BRITISH STANDARD

BS EN
12350-4:2000

Testing fresh concrete —

Part 4: Degree of compactability

The European Standard EN 12350-4:1999 has the status of a British Standard

ICS 91.100.30

National foreword

This British Standard is the English language version of EN 12350-4:1999. It supersedes BS 1881-103:1993 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/1, Concrete production and testing, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 4, an inside back cover and a back cover.

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This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 January 2000

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English version

Testing fresh concrete — Part 4: Degree of compactability

Essai pour béton frais —
Partie 4: Degré de compactabilité

Prüfung von Frischbeton —
Teil 4: Verdichtungsmaß

This European Standard was approved by CEN on 5 September 1999.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 12350-4:1999 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 104, Concrete (performance, production, placing and compliance criteria), the Secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by December 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard is one of a series concerned with testing fresh concrete.

It is based on the International Standard ISO 4111: *Fresh Concrete — Determination of the consistency — Degree of compactability (Compaction Index).*

A draft for this standard was published in 1996 for CEN enquriy as prEN 12357. It was one of a series of individually numbered test methods for fresh or hardened concrete. For convenience it has now been decided to combine these separate draft standards into three new standards with separate parts for each methods, as follows:

— *Testing fresh concrete* (EN 12350:1999);
— *Testing hardened concrete* (prEN 12390:1999);
— *Testing concrete in structures* (prEN 12504:1999);

This series EN 12350 includes the following parts where the brackets give the numbers under which particular test methods were published for CEN enquiry:

EN 12350: *Testing fresh concrete*

Part 1: *Sampling* (former prEN 12378:1996).

Part 2: *Slump test* (former prEN 12382:1996).

Part 3: *Vebe test* (former prEN 12350:1996).

Part 4: *Degree of compactability* (former prEN 12357:1996).

Part 5: *Flow table test* (former prEN 12358:1996).

Part 6: *Density* (former prEN 12383:1996).

Part 7: *Air content — Pressure methods* (former prEN 12395:1996).

CAUTION. When cement is mixed with water, alkali is released. Take precautions to avoid dry cement entering the eyes, mouth and nose whilst mixing concrete. Prevent skin contact with wet cement or concrete by wearing suitable protective clothing. If cement or concrete enters the eye, immediately wash it out thoroughly with clean water and seek medical treatment without delay. Wash wet concrete off the skin immediately.

Contents

1 Scope

This European standard specifies a method for determining the consistency of fresh concrete by determining the degree of compactability.

It is not applicable to concrete of which the maximum size of aggregate exceeds 63 mm.

If the degree of compactability is less than 1,04 or more than 1,46, the concrete has a consistency for which the degree of compactability test is not suitable.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12350-1:1999, *Testing fresh concrete — Part 1: Sampling.*

3 Principle

Fresh concrete is carefully placed in a container, avoiding any compaction whilst filling, using a trowel. When the container is full, the top surface is struck off level with the top of the container. The concrete is compacted by vibration and the distance from the surface of the compacted concrete to the upper edge of the container is used to determine the degree of compactability.

4 Apparatus

4.1 *Container*, made of metal not readily attacked by cement paste. The internal dimensions of the container shall be:

— base: (200 ± 2) mm × (200 ± 2) mm;

— height: 400 mm ± 2 mm.

The thickness of the base and walls shall be at least 1,5 mm.

NOTE The bottom of the container may be perforated to facilitate emptying. A suitable plastic plate to cover the bottom has then to be placed inside the container.

4.2 *Trowel*, with a flat blade (see Figure 1).

Dimensions in millimeters

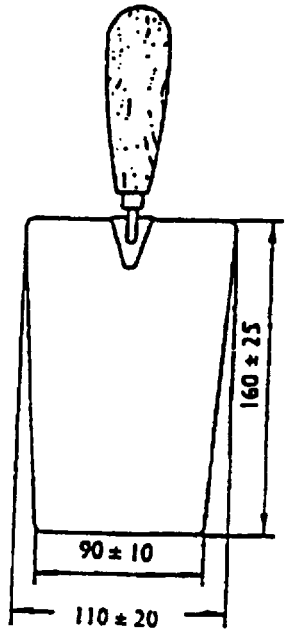

Figure 1 — Trowel

4.3 *Means of compacting the concrete*, which shall be one of the following:

— internal vibrator: with a minimum frequency of approximately 120 Hz (7 200 cycles per minute). The diameter of the internal vibrator shall not exceed one-quarter of the smallest dimension of the container;

— vibrating table: with a minimum frequency of approximately 40 Hz (2 400 cycles per second).

