
International Standard



4109

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Fresh concrete — Determination of the consistency, Slump test

Béton frais — Détermination de la consistance — Essai d'affaissement

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Descriptors : concrete, fresh concrete, tests, mechanical tests, compacting, measurement, subsidence, 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 4109 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
Belgium	Israel	Spain
Bulgaria	Italy	Sweden
Canada	Mexico	Switzerland
Czechoslovakia	New Zealand	United Kingdom
Denmark	Norway	USSR
Egypt, Arab Rep. of	Philippines	Yugoslavia
France	Poland	
Germany, F. R.	Portugal	

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

Chile
Netherlands
USA

Fresh concrete — Determination of the consistency — Slump test

1 Scope and field of application

This International Standard specifies a method for determining the slump of fresh concrete both in the laboratory and in the field.

The method is applicable to plastic and cohesive concrete. It is not applicable when the maximum size of aggregate is greater than 40 mm.

2 Reference

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

3 Sample

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

4 Apparatus

4.1 Mould to form the test specimen, made of metal not readily attacked by cement paste and not thinner than 1,5 mm. The mould may be made either with or without a seam. The interior of the mould shall be smooth and free from projections such as protruding rivets and shall be free from dents. The mould shall be 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 base and the top shall be open and parallel to each other and at right angles to the axis of the cone. The mould shall be provided, on the upper portion, with two handles at two-thirds of the height, and at the bottom with fixing clamps or foot pieces to hold it steady. A mould which can be clamped to the base is acceptable provided the clamping arrangement is such that it can be fully released without movement of the mould.

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.

5 Procedure

5.1 Dampen the mould (4.1) and place it on a rigid, flat, moist and non-absorbent surface. Hold the mould firmly in place during filling by standing on the two foot pieces. From the sample of concrete obtained in accordance with clause 3, immediately fill the mould in three layers, each approximately one-third of the height of the mould when compacted.

5.2 Tamp each layer with 25 strokes of the tamping rod. Uniformly distribute the strokes over the cross-section of each layer. For the bottom layer this will necessitate inclining the rod slightly and positioning approximately half the strokes spirally toward the centre. Tamp the bottom layer throughout its depth. Tamp the second layer and the top layer each throughout its depth, so that the strokes just penetrate into the underlying layer.

In filling and tamping the top layer, heap the concrete above the mould before tamping is started. If the tamping operation results in subsidence of the concrete below the top edge of the mould, add more concrete to keep an excess above the top of the mould at all times. After the top layer has been tamped, strike off the surface of the concrete by means of a sawing and rolling motion of the tamping rod.

5.3 Clean the bottom plate and remove the mould from the concrete by raising it carefully in a vertical direction. The operation of raising the mould shall be performed in 5 to 10 s by a steady upward lift with no lateral torsional motion being imparted to the concrete.

The entire operation from the start of the filling to the removal of the mould shall be carried out without interruption and shall be completed within 150 s.

5.4 Immediately after removal of the mould, measure the slump by determining the difference between the height of the mould and that of the highest point of the slumped test specimen to the nearest 5 mm.

1) At present at the stage of draft.

If a falling away or shearing off of concrete on one side occurs, disregard the test and make a new test on another portion of the sample.

If two consecutive tests show a falling away or shearing off of a portion of the concrete from the mass of the test specimen, the concrete lacks the necessary plasticity and cohesiveness for the slump test to be applicable.

6 Expression of results

The slump of the test specimen during the test, expressed in millimetres to the nearest 5 mm, is given by the formula

$$\text{Slump} = h_m - h_s$$

where

h_m is the height, in millimetres, of the mould, i.e. 300 mm;

h_s is the height, in millimetres, of the slumped test specimen.

If the slump is less than 10 mm, the concrete has a consistency stiffer than that for which the 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 test;
- c) identification of sample;
- d) slump of test specimen (see clause 6) and/or anomalies (shear, collapse etc.).

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