35 Default transport to the building site

Transport scenarios from the factory to the building site shall be representative for the Belgian market share of the production.

In case specific data on transport (e.g. statistical data from logistic department or data provided by c-PCR) is lacking, following default transport scenarios shall be used:

Organisation of transport:

- Unless the goods are produced in an overseas location, fractions of products that go directly from the factory to the building site or to a retailer first are determined based on product group according to Table 5. For products produced overseas, it is assumed that no products are transported directly to the building site (so 100% go from factory to retailer first).

[22] From ISO 21930 §7.2.5, Note3 and from Guidance document, 6.3.4.5.3 NOTE3

826 **Transport mode and route:**

827 Default transportation modes are available for each product group in Table 5. Default transport distances are
828 available in Table 4.

829 **Table 4 – Default transport distances (module A4)**

		TRANSPORT DISTANCE		
		Factory to construction site	Factory to supplier	Supplier to construction site
ORIGIN	**Production in Belgium**	100 km	100 km	35 km
	Production outside Belgium (NOT overseas)	Distance from production site to Brussels with a minimum distance of 100 km	Distance from production site to Brussels with a minimum distance of 100 km	35 km
	Production outside Belgium (overseas)		Distance (by road) from production site to closest harbour in the country of origin + Distance (by boat) to port of Antwerp + 60 km by road (Antwerp to retailer)	35 km

830

831 **Loading rates**

832 Default lorries identified in Table 5 are based on Ecoinvent v3.1 data records. Those implicitly suppose default
833 loading rates representing average European journeys. Unless more specific data is available, those average
834 loading rates can be used for the above specified trips. In case those average loading rates are used, return
835 trips can be omitted (as the loading factors used to create those records already take into account a certain
836 amount of empty returns).[23]

837 Any deviations from the default scenarios shall be clearly motivated in the project report and transport scenarios
838 shall be reported transparently in the EPD.

839

[23] Ecoinvent records based on Tremove model v2.7b (2009) and EcoTransIT (2011) report

840

Table 5 – Default transport scenario (module A4)

		ORGANISATION OF TRANSPORT		TRANSPORTATION MODE						
		% directly from factory to construction site	% via intermediary supplier	Factory to construction site			Factory to supplier	Supplier to construction site		
ORIGIN	**Transport from overseas location**	0%	100%				By road: See scenario's for each product group			
							By boat			
	Transport by road from Belgium or Europe	See scenario's for each product group		See scenario's for each product group						
		% directly from factory to construction site	% via intermediary supplier	Factory to construction site			Factory to supplier	Supplier to construction site		
				Lorry 16-32 ton (EURO 5)	Lorry 7.5-16 ton (EURO 5)	Lorry 3,5-7.5 ton (EURO 5)	Lorry >32ton (EURO 5)	Lorry 16-32 ton (EURO 5)	Lorry 7.5-16 ton (EURO 5)	Lorry 3,5-7.5 ton (EURO 5)
PRODUCT GROUPS	**Bulk materials for structural work** (e.g. cement, sand, gravel, ...)	75%	25%	100%	0%	0%	100%	90%	10%	0%
	Poured concrete	100%	0%	100%	0%	0%	nvt	nvt	nvt	nvt
	Prefabricated products for structural works (e.g. beams, columns,…)	100%	0%	100%	0%	0%	100%	100%	0%	0%
	Loose products (e.g. blocks, bricks, roof tiles, plasterboard,…)	40%	60%	100%	0%	0%	100%	85%	15%	0%
	Insulation	40%	60%	100%	0%	0%	100%	85%	15%	0%
	Finishing products: floor coverings (e.g. carpet, linoleum, ceramic tiles,…)	10%	90%	90%	10%	0%	100%	90%	10%	0%
	Finishing products: plasters (e.g. gypsum plaster, external plaster,…)	40%	60%	50%	50%	0%	100%	50%	50%	0%
	Finishing products: cabinet work (e.g. window frames, stairs)	90%	10%	50%	45%	5%	100%	40%	50%	10%
	Finishing products: paints and varnishes	10%	90%	0%	100%	0%	100%	0%	80%	20%
	Installations (e.g. heating boiler, radiators, ventilation)	0%	100%	na	na	na	100%	0%	80%	20%

