
Concrete —

Part 1:

**Methods of specifying and guidance
for the specifier**

Béton —

*Partie 1: Méthodes de spécification et lignes directrices pour le
spécificateur*

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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.

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

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

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

ISO 22965-1 was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 3, *Concrete production and execution of concrete structures*.

ISO 22965 consists of the following parts, under the general title *Concrete*:

- *Part 1: Methods of specifying and guidance for the specifier*
- *Part 2: Specification of constituent materials, production of concrete and compliance of concrete*

Introduction

This International Standard is intended for nations that have no national concrete standard and it sets out a framework of principles for nations revising their national standards. To be operable, this International Standard needs a national annex or a reference to the national complementary provisions. This International Standard can also be applied on specific projects where a project specification supplements the standards in lieu of a national annex applicable at the place of use.

This International Standard is applied under various climatic and geographical conditions, various levels of protection and under different established regional traditions and experience. Consequently, this International Standard includes classes for concrete with different properties to cover the most frequent and normal situations. For certain uses of concrete, additional or deviating rules can be necessary. The national provisions, preferably given in a national annex to this International Standard, or the project specification can specify any additional or deviating requirements.

During the development of this International Standard, consideration was given to detailing a performance-related approach to the specification of durability. It was concluded that such an approach is not yet sufficiently developed to be detailed in an International Standard. ISO/TC 71/SC 3 recognizes that some ISO member bodies have developed local tests and criteria for performance-based specifications. This International Standard does not exclude the continuation and development of such practices valid in the place of use of the concrete as an alternative to the prescriptive approach. It is necessary that these requirements be specified in the national annex or national complementary provisions. The Model Code for Service Limit Design (MC-SLD), which was published by fib in 2006, is a promising basis for implementation as future International Standards from ISO/TC 71; see Annex B.

This International Standard incorporates rules for the use of constituent materials that are covered by International Standards. For materials for which International Standards have not yet been published, the standards cited in the national annex (often the regional or national standards) apply; see 5.1. In particular, documents in current use for by-products of industrial processes, recycled materials, etc. are based on local experience. Until international specifications for these materials are available, this International Standard does not provide rules for their use, but instead refers to the national annex.

This International Standard defines the two parties involved in the ordering and the supply of concrete, which are hereinafter referred to as specifier and supplier. In practice, there can be several parties specifying requirements at various stages of the design and construction process, e.g. the client, the designer, the quantity surveyor, the constructor and the concreting subcontractor. Each is expected to pass the specified requirements, together with any additional requirements, to the next party in the chain until they reach the supplier. In the terms of this International Standard, this final compilation of requirements is known as the "concrete specification". In some cases, the specifier and the supplier is the same party (e.g. a constructor doing design, production and execution). In the case of ready-mixed concrete, the purchaser is the specifier.

This part of ISO 22965 also gives rules for the exchange of information between the parties. Contractual matters are not addressed.

This International Standard is intended for use with ISO 22965-2 and with the future ISO 22966, currently under development, which will give the requirements associated with the level of quality specified and the methods to be employed for the execution of concrete structures.

Concrete —

Part 1: Methods of specifying and guidance for the specifier

1 Scope

This part of ISO 22965 applies to concrete for structures cast *in situ*, pre-cast structures and structural pre-cast products for buildings and civil engineering structures. The concrete can be mixed on site, ready-mixed concrete or produced in a plant for pre-cast concrete products.

This part of ISO 22965 applies to concrete compacted to retain no appreciable amount of entrapped air other than entrained air and to normal-weight, heavy-weight and light-weight concrete.

Other International Standards for specific products, e.g. pre-cast products, or for processes within the field of the scope of this part of ISO 22965, can require or permit deviations from this part of ISO 22965.

This part of ISO 22965 contains requirements for the specification of concrete and guidance for the exchange of information between the specifier and supplier. An informative annex gives general guidance on specification. More specific guidance on specification related to the local conditions can be given in a national annex.

This part of ISO 22965 does not apply to

- concrete with a maximum aggregate size equal to or less than 4 mm or 5 mm (mortar),
- aerated concrete,
- foamed concrete,
- concrete with an open structure (“no-fine aggregate” concrete),
- concrete with a density less than 800 kg/m³,
- refractory concrete.

This part of ISO 22965 does not cover health and safety requirements for the protection of workers during production and delivery of concrete.

2 Normative references

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

ISO 1920-1, *Testing of concrete — Part 1: Sampling of fresh concrete*

ISO 1920-3, *Testing of concrete — Part 3: Making and curing test specimens*

ISO 1920-4, *Testing of concrete — Part 4: Strength of hardened concrete*

ISO 22965-2:2007, *Concrete — Part 2: Specification of constituent materials, production of concrete and compliance of concrete*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 addition
finely divided or ground material used in concrete in order to improve certain properties or to achieve special properties

NOTE This part of ISO 22965 deals with two types of additions:

- nearly inert additions (type I);
- pozzolanic or latent hydraulic additions (type II).

3.2 admixture
material added during the mixing process of concrete in small quantities relative to the mass of cement to modify the properties of fresh or hardened concrete

3.3 aggregate
granular mineral material suitable for use in concrete

NOTE Aggregates can be natural, artificial or recycled from material previously used in construction, e.g. recycled concrete aggregate.

3.4 batch
quantity of fresh concrete produced in one cycle of operations of a mixer or the quantity discharged during 1 min from a continuous mixer or quantity of concrete transported in a vehicle

NOTE For testing to be performed at site, the concrete transported as one load in a vehicle can be considered as one batch.

3.5 cement
(hydraulic binder) finely ground inorganic material that, when mixed with water, forms a paste that sets and hardens by means of hydration reactions and processes and that, after hardening, retains its strength and stability even under water

3.6 characteristic strength
value of strength below which 5 % of the population of all possible strength determinations of the volume of concrete under consideration are expected to fall

3.7 concrete
material formed by mixing cement, coarse and fine aggregate and water, with or without the incorporation of admixtures and additions, which develops its properties by hydration of the cement

NOTE International Standards for aggregate may define aggregates larger than 4 mm or 5 mm as coarse. In concrete for general-purpose use, the coarse aggregate should normally have a maximum aggregate size of at least 16 mm.

3.8**concrete specification**

all documented technical requirements necessary to produce and deliver the concrete

3.9**compliance test**

test performed to verify that the concrete complies with some aspect of the specification

3.10**delivery**

process of handing over the fresh concrete by the producer

3.11**designed concrete**

concrete for which the minimum characteristic strength, other required properties and additional characteristics are specified to the supplier who is responsible for providing a concrete complying with the specified minimum characteristic strength, any other specified properties and any specified additional characteristics

3.12**effective water content**

difference between the total water present in the fresh concrete and the water absorbed by the aggregates

3.13**entrained air**

microscopic air bubbles, typically between 10 µm and 300 µm in diameter and spherical or nearly so, intentionally incorporated in concrete during mixing, usually by use of a surface-active agent

3.14**entrapped air**

air voids in concrete that are not purposely entrained

3.15**environmental actions**

those chemical and physical actions to which the concrete is exposed and that result in effects on the concrete or reinforcement or embedded metal that are not considered as loads in structural design

3.16**evaluation of compliance**

systematic examination of the extent to which a product fulfils specified requirements

3.17**fresh concrete**

fully mixed concrete that is still capable of being compacted by the intended method

3.18**general suitability**

suitable for use in some concretes

3.19**hardened concrete**

concrete that is in a solid state and which has developed a certain strength

3.20**heavy-weight aggregate**

aggregate having an oven-dry particle density $\geq 3\,000\text{ kg/m}^3$

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