SLOVENSKI STANDARD
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Metode preskušanja malt za zidanje - 12. del: Določevanje sprijemne trdnosti strjenih zunanjih in notranjih ometov na podlage

Methods of test for mortar for masonry - Part 12: Determination of adhesive strength of hardened rendering and plastering mortars on substrates

Prüfverfahren für Mörtel für Mauerwerk - Teil 12: Bestimmung der Haftfestigkeit von erhärteten Putzmörteln

Méthodes d'essai des mortiers pour maçonnerie - Partie 12 : Détermination de l'adhérence des mortiers d'enduit durcis appliqués sur supports

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English Version

Methods of test for mortar for masonry - Part 12: Determination of adhesive strength of hardened rendering and plastering mortars on substrates

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This European Standard was approved by CEN on 9 April 2016.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 1015-12:2016) 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of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by March 2018.

This document supersedes EN 1015-12:2000.

The following technical changes have been done in this new edition:

— There has been a relaxation in the choice of metal for the pull-head plates.

— The temperature range for storage and curing the specimens has been extended slightly.

— The substrates may be rendered stored and tested either in the vertical or horizontal attitude instead of the vertical only.

EN 1015, *Methods of test for mortar for masonry*, currently comprises the following parts:

— *Part 1: Determination of particle size distribution (by sieve analysis)*;

— *Part 2: Bulk sampling of mortars and preparation of test mortars*;

— *Part 3: Determination of consistence of fresh mortar (by flow table)*;

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

— *Part 6: Determination of bulk density of fresh mortar*;

— *Part 7: Determination of air content of fresh mortar*;

— *Part 9: Determination of workable life and correction time of fresh mortar*;

— *Part 10: Determination of dry bulk density of hardened mortar*;

— *Part 11: Determination of flexural and compressive strength of hardened mortar*;

— *Part 12: Determination of adhesive strength of hardened rendering and plastering mortars on substrates* (the present document);

— *Part 17: Determination of water-soluble chloride content of fresh mortars*;

— *Part 18: Determination of water absorption coefficient due to capillary action of hardened mortar*;

— *Part 19: Determination of water vapour permeability of hardened rendering and plastering mortars*;

— *Part 21: Determination of the compatibility of one-coat rendering mortars with substrates.*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies a method for the determination of the adhesive strength between rendering and plastering mortars and a substrate.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 772-11, *Methods of test for masonry units - Part 11: Determination of water absorption of aggregate concrete, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units*

EN 998 (all parts), *Specification for mortar for masonry*

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

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

EN 1015-11, *Methods of test for mortar for masonry - Part 11: Determination of flexural and compressive strength of hardened mortar*

3 Principle

The adhesive strength is determined as the maximum tensile stress applied by a direct load perpendicular to the surface of the rendering or plastering mortar on a substrate. The tensile load is applied by means of a defined pull-head plate glued to the test area of the mortar surface. The adhesive strength obtained is the quotient between the failure load and the test area.

4 Symbols

f_u is the adhesive strength, (N/mm²);

F_u is the failure load, (N);

A is the test area of cylindrical specimen, (mm²).

5 Apparatus

5.1 Truncated conical rings, (see Figure 1) made of stainless steel or brass, with internal diameter of (50 ± 0,1) mm and (25 ± 0,5) mm in height.

The minimum thickness of the mould wall shall be 5,0 mm at the top. The external diameter at the base shall be (51 ± 0,1) mm.

5.2 Circular pull-head plates, made of metal, with diameter of (50 ± 0,1) mm and minimum thickness 10 mm, and with central fitting for connection to the direct pull tensile force apparatus.

