SLOVENSKI STANDARD
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Trajnostnost gradbenih objektov - Okoljske deklaracije za proizvode - Pravila za kategorije proizvodov za montažne betonske izdelke

Sustainability of construction works - Environmental product declarations - Product Category Rules for precast concrete products

Nachhaltigkeit von Bauwerken - Umweltproduktdeklarationen - Produktkategorieregeln für vorgefertigte Betonerzeugnisse

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Sustainability of construction works - Environmental product declarations - Product Category Rules for precast concrete products

Nachhaltigkeit von Bauwerken - Umweltproduktdeklarationen - Produktkategorieregeln für vorgefertigte Betonerzeugnisse

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 16757:2014) has been prepared by Technical Committee CEN/TC 229 “Precast Concrete Products”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

Introduction

This European Standard provides rules for Environmental Product Declarations (EPD) specifically for precast concrete products. It complements the core product category rules for all construction products and services as established in EN 15804.

An EPD communicates verifiable, accurate, non-misleading environmental information for products and their applications, thereby supporting scientifically based, fair choices and stimulating the potential for market-driven continuous environmental improvement.

The standardisation process has taken place in accordance with EN ISO 14025. All common issues are covered horizontally for all product types in order to minimize vertical (branch specific) deviations. All common issues are covered horizontally for all precast concrete products in order to minimize intra-sectoral deviations.

EPD information is expressed in information modules as defined in EN 15804, which allow easy organisation and expression of data packages throughout the life cycle of the product. The approach requires that the underlying data should be consistent, reproducible and comparable.

In line with EN 15804 the EPD is expressed in a form that allows aggregation (addition) to provide complete information for buildings. This standard does not deal with aggregation at the building level nor does this standard describe the rules for applying EPD in a building assessment.

The standard deals with a limited number of quantifiable predetermined parameters in EN 15804. Future revisions may lead to the incorporation of additional predetermined parameters. This European Standard provides the means for developing a Type III environmental declaration of precast concrete products in the context of a suite of standards that are intended to assess the sustainability of construction works.

This suite of standards includes:

EN 15643-1, *Sustainability of construction works — Sustainability assessment of buildings — Part 1: General framework.*

EN 15643-2, *Sustainability of construction works — Assessment of buildings — Part 2: Framework for the assessment of environmental performance.*

EN 15978, *Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method.*

EN 15804, *Sustainability of construction works — Environmental product declaration — Core rules for the product category of construction products.*

CEN/TR 15941, *Sustainability of construction works — Environmental product declarations — Methodology for selection and use of generic data.*

EN 15942, *Sustainability of construction works — Environmental product declarations — Communication formats: business to business.*

1 Scope

This document offers product category rules (PCR) guidance for the development of Type III environmental declarations for precast concrete products according to EN 15804.

This document defines the parameters to be reported, what EPD types (and life cycle stages) to be covered what rules to be followed in order to generate Life Cycle Inventories (LCI) and conduct Life Cycle Impact Assessment (LCIA) and what quality data to be used in the development of EPDs.

Additional to the common parts of EN 15804, this European Standard for precast concrete products:

— defines the system boundaries;

— defines the modelling and assessment of material-specific characteristics;

— defines allocation procedures for multi-output processes along the production chain;

— defines allocation procedures for reuse and recycling;

— includes the rules for calculating the LCI and the LCIA underlying the EPD;

— provides guidance/specific rules for the determination of the reference service life (RSL);

— gives guidance on the establishment of default scenarios;

— gives guidance on default functional units for precast concrete products.

This document is intended to be used either for cradle to gate, cradle to gate with options or cradle to grave assessment, provided the intention is properly stated in the system boundary description.

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.

EN 15804, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products.*

EN 15942, *Sustainability of construction works — Environmental product declarations — Communication formats: business to business.*

EN 15978, *Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15804: 2012 + A1:2013 and the following apply:

3.1
carbonation
carbon dioxide reaction with cementitious products to form calcium carbonate

3.2
precast concrete product
product made of concrete and manufactured in a place different from the final destination of use, protected from adverse weather conditions during production. The product is the result of an industrial process under a factory production control system and with the possibility of sorting before delivery

3.3
direct land use change
change in human use or management of land at the location of the production, use or disposal of raw materials, intermediate products and final products or wastes in the product system being assessed

4 Abbreviations

Abbreviations as given in standard EN 15804 shall apply.

