PD CEN/TR 13933:2023

BSI Standards Publication

Masonry cement — Testing for workability (cohesivity)

bsi.

National foreword

This Published Document is the UK implementation of CEN/TR 13933:2023. It supersedes PD CR 13933:2000, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/516, Cement and lime.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

Published by BSI Standards Limited 2023

ISBN 978 0 539 28110 1

ICS 91.100.10

Compliance with a Published Document cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2023.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER REPORT

CEN/TR 13933

November 2023

ICS 91.100.10

Supersedes CR 13933:2000

English Version

Masonry cement - Testing for workability (cohesivity)

Ciment de maçonnerie - Test de maniabilité (cohésivité)

Mauerzement - Prüfung auf Verarbeitbarkeit (Kohäsion)

This Technical Report was approved by CEN on 20 November 2023. It has been drawn up by the Technical Committee CEN/TC 51.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. CEN/TR 13933:2023 E

Contents

Page

European foreword

This document (CEN/TR 13933:2023) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by NBN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CR 13933:2000.

This document includes the following significant technical changes with respect to CR 13933:2000:

— the titles have been added in French and in German,

— text has been rewritten to exclude permissions, recommendations and requirements.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

Introduction

Mortars incorporating masonry cements are used for bedding masonry units and also for rendering and plastering. In 1988 the CEN Technical Committee responsible for Cements and Building Limes (TC 51) charged its Working Group 10 to produce a Standard for Masonry cements and for the test methods to support that Standard.

Test methods for setting time, soundness and strength are common requirements in most cement standards. However, where the cement is specifically designed to adhere to and subsequently provide a good bond with masonry units, it is important that an adequate level of workability is achieved. In contrast to the concept of workability as applied to concrete, workability in mortars is not just a question of adjusting the "wetness" of the mortar by adding more or less water. In masonry work, the craftsman requires rather more of his materials in that he expects them to flow easily from the trowel and to spread on to the masonry unit evenly and without segregation. It is only when these properties are present that he can expect to achieve the consistent degree of bonding necessary to produce durable watertight joints and renderings.

The appropriate RILEM Committee considered that workability comprised two main components, notably: consistence and plasticity. They defined these components as follows:

Consistence: That property of a mortar by virtue of which it tends to resist deformation.

Plasticity: That property of a mortar by virtue of which it tends to retain its deformation after reduction of the deforming stress to its yield point.

Consistence is a measure of wetness and is measured using a penetration device, but that plasticity required a more dynamic assessment such as could be achieved by using apparatus which caused the mortar to move. However, in order to obtain any meaningful numerical measure of plasticity, it was adjudged important to ensure that the testing for this characteristic was carried out on mortars where the consistence had been controlled to a narrow band.

Since the testing procedure adopted in the CEN Standard EN 413-2:1994, *Masonry cement - Part 2: Test methods* involved the preparation of a mortar using standard sand and with sufficient water to achieve a narrow band of consistence as assessed using a plunger (penetration) test, this was considered as the starting point for the work to assess workability or as was deemed more appropriate "cohesivity".

Early work involved measuring the time taken for a mortar of standard consistence to flow between two points in the AFNOR workability meter. This method was incorporated into EN 413-2:1994 as a test method, but on account of the limited amount of experience available no limits were set in the Masonry cement Prestandard ENV 413-1. Subsequently, further testing revealed significant calibration problems between laboratories and consideration was given to the use of a flow table as an alternative means of providing the dynamic component of the test. This document deals with the development of the test using flow tables.

1 Scope

This document deals with the adaption of existing test methods and equipment to provide a repeatable and reproducible means of assessing the workability ("cohesivity") imparted to mortar by masonry cements.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

4 Equipment

As has been discussed in the introduction, there is considerable merit in using the standard consistence mortar produced in EN 413-2:1994 as the starting point for the cohesivity test. Such a practice uses no equipment beyond that already in use for masonry cement testing. The mortar is prepared in the mixer defined in EN 196-1:1994 and the sand used and the plunger device for measuring consistence are those specified in EN 413-2:1994.

Since flow tables are not uncommon in cement testing laboratories it was decided to evaluate these in order to provide a measure of cohesivity. However, previous experience suggests that even where these pieces of equipment are covered by strict specification requirements, their performance can be expected to vary from table to table. A review of the flow tables in use in various European testing laboratories revealed considerable differences as is shown in Table 1. Calibration of the tables was therefore considered to be an essential step in the test procedure.

In order to keep this calibration procedure as simple as possible, the first attempts at calibration were carried out using the EN 196-1:1994 sand damped with a fixed amount of water. The results from this calibration as carried out in the nine laboratories participating in the co-operative test program are given in Table 1.