International Standard ISO 2736/2

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Concrete tests — Test specimens — Part 2 : Making and curing of test specimens for strength tests

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2736/2 was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Concrete tests — Test specimens — Part 2 : Making and curing of test specimens for strength tests

1 Scope and field of application

This part of ISO 2736 specifies methods of making and curing test specimens for strength tests.

The information gained from testing the specimens is intended for use in the assessment of concrete production, both by the supplier and/or the customer.

2 References

ISO 1920, *Concrete tests — Dimensions, tolerances and applicability of test specimens.*

ISO 2736/1, *Concrete tests — Test specimens — Part 1 : Sampling of fresh concrete.*

ISO 4103, Concrete — Classification of consistency.

3 Apparatus

3.1 Moulds

The moulds used shall be capable of providing test specimens the dimensions and tolerances of which conform to ISO 1920. The moulds shall be made of non-absorbent material which does not react with cement. They shall be watertight.

3.2 Filling frame (optional)

Filling of the moulds may be simplified by using a filling frame fitted tightly to the mould. The use of a filling frame shall be stated in the test report (see clause 8).

3.3 Means of compaction

The means for compacting the concrete in the mould shall be one of the following :

a) a vibrating table with a recommended minimum frequency of 40 Hz (2 400 cycles per minute);

b) an internal vibrator with a recommended minimum frequency of 120 Hz (7 200 cycles per minute). The diameter of the tube shall not exceed one-quarter of the smallest dimension of the test specimen;

c) a tamping rod, for hand compaction, preferably a round steel bar, 16 mm in diameter and approximately 600 mm in length, with at least one end rounded to a hemispherical tip.

4 Sample

The sample shall be obtained and treated according to ISO 2736/1.

5 Making of test specimens

5.1 Preparation and filling of the moulds

Before filling, the inner surface of the mould shall be covered with a thin film of mineral oil or any other non-reactive release material to prevent the concrete from adhering to the mould.

If a filling frame is used, the amount of concrete intended to fill the mould shall be such that a layer of concrete remains in the filling frame after compaction. The thickness of this layer shall be about 10 to 20 % of the height of the test specimen.

Test specimens of all shapes compacted by hand, and cylindrical test specimens compacted by vibration shall be produced by filling the mould in at least two approximately equal layers. The thickness of each layer shall not exceed 160 mm.

5.2 Compaction of the concrete

5.2.1 General

The concrete shall be compacted immediately after placing in the moulds in such a way as to produce full compaction of the concrete with neither segregation nor excessive laitance.

5.2.2 Methods of compaction

5.2.2.1 Vibrating table

The mould shall be attached to, or firmly held against, the vibrating table. Vibration shall continue to, and stop at, the point where large air bubbles are no longer released and a thin layer of mortar covering all large aggregate particles appears on top of the concrete. Over-vibration shall be avoided.

5.2.2.2 Internal vibrator

The internal vibrator shall be plunged vertically and rapidly into the concrete to a depth approximately 20 mm above the bottom of the mould. It shall remain in this position until large air bubbles are no longer released and a thin layer of mortar covering all large aggregate particles appears on top of the concrete. Then the internal vibrator shall be removed slowly in order to avoid leaving a cavity. When compacting in layers, the internal vibrator shall not penetrate the layer directly below by more than 20 mm.

When an internal vibrator is used, a filling frame is recommended.

5.2.2.3 Hand compaction

Each layer shall be rodded with the hemispherical end of the tamping rod at least once for every 1 000 mm^2, the rod also penetrating the layer directly below.

NOTE — The use of a vibrating table is generally suitable for concretes having the following consistency class, according to ISO 4103 :

- slump classes S1 and S2,
- Vebe classes V0, V1 and V2,
- Compaction classes C0, C1 and C2.

The use of an internal vibrator is generally suitable for concretes having the following consistency class, according to ISO 4103 :

- slump class S2,
- Vebe class V2,
- Compaction class C2.

The use of a tamping rod is generally suitable for concretes having the following consistency class, according to ISO 4103 :

- slump classes S3 and S4,
- Vebe classes V3 and V4,
- Compaction class C3.

5.3 Surface levelling

The concrete above the upper edge of the mould shall be removed and the surface carefully levelled.

If a filling frame is used, it shall be removed immediately after compaction.

5.4 Marking

The test specimens shall be marked clearly and durably. Records shall be kept which ensure the specimen identity is known from sampling to testing.

6 Curing of test specimens

During the time of curing, the ambient temperature shall be 20 ± 2 °C (or 25 ± 3 °C in countries with a hot climate).

Test specimens shall remain in the mould for at least 16 h, but not longer than 3 days, protected against shock, vibration and dehydration.

After removal from the mould, the test specimens shall be kept wet either by immersion in water or in a thoroughly damp atmosphere (relative humidity > 95 %) under laboratory conditions, such that the surfaces of the specimens are covered by a water film until testing.

7 Transport of test specimens

Loss of moisture and deviations from the required curing temperature shall be avoided at all stages of transport. The test specimens shall therefore be packed in wet sand or wet sawdust, or sealed in plastic bags containing water.

8 Test report

The following information shall be recorded for each specimen :

a) date and time of production;

b) identification of concrete sample;

c) intended purpose of specimen;

d) method of compaction;

e) whether a filling frame was used;

f) curing procedure;

g) method of transport.