5 General aspects

5.1 Objective of the Precast Concrete Products PCR

The objective of this PCR is to provide common rules specific for precast concrete products for the application of the EN 15804. In addition to the objectives of EN 15804 this document aims to:

— define the parameters to be declared and the way in which they are collated and reported;

— describe which stages of a product's life cycle are considered in the EPD and which processes are to be included in the life cycle stages;

— to define rules for the development of scenarios, including the rules for calculating the Life Cycle Inventory and the Life Cycle Impact Assessment underlying the EPD, including the specification of the data quality to be applied;

— to communicate EPDs and environmental information about precast concrete products;

— to ensure that comparisons between construction products are carried out in the context of their application in the building.

5.2 Types of EPD with respect to life cycle stages covered

EN 15804 shall apply.

Only cradle-to-grave EPD can be used without additional information in order to evaluate the environmental performance of construction works.

5.3 Comparability of EPD for construction products

EN 15804 shall apply.

As comparison between alternative solutions being relevant at the work level only, comparing EPDs of products at the level of the declared unit (e.g. $1m^3$ of concrete or $1m^2$ of floor) is misleading and shall be avoided. Comparison at the level of the functional unit could be possible, provided that the same system boundaries and main hypotheses are the same.

5.4 Additional information

EN 15804 shall apply.

5.5 Ownership, responsibility and liability for the EPD

EN 15804 shall apply.

5.6 Communication formats

EN 15804 shall apply.

6 Product Category Rules for LCA

6.1 Product category

The product category referred to in this standard includes all precast concrete products for buildings and other construction works.

6.2 Life cycle stages and their information modules to be included

6.2.1 General

Preferably the building life cycle information (from A1 to C4) shall be included in the EPD, which corresponds to the “cradle to grave” option.

A general description of the life cycle stages is given in EN 15804, clause 6.2.

6.2.2 A1-A3, Product stage, information modules

EN 15804 shall apply.

NOTE Precast concrete products may contain the following constituents:

— aggregates, including secondary aggregates;

— hydraulic binder;

— water;

— admixtures;

— nearly inert and pozzolanic or latent hydraulic additions;

— reinforcement steel;

— fibres;

— other products.

When the LCI “A1 to A3” of constituents is not available, impact indicators from the EPDs for the constituents or for a ready-mixed concrete, covering modules A1 to A3, can be used for the assessment of the module A1 of the precast concrete product. If transport is included, then the impacts covering modules A1 to A4 can be used for the assessment of the modules A1 and A2 of the precast concrete product (see Figure 1).