Dimensions in millimetres

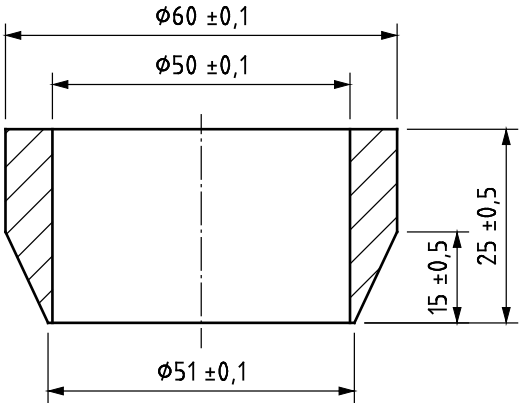

Figure 1 — Sharp-edged, truncated conical ring

5.3 Adhesive based on resin, e.g. epoxy resin or methylmethacrylate resin.

5.4 Core drilling machine, with core drill of nominally 50 mm internal diameter, suitable to cut core samples from hardened mortars and substrates.

5.5 Testing machine for direct pull tensile force test and with suitable capacity and sensitivity for the test as specified in Clause 8.

It shall be capable of applying the load to the pull-head plate through a suitable fitting that excludes any bending forces. The machine shall comply with the requirements in Table 1.

5.6 Storage chamber, capable of maintaining a temperature of 20 °C (+3/-2 °C) and at a relative humidity of (65 ± 5) %.

Table 1 — Requirements for testing machine

Maximum permissible repeatability of forces as percentage of nominal force	Maximum permissible mean error of forces as percentage of nominal force	Maximum permissible error of zero force as percentage of maximum force of range
%	%	%
2,0	±2,0	±0,4

6 Sampling and sample preparation

6.1 General

The fresh mortar for this test shall have a minimum volume of 1,5 l or at least 1,5 times the quantity needed to perform the test, whichever is the greater, and shall either be obtained by reduction of the bulk test sample (see EN 1015-2) using a sample divider or by quartering or by preparation from water and the other constituents in the laboratory. Two test samples shall be prepared.

6.2 Laboratory prepared mortars

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

The mortar shall be brought to a defined flow value as specified in EN 1015-2 determined in accordance with EN 1015-3 and reported. The test procedure shall not start until at least 10 min after completion of mixing and shall be concluded within the specified workable life of the mortar (preferably within 30 min after completion of mixing), unless otherwise instructed by the manufacturer.

6.3 Mortars, other than laboratory prepared mortars

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 used for specimen preparation within their specified workable life.

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

The flow value of the mortar in the bulk test sample shall be determined in accordance with EN 1015-3 and reported.

7 Preparation and storage of test specimens

7.1 Substrate

For rendering or plastering systems manufactured for a specific background, i.e. clay or calcium silicate masonry units, concrete masonry units, panels or cast *in situ* concrete, etc., these materials, in an air-dried condition, should be used as test substrates. The water absorption due to capillary action of the units used in the substrate shall be recorded, if known, or tested in accordance with EN 772-11 where appropriate.

Where no specific background is prescribed rectangular concrete panels shall be used as substrate, with dimensions not less than 550 mm x 150 mm and 50 mm in thickness. The concrete shall be mixed with a water/cement ratio of 0,55 and using normal graded aggregates with maximum particle size of one third of the concrete panel thickness. The upper surface of the moulded substrate shall be levelled and wood-floated to achieve a suitable surface. Within a period of 6h to 24h lightly brush the surface.

The concrete panels shall have an age of not less than 28 d when applying the plastering or rendering system, the panels being cured under standardized conditions as described in EN 1015-11.

NOTE Concrete panels as a substrate will normally give conservative adhesive strength values.

7.2 Application

The fresh mortar mix shall be applied to the prescribed substrate according to the manufacturers recommendations and the intended use. The substrate may be either horizontal or vertical during application. Unless otherwise specified the total thickness of the mortar layer shall be (10 ± 1) mm.

7.3 Test areas

7.3.1 General

Circular test areas of approximately 50 mm in diameter shall be cut through the mortar layer, either in the fresh mortar according to 7.3.2 or in the hardened mortar according to 7.3.3. The diameter of the circular test area shall be recorded for each specimen. Five test areas shall be provided.

7.3.2 Fresh mortar

After application and the initial setting of the mortar layer, the truncated conical rings (5.1), cleaned and lubricated with a thin layer of mineral oil, shall be pressed with their sharp edge, slightly rotating, through the fresh mortar layer until full contact with the substrate is reached. The minimum distance