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**Environmental management for
concrete and concrete structures —
Part 3:
Production of concrete constituents
and concrete**

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ISO 13315-3

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Foreword

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This document was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 8, *Environmental management for concrete and concrete structures*.

A list of all parts in the ISO 13315 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Concrete, a material essential for constructing buildings and civil structures forming infrastructure, is extensively used worldwide, requiring huge amounts of natural resources for its production, including the production of its constituents. A variety of byproducts from other industries are also used for their production. Moreover, the production of concrete constituents and concrete causes emissions of global warming gases including CO₂ and air pollutants such as NO_x and SO_x, water pollutants, as well as discharges of waste such as concrete rubble. Cement, one of the primary constituents of concrete, causes a large amount of CO₂ emissions during its production. Extraction of mineral resources, which are materials for concrete constituents, can also change the land use and alter the habitats of flora and fauna.

In this context, when producing concrete constituents and concrete, environmental consideration is necessary from every aspect including effective use of resources and prevention of global warming.

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Environmental management for concrete and concrete structures —

Part 3: Production of concrete constituents and concrete

1 Scope

This document provides the principles and procedures for environmental management related to production of concrete constituents and concrete. This document covers the following:

- concrete constituents: cement, admixtures, additions, aggregate and mixing water;
- concrete and precast concrete.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13315-1, *Environmental management for concrete and concrete structures — Part 1: General principles*

ISO 13315-2, *Environmental management for concrete and concrete structures — Part 2: System boundary and inventory data*

ISO 13315-4, *Environmental management for concrete and concrete structures — Part 4: Environmental design of concrete structures*

ISO 13315-6, *Environmental management for concrete and concrete structures — Part 6: Use of concrete structures*

ISO 13315-8, *Environmental management for concrete and concrete structures — Part 8: Environmental labels and declarations*

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

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

ISO 14050, *Environmental management — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13315-1, ISO 13315-2, ISO 13315-4, ISO 13315-6, ISO 13315-8, ISO 14040 and ISO 14050 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

target product

product for which environmental consideration is given

3.2

reference product

standard product, having the same function as a target product, or a product prior to environmental improvement, to be used for comparison in the environmental management related to production of concrete constituents and concrete

4 Symbols

Symbols used in this document are as follows:

$P_{\text{tpr}}(i)$	expected or attained environmental performance of the target product expressed as a function of indicator i ;
$P_{\text{tpr}}^e(i)$	expected environmental performance of the target product expressed as a function of indicator i ;
$P_{\text{tpr}}^a(i)$	attained environmental performance of the target product expressed as a function of indicator i ;
$P_{\text{rpr}}(i)$	environmental performance of the reference product expressed as a function of indicator i ;
$S_{\text{pr}}(i)$	environmental performance requirement of the product expressed as a function of indicator i ;
$R_{\text{tpr}}^a(i)$	reduction amount of environmental impact of the target product in comparison with reference product;
$R_{\text{tpr}}^r(i)$	reduction rate of environmental impact of the target product in comparison with reference product.

5 Principles and procedure for environmental management related to production of concrete constituents and concrete

5.1 General

This clause provides the principles and procedures to appropriately carry out environmental management related to production of concrete constituents and concrete.

NOTE ISO 22965-2 serves as a reference for the specification of constituent materials, production of concrete and compliance of concrete.

5.2 Principles

In the production of concrete constituents and concrete, environmental management shall be carried out to reduce the environmental impacts of these products.

5.3 Procedure

Environmental management for the production of concrete constituents and concrete shall be conducted in accordance with ISO 14040, ISO 14044, and with the following procedure:

- setting of the environmental performance requirements (see 5.4);
- production design (see 5.5);

- c) estimation (see 5.6);
- d) verification (see 5.7);
- e) production and related works (see 5.8);
- f) inspection (see 5.9);
- g) documentation (see 5.10).

Figure 1 shows the flow chart of the procedure.