841

7.3.2.2 A5, Installation in the building

As in NBN EN 15804+A1 (2014)

7.3.3 B1-B7 use stage

7.3.3.1 B1-B5 use stage related to the building fabric

As in NBN EN 15804+A1 (2014)

7.3.3.2 Reference service life

As in NBN EN 15804+A1 (2014)

7.3.3.3 B6, use of energy and B7, use of water

As in NBN EN 15804+A1 (2014)

7.3.4 End-of-life

As in NBN EN 15804+A1 (2014), in addition:

A 36 Default end-of-life scenario

End-of-life scenarios shall be representative of the Belgian situation. In case specific data on end-of-life is lacking, following default scenarios shall be used. Any deviations from the default scenarios shall be clearly motivated in the project report and scenarios shall be reported transparently in the EPD.

Default End-of-life scenario depending on product group: see Table 6.

NOTE 1 The scenarios in Table 6 represent the average Belgian practice in 2016 (averaged over the different regions and different types of construction works). As a result they do not necessarily represent the technical end-of-life potential or best practice and in some cases might deviate from regulation.

NOTE 2 For recycling, no distinction is made between "open loop" and "closed loop" recycling. This information might be specified for a specific product group in the complementary vertical PCR (c-BE-PCR).

Default transport of waste:

- With the exception of soil, all construction and demolition waste, whether or not sorted on site, is transported from the construction/demolition site to a sorting facility/collection point (e.g. metal dealer) or crusher first and from there it is eventually further dispatched to recycling, incineration, energy recovery or landfill.
- Transport distance:
  - From construction/demolition site to sorting plant/crusher/collection point: 30 km
  - From sorting plant to landfill: 50 km
  - From sorting facility to incineration plant/energy recovery: 100 km
- Transport mode: 100% with Lorry 16-32 ton (EURO 5)
- Average load factor: if default load factors from ecoinvent are used, no empty return has to be taken into account. Otherwise, calculations shall consider empty returns.

878 **Default impact of the sorting plant:**

879 • Electricity use (Belgian electricity mix):

880 - Sorting plant without crusher (=energy demand of conveyor belt etc.) 0.0022 kWh/kg waste
881 (for materials sorted out prior to the crusher (e.g. mineral wool, boards,…) or causing no
882 resistance in crushing (e.g. paints)

883 - Sorting plant with crusher (e.g. for concrete materials): 0.0037 kWh/kg waste

884 - Use Belgian electricity mix (low voltage)

885 • Diesel consumption for charging and discharging waste: 5.9 MJ diesel burned in building machine/m3
886 bulk volume of waste

