
International Standard



4110

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Fresh concrete — Determination of the consistency — Vebe test

Béton frais — Détermination de la consistance — Essai Vébé

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Descriptors : concrete, fresh concrete, tests, mechanical tests, compacting, measurement, consistency.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.

International Standard ISO 4110 was developed by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, and was circulated to the member bodies in September 1977.

It has been approved by the member bodies of the following countries:

Australia	Greece	Romania
Austria	India	South Africa, Rep. of
Bulgaria	Israel	Spain
Canada	Italy	Sweden
Chile	Mexico	Switzerland
Czechoslovakia	New Zealand	Turkey
Denmark	Norway	United Kingdom
Egypt, Arab Rep. of	Philippines	USA
France	Poland	USSR
Germany, F. R.	Portugal	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium
Netherlands

Fresh concrete — Determination of the consistency — Vebe test

1 Scope and field of application

This International Standard specifies a method for determining the consistency of fresh concrete by means of the Vebe time.

The method is considered particularly useful for concrete with low workability. It is not suitable for concrete with a maximum size of aggregate greater than 40 mm.

2 References

ISO 2736, *Concrete — Sampling, making and curing of test specimens*.¹⁾

ISO 4109, *Fresh concrete — Determination of the consistency — Slump test*.¹⁾

3 Sample

The sample of concrete used in the test shall be representative of the entire batch. It shall be obtained in accordance with ISO 2736.

4 Apparatus

4.1 Consistometer, as shown in the figure, comprising the following items :

4.1.1 Container, made of metal, cylindrical in shape (A), having an internal diameter of 240 ± 5 mm and a height of 200 mm. The thickness of the wall shall be 3 mm and that of the base 7,5 mm.

The container shall be watertight, and of sufficient rigidity to retain its shape under rough usage; it shall be fitted with handles and protected from corrosion. The container shall be provided with suitable footpieces to enable it to be securely clamped to the top of the vibrating table (G) (see 4.1.4) by means of wing nuts (H).

4.1.2 Mould (B), in the form of a hollow frustum of a cone having the following internal dimensions :

diameter of base : 200 ± 2 mm;

diameter of top : 100 ± 2 mm;

height : 300 ± 2 mm.

The mould shall be constructed of metal at least 1,5 mm thick and the top and bottom shall be open and at right angles to the axis of the cone. The mould shall have a smooth internal surface and shall be provided with handles to facilitate lifting it from the moulded concrete test specimen in a vertical direction, as required by the test.

4.1.3 Disc, transparent, horizontal (C), attached to a rod (J) which slides vertically through a guide sleeve (E) mounted on a swivel arm (N) and which can be fixed in position by a screw (Q). The swivel arm also supports a funnel (D), the bottom of which coincides with the top of the conical mould when the latter is positioned concentrically in the container. The swivel arm is located by a holder (M) and can be fixed in position by a set screw (F). When in the appropriate position, the axes of the rod and of the funnel shall be coincident with the axis of the container.

The transparent disc shall be 230 ± 2 mm in diameter and 10 ± 2 mm in thickness. A weight (P) placed directly above the disc shall be provided such that the moving assembly comprising rod, disc and weight has a mass of $2\,750 \pm 50$ g. The rod shall be provided with a scale to record the slump of the concrete.

4.1.4 Vibrating table (G), 380 mm in length and 260 mm in width and supported on four rubber shock absorbers. A vibrator unit (L) carried on a base (K) resting on three rubber feet, shall be securely fixed beneath it. The vibrator shall operate at an approximate frequency of 3 000 vibrations per minute and the vertical amplitude of the table with the empty container on top of it shall be approximately $\pm 0,5$ mm.

4.2 Tamping rod, of circular cross-section, straight, made of steel or other suitable metal, having a diameter of 16 mm, 600 mm in length and with rounded ends.

4.3 Stop watch or clock, capable of recording time with an accuracy of 0,5 s.

¹⁾ At present at the stage of draft.

5 Procedure

5.1 Place the Vebe meter (consistometer, 4.1) horizontally on a rigid base. Make sure that the container (A) is firmly fixed to the vibrating table (G) by means of the screws (H). Dampen the mould (B) and place it in the container. Swing the funnel (D) into position over the mould and lower the funnel on the mould. Tighten the screw (F) so that the mould cannot rise from the bottom of the container.

