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## **Environmental management for concrete and concrete structures**

### **Part 3: Production of concrete constituents and concrete**

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## Foreword

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

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part-1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part-2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may involve the use of a patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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](http://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 CO<sub>2</sub> and air pollutants such as NO<sub>x</sub> and SO<sub>x</sub>, 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 CO<sub>2</sub> 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**

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## 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*

### 4.3 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

## 5.4 Symbols

Symbols used in this document are as follows:

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

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

### 6.5.1 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.

### 6.5.2 Principles

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

### 6.3.5.3 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:

- a) ~~a)~~ setting of the environmental performance requirements (see ~~5.4);5.4~~);
- b) ~~b)~~ production design (see ~~5.5);5.5~~);
- c) ~~c)~~ estimation (see ~~5.6);5.6~~);
- d) ~~d)~~ verification (see ~~5.7);5.7~~);
- e) ~~e)~~ production and related works (see ~~5.8);5.8~~);
- f) ~~f)~~ inspection (see ~~5.9);5.9~~);
- g) ~~g)~~ documentation (see ~~5.10);5.10~~).

~~Figure 1~~ **Figure 1** shows the flow chart of the procedure.

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