887 • Infrastructure from sorting plant: 1x10-10 plant/kg waste

888 NOTE 1 as an approximation, the bulk density of waste can be calculated as 0.9 x material density.

889

890 **Table 6 – Default end-of-life scenarios**

Flux de déchet	Produits / Description	Traitement en fin de vie (scénario 2016)			
		Décharge	*Incinération et/ou valorisation énergétique*	*Recyclage (a)*	*Réemploi*
		%	*%*	*%*	*%*
Pierreux & verre (inertes)	Béton	5	0	95	0
	Briques, tuiles	5	0	95	0
	Autres déchets pierreux inertes (p.ex. carrelage, pierre naturelle, ardoise, blocs silico-calcaires)	5	0	95	0
	Porcelaine & céramique (p.ex. WC, bain, lavabo)	15	0	85	0
	Matériaux en vrac (p.ex. sable, graviers, argile expansé)	5	0	0	95
	Verre plat	5	0	95 *(b)*	0
Bois	Bois non-traité, non-contaminé (p.ex. charpente et structure, coffrage, petits bois)	0	25	75	0
	Bois massif traité et non-imprégné (p.ex. bois peint ou vernis (chassis, parquet massif))	0	85	15	0
	Produits en bois composé (p.ex. panneaux de fibres (stratifiés/laminés, agglomérés (MDF, OSB), multiplex, ...))	0	95	5	0
	Bois imprégné et traité chimiquement (p.ex. billes de chemin de fer, bois pour abri-garage, jouets extérieurs, écrans de jardin, ...)	0	100	0	0
Métaux	Fer, acier, métaux non-ferreux (cuivre, bronze laiton, aluminium, plomb, zinc, étain)	5	0	95	0
Emballages (chantier)	Papier et carton	0	5	95	0
	Films en plastique (emballages)	5	60	35	0
	Emballages EPS	10	30	60	0
	Palettes	0	40	40	20
Isolants	Isolants minéraux (p.ex. laine de roche, laine de verre)	50	50	0	0
	Isolants synthétiques (p.ex. polyuréthane (PUR), polyisocyanurate (PIR), polystyrène extrudé (XPS), mousse phénolique, polystyrène expansé (EPS))	5	95	0	0
	Isolants organiques (p.ex. fibres de plantes (bois, cocos, chanvre, lin), cellulose (en vrac ou en matelas), laine de mouton, liège (en vrac ou en matelas))	5	95	0	0
Produits fibro-ciment	p.ex. Plaque /Ardoise fibro-ciment	100	0	0	0
Eléments en plâtre	p.ex. Blocs de plâtre, plaques de plâtre	80	0	20	0
Béton cellulaire	p.ex. Eléments, blocs	70	0	30	0
Bitume	p.ex. Roofing bitumineux, pare/frein vapeur, pare eau, ...	85	5	10	0
Polyoléfines (PP, PE)	p.ex. Pare/frein vapeur en papier kraft ou polyéthylène (PE), conduits. Hors emballages.	10	85	5	0
Elastomères	p.ex. Roofing résineux réticulé EPDM	90	0	10	0
PVC	Films PVC, p.ex. roofing résineux thermoplastique PVC, membranes étanches (ex. pour les piscines)	20	65	15	0
	Profils en PVC, p.ex. châssis	10	45	45	0
	Cablage, p.ex. câbles électriques et isolation de fil	10	40	50	0
	Conduits, p.ex. pour les canalisations *(c)*	10	30	50	0
Revêtements de sol souples	p.ex. linoleum, tapis-plain, vinyle	0	95	5	0
Finitions *(d)*	Couche de finition collée à du bois, à de la matière synthétique ou à du métal, p.ex. peinture, revêtement, colle	0	100 *(e)*	0	0
	Couche de finition collée à des débris (inertes), p.ex. plâtre (p.ex. de gypse, de calcaire et d'argile), peinture, revêtement, colle	5	0	95 *(f)*	0
Déchets résiduels	Déchet résiduel non-combustible	100	0	0	0
	Déchet résiduel combustible (p.ex. lamelles, textile de pare soleil)	0	100	0	0
Autres déchets dangereux	Bombes et kits (mousse PU, silicones)	0	100 *(g)*	0	0
	Amiante liée ou non-liée	100	0	0	0
	Tubes fluorescents	30	0	70	0
	Déchets fluides de chantier, p.ex. restes de peintures, colles, résines, huiles de décoffrage, white spirit	0	75	25	0

(a) *La valorisation énergétique ne tombe pas sous la catégorie "recyclage" mais sous la catégorie "incinération et/ou valorisation énergétique". Le recyclage peut être 'open loop' (recyclage dans une autre application) ou 'closed loop' (recyclage dans la même application).*

(b) *Principalement recyclage "open loop" (Si le verre n'est pas démonté avant démolition, celui-ci est recyclé avec la fraction inerte. Applications courantes pour le verre collecté séparément sont: production de laine de verre, verre cellulaire, billes de verre,...).*

(c) *10% restent généralement dans le sol. La somme des scénarios n'est donc pas égale à 100%.*

(d) *Il s'agit de relativement petites quantités de matériaux qui sont collées aux autres matériaux.*

(e) *La finition suit le même chemin que son support. Lors du broyage du bois (pour recyclage), la couche de finition se retrouve dans les fines qui sont ensuite incinérées. Le recyclage des métaux est réalisé à haute température, donc en pratique la couche de finition est aussi incinérée.*

(f) *La finition suit le même chemin que son support (p.ex. béton, brique). Lors du broyage, la couche de finition est recyclée avec le débris (open loop recycling). Il faut remarquer que le plâtre de gypse est un facteur qui peut déranger la qualité de la fraction inerte.*

891 (g) *La bombe elle-même sera recyclée (métal), le contenu sera incinéré pendant ce processus.*