5.2 Fill the slump mould and compact the concrete using the tamping rod (4.2) as described in ISO 4109. Loosen screw (F), return the funnel to its original position and strike off the concrete level across the top of the mould. Lift the mould clear of the concrete, using the handles of the mould.

5.3 Swing the transparent disc (C) over the top of the concrete, loosen screw (Q) and very carefully lower the disc until it comes into contact with the concrete. The slump of the concrete can now be read off with the aid of a scale graduated in millimetres, provided that the slumped concrete does not come into contact with the container wall.

5.4 Tighten screw (F), at the same time checking that the screw (Q) is loose so that the transparent disc (C), can easily slide down into the container.

Commence vibration of the table, simultaneously starting the

stop watch (4.3). Observe through the transparent disc how the concrete is being compacted. As soon as the lower surface of the transparent disc is covered completely with cement grout, stop the watch and switch off the vibrator.

6 Expression of results

Record the time read from the stop watch to the nearest second. This is the Vebe time expressing the consistency of the mix under test.

If the time is less than 5 s or more than 30 s, the concrete has a consistency outside that for which the Vebe test is suitable.

7 Test report

The test report shall contain the following details :

- a) reference to this International Standard;
- b) date and time of the test;
- c) identification of sample;
- d) Vebe time in seconds;

e) slump of the test specimen (if appropriate).

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<https://standards.iteh.ai/catalog/standards/sist/26d78f42-2240-4958-a41c-b13c92aab4df/iso-4110-1979> Dimensions in millimetres

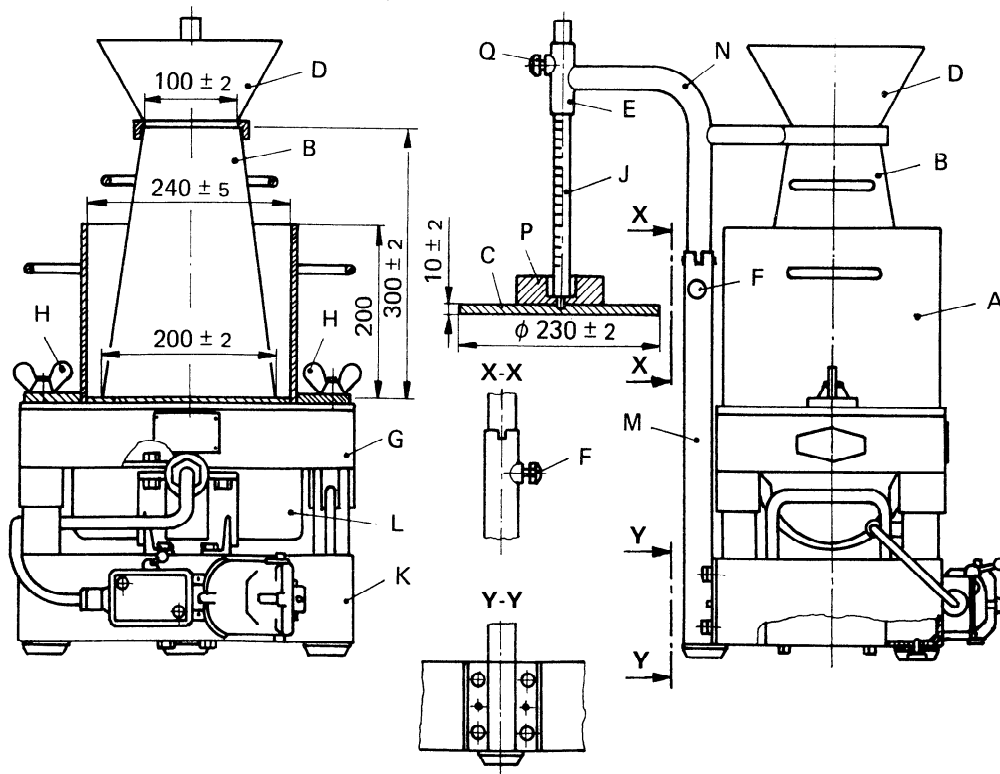


Figure — Consistometer (Vebe meter)