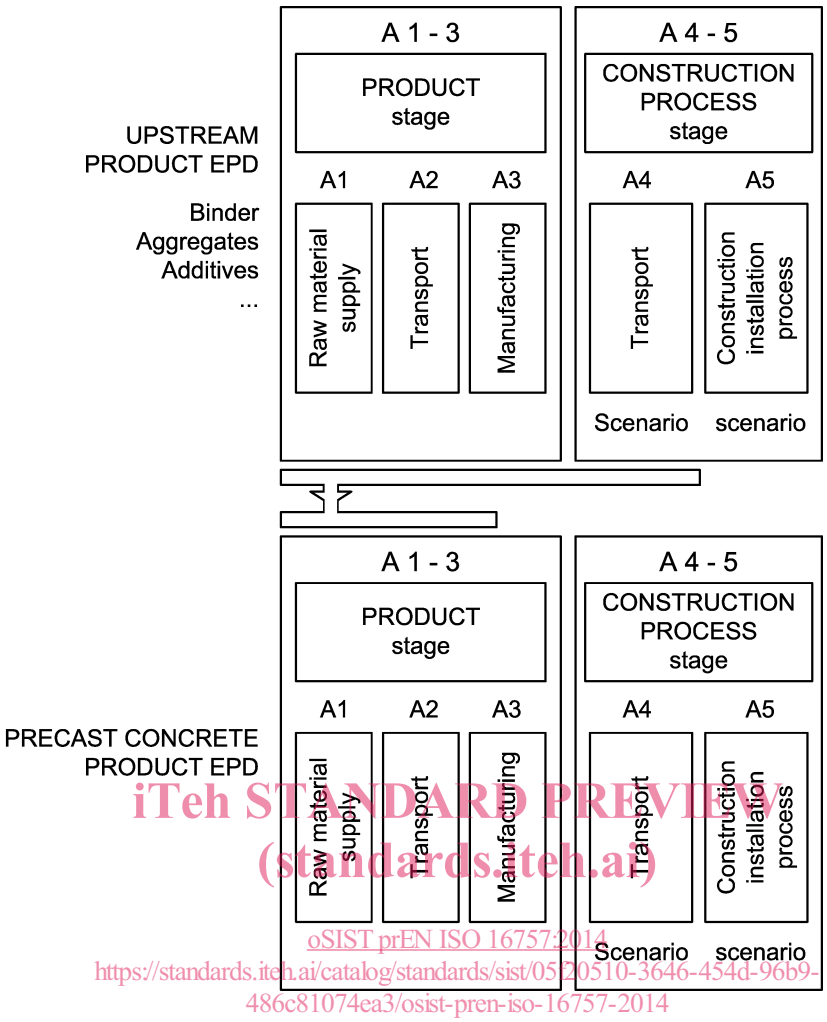

Figure 1 — EPD of constituents and precast concrete products

6.2.3 A4-A5, Construction process stage, information modules

EN 15804 shall apply.

NOTE At the construction stage, additional constituents may be added to the precast concrete product to obtain the defined functional unit; in this case these constituents should be also taken into account during the proper stage.

EXAMPLE Reinforcement steel, mortar, structural topping etc.

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

EN 15804 shall apply.

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

EN 15804 shall apply.

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

EN 15804 shall apply.

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

EN 15804 shall apply.

6.3 Calculation rules for the LCA

6.3.1 Functional unit

EN 15804 shall apply.

The functional unit is based on the function performed by the product in the construction work and on the RSL of the product. It depends on the type of precast concrete product. The functional unit is defined in function of the application of the product in the construction work.

NOTE 1 An example of functional unit is: 1 representative m^2 masonry part of an exterior load bearing wall in typical dwellings, which fulfils the performance requirements of national building codes concerning construction, thermal insulation and sound insulation and fire safety, functioning for 100 years.

NOTE 2 As additional information, the environmental impact may be recalculated for one year of service life.

6.3.2 Declared unit

EN 15804 shall apply.

6.3.3 Reference service life (RSL)

EN 15804 shall apply.

Requirements and guidance on the estimation of service life are given in normative Annex A.

RSL shall be consistent with scenarios described in 6.3.8, especially those related to use stages B1 to B7.

NOTE Guidance values for RSL of precast concrete products, considering appropriate (mix-)design according to the relevant (product-)standards and scenarios for maintenance, are given in Table (Annex E). RSL can be even higher considering additional scenarios for repair or retrofitting.

6.3.4 System boundaries

EN 15804 shall apply.

6.3.4.1 General

EN 15804 shall apply.

6.3.4.1.1 Carbonation

Within the system boundaries, the impact of carbonation during the use and the end-of-life stages of the product shall be taken into account. If module D is used, additional impacts shall be considered.

Chapter 6.3.4.5 defines the system boundaries of the end of life stage, in order to distinguish between the benefits within and beyond the system boundaries.

Annex D provides several ways to assess carbon dioxide sequestration through carbonation in the different life cycle stages.

NOTE Sequestration of CO_2 by concrete surfaces through carbonation can continue for hundreds of years. Studies show that after 100 years, up to 86% of the CO_2 released during the cement manufacturing is absorbed by the concrete.

6.3.4.2 Product stage

EN 15804 applies.

Requirements and guidance on waste are given in normative Annex B.

Product stage A3

Product and Construction stages for precast concrete can be found in figure 2.

Manufacturing of precast concrete products may include the following:

— transportation activities on the production site;

— manufacture of products and co-products;

— curing of products including the necessary energy;

— the manufacturing of any packaging used for the product;

— land filling, disposal and processing (up to the end-of-waste stage) of any output from the product system at this unit process (A3) which reaches the end-of-waste state;

— use of materials and equipment for waste water treatment;

— the local production of energy used in the manufacturing.

Depending on the process, production of ancillary materials used in the manufacture of precast concrete products may also include materials such as coatings, lubricating oils, disposable moulds, engine oils, production and manufacture of pre-products.

NOTE 1 Examples of pre-products include binder preparation, processing of aggregates and preparation of reinforcement steel and steel strands.

Some infrastructure equipment (such as moulds or trench boxes) may have a limited service life. In this case their impact shall be taken into account at the product stage.

