BRITISH STANDARD

BS EN
1015-4:1999

Methods of test for mortar for masonry —

Part 4: Determination of consistence of fresh mortar (by plunger penetration)

The European Standard EN 1015-4:1998 has the status of a British Standard

ICS 91.100.10

National foreword

This British Standard is the English language version of EN 1015-4:1998. It is included in a package of standards declared by CEN/TC 125 that will partially supersede BS 4551-1, *Methods of testing mortars, screeds and plasters — Part 1: Physical testing*, the corresponding test methods of which, it is intended, will be withdrawn on 30 September 2000 if all the European Standards included in the package are available.

The UK participation in its preparation was entrusted by Technical Committee B/519, Masonry and associated testing, to Subcommittee B/519/2, Mortar, 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.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 5 and a back cover.

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 February 1999

ISBN 0 580 30747 6

Amendments issued since publication

Amd. No.	Date	Text affected

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1015-4

October 1998

ICS 91.100.10

Descriptors: masonry work, mortars: materials, tests, penetration tests, determination, consistency

English version

Methods of test for mortar for masonry — Part 4: Determination of consistence of fresh mortar (by plunger penetration)

Méthodes d'essai des mortiers pour maçonnerie — Partie 4: Détermination de la consistance des mortiers frais (par pénétration du piston)

Prüfverfahren für Mörtel für Mauerwerk — Teil 4: Bestimmung der Konsistenz von Frischmörtel (mit Eindringgerät)

This European Standard was approved by CEN on 4 September 1998.

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 1015-4:1998 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 125, Masonry, the Secretariat of which is held by BSI.

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 1999, and conflicting national standards shall be withdrawn at the latest by September 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and includes the performance requirements referred to in the Eurocode for masonry structures.

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.

Contents

Introduction

Fresh mortar is brought to a defined level of consistence as measured using the plunger penetration rod prior to the assessment of those properties which are used to characterize it.

Consistence is a measure of the fluidity and/or wetness of the fresh mortar and gives a measure of the deformability of the fresh mortar when subjected to a certain type of stress. The consistence however is not directly associated with the manner in which the fresh mortar handles when used by a craftsman.

Normally there will be a linear correlation between the plunger penetration value, measured according to this test method, and the flow value measured in accordance with prEN 1015-3, for the same type of mortar with increasing water content, but the slope will differ with different types of mortars.

1 Scope

This European Standard specifies a method for determining the consistence of freshly mixed mortars (in the following briefly referred to as fresh mortars) including those containing mineral binders and both dense and lightweight aggregates, which is by means of the plunger penetration value.

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 1015-2, *Methods of test for mortar for masonry — Part 2: Bulk sampling of mortars and preparation of test mortars.*

3 Principle

The plunger penetration value of a defined sample of fresh mortar is measured by the vertical penetration of a defined plunger rod which has been allowed to fall freely through a given height into the fresh mortar sample.

4 Apparatus

4.1 *Plunger apparatus*, conforming to Figure 1, and consisting of the following parts:

Plunger stand, with the base plate (A), frame, clamp with guide bushes (B) and fixing screw (C).

Cylindrical vessel, (D) secured centrally in a positioning recess.

Penetration rod, (E) with an upper scale and having a plastics plunger (F) of circular cross-section at the base and with a hemispherical lower end of the same diameter. The total mass of the penetration rod and plunger is 90 g $\pm$ 2 g. The penetration rod is fixed in an initial position 100 mm above the mortar surface, measured from the lower, hemispherical end of the plunger.

4.2 *Tamper*, consisting of a rigid, non-absorptive rod of circular cross-section, approximately 40 mm in diameter and approximately 200 mm long. The tamping face is flat and at right angles to the length of the tamper. The mass of the tamper is 0,250 kg $\pm$ 0,015 kg.

4.3 *Trowel.*

4.4 *Palette knife.*

5 Sampling, preparation and storage of test samples

The fresh mortar for this test shall have a minimum volume of 1,5 l and shall be obtained by reduction of the bulk test sample (see EN 1015-2) using a sample divider or by quartering.

Ready to use mortars (factory-made wet mortars which are retarded), and pre-batched air-lime/sand wet mortars when not gauged with hydraulic binders, shall be tested within their specified workable life.

Mortars that are made from dry constituents and water shall be mixed in accordance with EN 1015-2 unless otherwise specified.

The length of mixing period shall be measured from the moment all the constituents are introduced into the mixer.

Before testing, the batch shall be gently stirred by hand using a trowel (**4.3**) or palette knife (**4.4**) in 5 to 10 seconds to counteract any false setting etc., but without any additional mixing of the batch.

Any deviation from the mixing procedure shall be noted.

Two test samples shall be tested.

6 Procedure

Using the fixing screw [**4.1**(C)], secure the penetration rod [**4.1**(E)] in its initial position. Wipe the plunger [**4.1**(F)] clean with a damp cloth and dry before use.