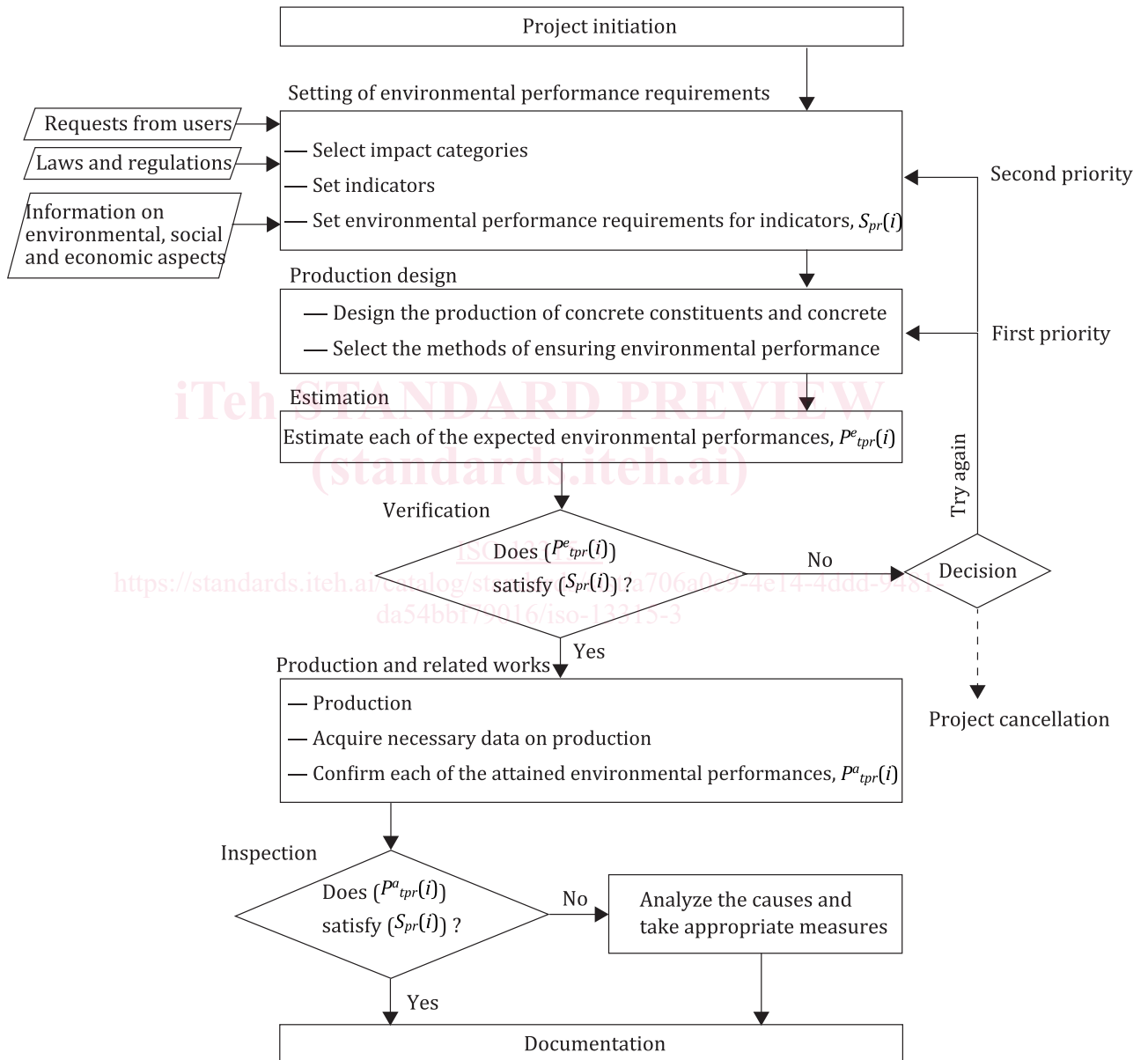


Figure 1 — Procedure for environmental management of production of concrete constituents and concrete

5.4 Setting of environmental performance requirements

5.4.1 General

The producer shall collect information on environmental, social and economic aspects necessary for the setting of environmental performance requirements. The environmental performance requirements can be set either based on the goals set by the producer or based on requests from users of the products. The producer shall select impact categories suitable for the performance requirements and set necessary indicators.