In case of cradle –to-gate declaration, the impact of carbonation is not taken into account, as it will occur during the use and end of life stages. However, the impact of the chemical reaction shall be taken into account when assessing the impact of an entire construction work.

NOTE 2 For biogenic carbon sequestration (associated with wood or packaging) there might be a need to account for all stored carbon being released to atmosphere through loss as CO_2 or through decomposition as CH_4 within 100 years or longer if relevant. (See paragraph 6.3.7).

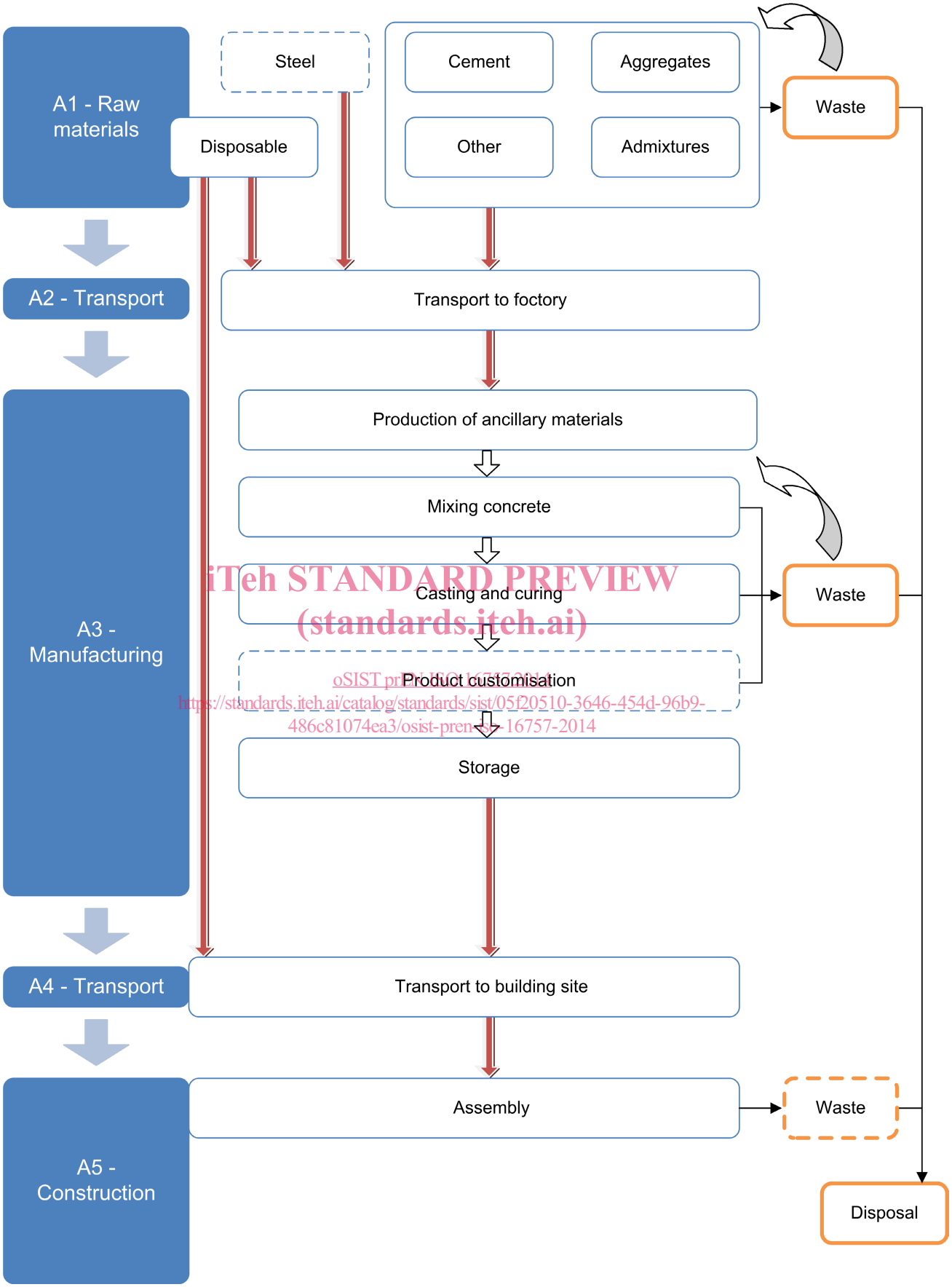

Figure 2 — Typical precast concrete Production and construction stages, including transport