Fill the vessel [**4.1**(D)] with mortar in two layers, each layer being compacted by 10 short strokes of the tamper (**4.2**), to ensure uniform filling of the vessel. Skim off the excess mortar with a palette knife leaving the mortar surface plane and level with the top rim of the vessel. Do not trowel further.

Place the filled vessel on the base plate [**4.1**(A)] and release the fixing screw, allowing the plunger to fall freely, starting from its initial position.

Determine the penetration of the plunger into the mortar by reading the scale on the lower side of the upper guide bush [**4.1**(B)] to the nearest mm.

7 Calculation and expression of results

Calculate the mean value of the plunger penetration from the individual values for each mortar test sample, to the nearest mm. If the two individual values deviate from their mean value by less than 10 % use this mean value as the plunger penetration value of the mortar. If the two individual plunger penetration values deviate from their mean value by more than 10 %, repeat the test using further mortar from the reduced bulk test sample (see clause **5**) and if the results deviate from their mean value by less than 10 % use the mean value from the repeat test as the plunger penetration value of the mortar. If the results differ by more than 10 % consider the measurements unsatisfactory and take fresh test samples from the bulk test sample or laboratory prepared mortar and repeat the test.

8 Test report

The test report shall include the following information:

a) the number, title and date of issue of this European Standard;

b) the place, date and time of taking the bulk test sample[1)];

NOTE This is the sample taken from the bulk supply that is to be used for all of the tests in EN 1015.

c) the method used for taking the bulk test sample (if known) and the name of the organization that took it;

d) the type, origin and designation of the mortar by reference to the relevant part of prEN 998;

e) preparation (mixing, casting) and storage (curing) conditions;

f) the date and time of preparing test samples for test (i.e. date and time of any mixing, casting, moulding, or demoulding procedure, if appropriate);

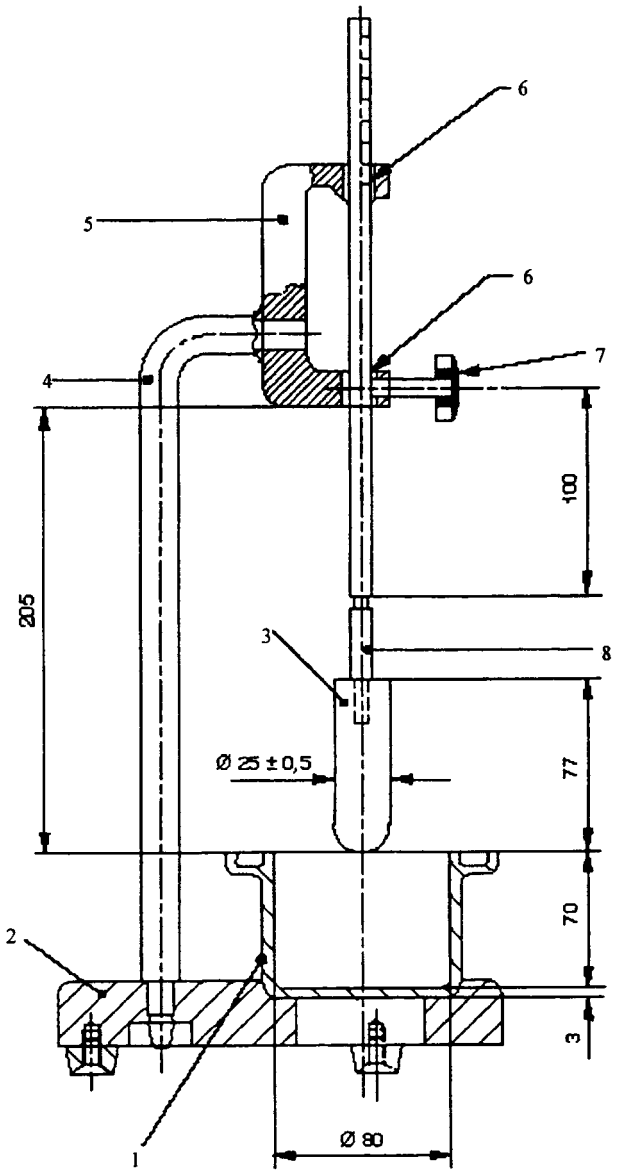
g) the date and time of testing;

h) test results (individual measurements and the plunger penetration values in mm for each test sample);

i) remarks, if any.

[1)] This information is contained on the certificate of sampling (see EN 1015-2).

Dimensions in millimetres



Key:					
1	Cylindrical vessel	2	Base plate	3	Plastics plunger
4	Frame	5	Clamp	6	Guide bush
7	Fixing screw	8	Penetration rod		

Figure 1 — Plunger test apparatus

Annex A (informative)

Bibliography

The following informative reference is made in this standard:

prEN 1015-3, *Methods of test for mortar for masonry — Part 3: Determination of consistence of fresh mortar (by flow table).*

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