5.4.2 Selection of impact categories

Impact categories to be considered shall be selected from the following items:

- global climate change;
- natural resources use (materials, water and fuel);
- stratospheric ozone level;
- land use/habitat alteration;
- eutrophication;
- acidification;
- air pollution;
 - photochemical oxidant creation,
 - particulate matter air pollution,
 - other air pollution (toxics, etc.),
 - indoor air pollution;
- water pollution;
- soil contamination;
- pollution due to radioactive substances;
- impacts due to waste generation;
- noise/vibration.

NOTE Mandatory impact categories are specified for an environmental product declaration in ISO 21930.

5.4.3 Setting of indicators

Appropriate indicators shall be set for each category selected.

The reduction amount of environmental impact or the reduction rate of environmental impact of the target execution activity in comparison with the reference execution activity may be used as an indicator. The environmental performance of the reference execution activity shall be appropriately estimated.

NOTE [Annex A](#) serves as a reference for setting indicators.

5.4.4 Setting of environmental performance requirements for indicators

An environmental performance requirement shall be set for each indicator.

The environmental performance requirements shall be quantitatively set in the form of upper limits, lower limits, or ranges, when the indicators are expressible in numerals.

NOTE The reduction amount of environmental impact of the target product, $R_{\text{tpr}}^{\text{a}}(i)$, refers to the difference between the environmental performance of the reference product and the expected or attained environmental performance of the target product. It is defined as [Formula \(1\)](#).

$$R_{\text{tpr}}^{\text{a}}(i) = P_{\text{rpr}}(i) - P_{\text{tpr}}(i) \quad (1)$$

The reduction rate of environmental impact of the target product, $R_{\text{tpr}}^{\text{r}}(i)$, refers to the ratio of the reduction of the environmental impact, $R_{\text{tpr}}^{\text{a}}(i)$, to the environmental performance of the reference product. It is defined as [Formula \(2\)](#).

$$R_{\text{tpr}}^{\text{r}}(i) = \frac{P_{\text{rpr}}(i) - P_{\text{tpr}}(i)}{P_{\text{rpr}}(i)} \quad (2)$$

5.5 Production design

5.5.1 General

Production design shall be conducted to meet the environmental performance requirements set in [5.4](#).

5.5.2 Methods of environmental consideration

Methods to ensure the required environmental performance in the production of concrete constituents and concrete include, for instance, the following:

- a) selection of materials with low environmental impacts (for example, use of byproducts and wastes);
- b) selection of energy sources with low environmental impacts [for example, use of recyclable energy sources and wastes (waste tires, waste plastics, refuse-derived fuels (RDF))];
- c) selection of machinery/equipment with low environmental impacts;
- d) appropriate control/treatment of substances emitted from plants (for example, use of treatment equipment for waste gas and water);
- e) appropriate control/treatment of substances disposed of in plants (for example, use of equipment to prevent dust dispersion);
- f) application of appropriate sound-proof/vibration-proof measures (for example, installation of sound insulating walls);
- g) selection of suppliers of materials in consideration of environmental impacts of transportation.

NOTE [Annex B](#) serves as a reference for methods of environmental consideration.

5.6 Estimation

The expected environmental performances of the products by the production design prescribed in [5.5](#) shall be estimated by collecting necessary data. The methods of collecting data include the following items:

- a) trial production;

NOTE In contrast to the execution stage of a structure, trial production (e.g. trial mixing of concrete) is possible, at the production stage of a product, for estimating its performance.