The use of a vibrating table shall be the reference method.

4.4 *Remixing container*, flat tray of rigid construction and made from a non-absorbent material not readily attacked by cement paste. It shall be of appropriate dimensions such that the concrete can be thoroughly re-mixed, using the square-mouthed shovel.

4.5 *Shovel*, with square mouth.

NOTE The square mouth is required to ensure proper mixing of material on the remixing container.

4.6 *Straight edged scraper*, more than 200 mm in length

4.7 *Rule.*

4.8 *Moist cloth.*

5 Sampling

The sample shall be obtained in accordance with EN 12350-1:1999.

The sample shall be re-mixed before carrying out the test.

6 Procedure

Clean the container and moisten the inner surfaces using a damp cloth.

Fill the container, without tamping it, by tilting the trowel sideways from all four upper edges of the container in turn. When the container is filled, remove all concrete above the upper edges, using the straight edged scraper with a sawing action, in such a way as to avoid any compacting effect.

Compact the concrete by means of a vibrating table or by the use of an internal vibrator, until no further reduction in volume is determinable. During compaction avoid loss of concrete through splashing, or leakage.

NOTE 1 Great care is recommended if loss of entrained air is to be avoided when using an internal vibrator.

After compaction, determine the value of s (see Figure 2), i.e: the mean value of the distance between the surface of the compacted concrete and the upper edge of the container to the nearest millimetre. Obtain this value by measuring at the middle of each side of the container.

NOTE 2 The consistence of a concrete mix changes with time, due to hydration of the cement and, possibly, loss of moisture. Tests on different samples should, therefore, be carded out at a constant time interval after mixing, if strictly comparable results are to be obtained.

7 Expression of results

The degree of compactability c is given by the formula:

$$c = \frac{h_1}{h_1 - s}$$

where

h_1 is the internal height of the container, in millimetres;

s is the mean value, to the nearest millimetres, of the four distances from the surface of the compacted concrete to the upper edges of the container.

The result shall be reported to two decimal places.

8 Test report

The report shall include:

a) identification of the test sample;

b) location of performance of test;

c) date of test;

d) determined degree of compactability, to two decimal places;

e) any deviation from standard test method;

f) declaration by the person technically responsible for the test that it was carded out in accordance with this standard, except as noted in item e).

The report can include:

g) time of test;

h) temperature of the concrete sample at time of test.

9 Precision

There is currently no precision data for this test.

Dimensions in millimeters

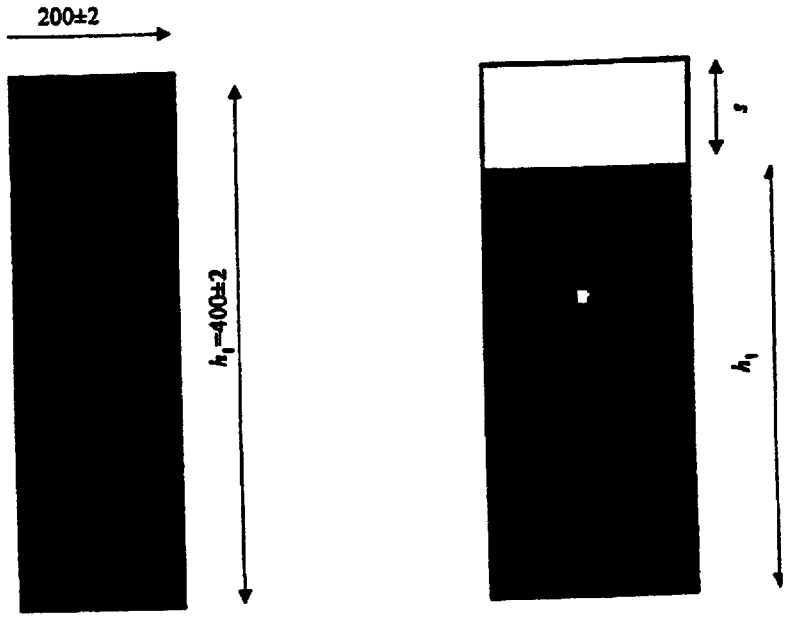

Figure 2 — Concrete in container, before and after compaction

BS EN 12350-4:2000

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