Afvalstroom	Product / Beschrijving	Afvalbehandeling (scenario 2016)			
		Stort	*Verbranding en/of energetische valorisatie*	*Recyclage (a)*	*Hergebruik*
		%	*%*	*%*	*%*
Steenachtig & glas	Beton	5	0	95	0
	Baksteen, dakpannen	5	0	95	0
	Ander steenachtig (o.a. tegels, natuursteen, leisteen, kalkzandsteenblokken)	5	0	95	0
	Porcelein & keramiek (o.a. wc, bad, lavabo)	15	0	85	0
	Bulkmaterialen (o.a. zand, grind, geëxpandeerde kleikorrels)	5	0	0	95
	Vlakglas	5	0	95 *(b)*	0
Hout	Onbehandeld, niet-verontreinigd hout, bv. daken en structuur, bekisting & hulphout, …	0	25	75	0
	Massief hout met oppervlaktebehandeling, bv. geverfd of gevernist hout (raamkaders, massief parket)	0	85	15	0
	Composiet hout producten, bv. vezelplaten (multiplex, spaanplaten, OSB, MDF), fineerhout, laminaat, …	0	95	5	0
	Chemisch behandeld geïmpregneerd hout, bv. treinbilzen, hout voor carports, buitenspeeltuigen, tuinschermen, …	0	100	0	0
Metalen	Ijzer, staal, non-ferro metalen (koper, messing, aluminium, lood, zink, tin)	5	0	95	0
Verpakkingen (Werf)	Papier en karton	0	5	95	0
	Plastiekfolies (verpakkingen)	5	60	35	0
	EPS-verpakkingen	10	30	60	0
	Paletten	0	40	40	20
Isolatiematerialen	Minerale isolatiematerialen (o.a. rotswol, glaswol)	50	50	0	0
	Synthetische isolatiematerialen (o.a. polyurethaan (PUR), polyisocyanurate (PIR), geëxtrudeerd polystyreen (XPS), fenolschuim, EPS)	5	95	0	0
	Organische isolatiematerialen (o.a. plantaardige vezels (hout, kokos, hennep, vlas), cellulose (in bulk of matten), schapenwol, kurk (in bulk of platen))	5	95	0	0
Vezelcementproducten	o.a. Vezelcementplaten/leien	100	0	0	0
Gipselementen	o.a. Gipsblokken, gips(karton)platen	80	0	20	0
Cellenbeton	o.a. Elementen, blokken	70	0	30	0
Bitumen	o.a. Bitumineuze dakbedekking, dampschermen, vochtkering, …	85	5	10	0
Polyolefinen (PP, PE)	o.a. Dampscherm in kraftpapier of polyethyleen (PE), buizen. Uitgezonderd verpakkingen	10	85	5	0
Elastomeren	o.a. EPDM dakbedekking	90	0	10	0
PVC	Folies, o.a. PVC dakbedekking, waterdichte membranen (bv. voor zwembaden)	20	65	15	0
	Profielen (o.a. raamkozijnen)	10	45	45	0
	Bekabeling (o.a. elektrische kabels en draadisolatie)	10	40	50	0
	Buizen (o.a. voor riolering) *(c)*	10	30	50	0
Soepele vloerbekledingen	o.a. linoleum, vast tapijt, vinyl	0	95	5	0
Afwerkingslagen *(d)*	Verkleefd aan hout, kunststof of metaal: bv. verven, coatings, lijmen	0	100 *(e)*	0	0
	Verkleefd aan steenachtig afval: bv. pleisters (o.a. gips-, kalk-, en leempleisters), verven, coatings, lijmen	5	0	95 *(f)*	0
Restafval	Niet brandbaar restafval	100	0	0	0
	Brandbaar restafval (o.a. lamellen, textiel van zonwering)	0	100	0	0
Ander gevaarlijk afval	Spuitbussen en kits (PU-schuim, siliconen)	0	100 *(g)*	0	0
	Asbest (gebonden, ongebonden)	100	0	0	0
	TL-Lampen, …	30	0	70	0
	Vloeibaar werfafval van o.a. verven, lijmen, harsen, bekistingsoliën, white spirit, …	0	75	25	0

(a) *Energetische valorisatie valt NIET onder de categorie "recyclage" maar onder de categorie "verbranding en/of energetische valorisatie". Recyclage kan "open loop" (recyclage in een andere toepassing) of "closed loop" zijn (recyclage in dezelfde toepassing).*

(b) *Grotendeels "open loop" recycling (Indien het glas niet gedemonteerd wordt voor het slopen, wordt het samen met de inerte fractie gerecycleerd. Courante toepassingen voor glas dat wel afzonderlijk ingezameld wordt: productie van glaswol, cellenglas, glasparels,…)*

(c) *10% blijft typisch in de grond zitten, waardoor de som van het scenario geen 100% is.*

(d) *Het betreft relatief kleine hoeveelheden materiaal die verkleefd zijn aan andere materialen.*

(e) *De afwerkingslaag volgt dezelfde weg als zijn drager. Bij het verbrijzelen van hout (voor recyclage) komt de afwerkingslaag in de poederfractie terecht die dan verbrand wordt. Recyclage van metalen gebeurt bij hoge temperaturen zodat de afwerkingslaag in de praktijk ook verbrand wordt.*

(f) *De afwerkingslaag volgt dezelfde weg als zijn drager (bv. beton, baksteen). Bij het breken wordt de afwerkingslaag dus samen met het puin gerecycleerd tot puingranulaat (open loop recycling).*
Hierbij dient te worden opgemerkt dat gipspleister een storende stof is die de kwaliteit van de inerte fractie kan verminderen.

(g) *De spuitbus zelf(metaal) zal worden gerecycleerd, de inhoud ervan zal tijdens dit proces worden verbrand.*

7.4 Additional information on release of dangerous substances to indoor air, soil and water during the use stage

As in NBN EN 15804+A1 (2014)

7.4.1 Indoor air

As in NBN EN 15804+A1 (2014), in addition:

A 37 Emissions into indoor air

For building products in direct contact with and with possible emissions into the indoor air, information concerning possible emission into indoor air should be declared. In case of declaration the characteristics shall be determined according to CEN/TS 16516 *"Construction Products – Assessment of release of dangerous substances – Determination of emissions into indoor air"*:

Characteristic	
R value	2 significant figures
TVOC content	µg/m³ with 2 significant figures
TSVOC content	µg/m³ with 2 significant figures
Carcinogenic substances	mg/m with 1 significant figures or "below the detection limit"
Formaldehyde	µg/m³ with 2 significant figures or "below the detection limit"

In case of declaration, the EPD shall also list the test method reference.

For floor coverings, glues for floor coverings and finishing products for wooden floor coverings the legal obligations specified in the *Royal Decree of 8 May 2014 concerning emissions of building products to the indoor environment* are valid (Koninklijk besluit van 8 mei 2014 tot vaststelling van de drempelniveaus voor de emissies naar het binnenmilieu van bouwproducten voor bepaalde beoogde gebruiken).

7.4.2 Soil and water

As in NBN EN 15804+A1 (2014)

7.5 Aggregation of information modules

As in NBN EN 15804+A1 (2014)

8 Project report

As in NBN EN 15804+A1 (2014)

8.1 General

8.2 LCA-related elements of the project report

As in NBN EN 15804+A1 (2014), in addition:

A 38 Average EPD

For an average EPD, the project report should also describe and present the results from the analysis of variability of LCIA results within the product group (see *A 22 Selection of data with regard to average EPD's*)

8.3 Documentation on additional information

As in NBN EN 15804+A1 (2014)

8.4 Data availability for verification

As in NBN EN 15804+A1 (2014)

9 Verification and validity of an EPD

As in NBN EN 15804+A1 (2014)

Annex A :
Requirements and guidance on the reference service life
(normative)

As in NBN EN 15804+A1 (2014)

Annex B :
Waste
(informative)

As in NBN EN 15804+A1 (2014)

Annex C :
Characterisation factors for GWP, ODP, AP, EP, POCP and ADP
(normative)

As in NBN EN 15804+A1 (2014)

Bibliography

As in NBN EN 15804+A1 (2014), in addition:

Guidance document FprCEN TR 16970
CEN/TC350

Technical report. Final draft FprCEN/TR 16970. Sustainability of construction works — Guidance for the implementation of EN 15804. Version December 2015

ISO/DIS 21930:2015 (E)
Draft international standard circulated by ISO/TC59/SC17.

Sustainability in buildings and civil engineering works – Environmental declaration of building products (Draft circulated for comment and approval. Voting terminates on 2016-05-10)