

Composition cork — Expansion joint fillers — Test Methods

ICS 79.100; 91.100.50

National foreword

This British Standard reproduces verbatim ISO 3867:2001 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee PRI/81, Cork-INT, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/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 committee 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, ISO title page, pages ii to iv, pages 1 to 6, an inside back cover and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Sector Policy and Strategy Committee for Materials and Chemicals, was published under the authority of the Standards Policy and Strategy Committee on 15 October 2001

© BSI 15 October 2001

ISBN 0 580 38565 5

INTERNATIONAL STANDARD

ISO
3867

Second edition
2001-07-01

Composition cork — Expansion joint fillers — Test methods

*Aggloméré composé de liège — Matériau pour le remplissage de joints de
dilatation — Méthodes d'essai*



Reference number
ISO 3867:2001(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

International Standard ISO 3867 was prepared by Technical Committee ISO/TC 87, *Cork*, using the standard ASTM D 545:1984 as the basis for the work.

This second edition cancels and replaces the first edition (ISO 3867:1982), which has been technically revised.

Introduction

Some test methods specified in this International Standard (e.g. compression resistance perpendicular to the faces, extrusion during compression and ability to recover after release of the load) are indicative of the ability of a joint filler to continuously fill a concrete expansion joint and thereby to prevent damage that might otherwise occur during thermal expansion. The resistance to water absorption is a relative measure of durability and life expectancy.

Composition cork — Expansion joint fillers — Test methods

1 Scope

This International Standard specifies test methods to determine the following characteristics of the composition cork intended to be used as a joint filler of expansion joints of concrete or other construction materials:

- apparent density,
- expansion in water,
- compression,
- recovery,
- extrusion,
- water absorption.

These test methods apply to agglomerated cork joint filler with a nominal thickness ranging from 6,3 mm to 25 mm.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 633, *Cork — Vocabulary*

ISO 3869:2001, *Composition cork — Expansion joint fillers — Specifications, packaging and marking*

ISO 7322:2000, *Composition cork — Test methods*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 633 apply.

4 Apparatus

4.1 Balance, with resolution of 0,01 g.

4.2 Convection oven, capable of maintaining (105 ± 6) °C.

4.3 Desiccators, of sufficient size to accommodate the test specimens and containing an efficient desiccant.

4.4 Vernier gauge, with resolution of 0,1 mm.

4.5 Compression testing machine, with one fixed jaw and one mobile jaw which shall move unloaded at a speed of 1,3 mm/min, and having enough capacity to reduce the test specimen to 50 % of its initial thickness.

4.6 Load recorder, to indicate the load with a readability of 1 %.

4.7 Three-sided extrusion mould, to confine the lateral movement of test specimens under compression to one side only. The mould shall have internal dimensions equal to $(100 \pm 0,5)$ mm \times $(100 \pm 0,5)$ mm and sides of such height as to extend at least 13 mm above the test specimens.

4.8 Steel template, to fit the extrusion mould to within 0,13 mm in length and width, equipped with a dial comparator.

4.9 Dial gauge, with a resolution of 0,02 mm.

4.10 Metal plate, having dimensions of $(100 \pm 2,5)$ mm \times $(100 \pm 2,5)$ mm \times 0,6 mm, with parallel faces machined.

4.11 Cutting system.

5 Sampling and preparation of test specimens

5.1 Sampling

5.1.1 The sample taken shall be approximately 0,2 m² from each lot of 100 m² and shall consist of sufficient material to provide at least five test specimens measuring 100 mm \times 100 mm. Each test specimen shall be squarely cut using the cutting system (4.11).

5.1.2 The test specimens from self-expanding agglomerated cork joint filler shall be properly banded and plastic-wrapped at the factory immediately after cutting.

Samples shall be packaged for safe transportation to the testing laboratory so that there will be no distortion or breakage.

5.2 Preparation of test specimens

5.2.1 If necessary, squarely cut the test specimens immediately before testing to obtain test specimens with a side length of 100 mm.

5.2.2 The test specimens of self-expanding agglomerated cork shall be dried for 24 h in ambient air after boiling the specimens (see 6.2.1). Then cut the test specimens to the size described in 5.1.1.

6 Tests

6.1 Determination of dimensions

6.1.1 Determination of thickness

See ISO 7322:2000, 6.1.

6.1.2 Determination of length and width

See ISO 7322:2000, 6.2.1.

6.2 Expansion in water

6.2.1 Procedure

For self-expanding agglomerated cork, use the five test specimens delivered by the manufacturer as described in 5.1.2.

Determine the thickness (d_1) of one test specimen as described in 6.1. Immerse the test specimen in boiling water for 1 h. Remove the test specimen and allow to cool at room temperature for 15 min. Measure the final thickness to the nearest 0,1 mm.

6.2.2 Calculation and expression of results

Calculate the expansion, E , of composition cork using the following formula:

$$E = \frac{d_2}{d_1} \times 100 \%$$

where

d_1 is the thickness of each test specimen before immersion, expressed in millimetres, rounded to the nearest 0,1 mm;

d_2 is the thickness of each test specimen after immersion, expressed in millimetres, rounded to the nearest 0,1 mm.

The test result is the mean value of individual results expressed as a percentage rounded to the nearest integer.

6.3 Recovery

6.3.1 Procedure

Place one test specimen prepared as described in 5.1.1 or 5.1.2 on the testing machine. Give the test specimen a single application of a load sufficient to reduce its thickness to 50 % of its initial thickness. Apply the load without shock and at such a rate that the test specimen is compressed approximately at 1,3 mm/min. Record this applied load (F).

Immediately release the load and allow the test specimen to recover for 10 min. Measure the new thickness (d_2).

6.3.2 Calculation and expression of results

Calculate the recovery, R , from the following formula:

$$R = \frac{d_1}{d_2} \times 100 \%$$

where

d_1 is the thickness of the test specimen before compression, expressed in millimetres rounded to the nearest 0,1 mm;

d_2 is the thickness of the test specimen after compression, expressed in millimetres rounded to the nearest 0,1 mm.

The test result is the mean value of individual results expressed as a percentage rounded to the nearest integer.

6.3.3 Retest provision

6.3.3.1 If the test specimen fails to comply with the requirements of the specification (see ISO 3869:2001, 4.5), test a new specimen in accordance with the following procedure.

6.3.3.2 Give the test specimen three applications of a load sufficient to reduce its thickness to 50 % of its initial thickness. Apply the load without shock and at such a rate that the test specimen is compressed approximately at 1,3 mm/min.

6.3.3.3 After the first and the second applications, release the load immediately and allow the test specimen to recover for 30 min before the load is applied again.

6.3.3.4 After the third application, release the load immediately and allow the test specimen to recover for 1 h; then measure the thickness again.

6.3.3.5 Calculate the recovery, R' , from the following formula:

$$R' = \frac{d_1}{d_3} \times 100 \%$$

where

d_1 is the thickness of the test specimen before compression, expressed in millimetres rounded to the nearest 0,1 mm;

d_3 is the thickness of the test specimen after the third compression, expressed in millimetres, rounded to the nearest 0,1 mm.

The test result is the mean value of individual results, expressed as a percentage rounded to the nearest integer.

6.4 Calculation of compression

Calculate the pressure, p , to which the test specimen has been submitted during the recovery test, using the following formula:

$$p = \frac{F}{S} \times 10^{-3}$$

where

F is the maximum force required to reduce the initial thickness of the test specimen to 50 % (see 6.1), expressed in newtons, rounded to the nearest 0,1 N;

S is the area of the test specimen (10 000 mm²), expressed in square metres rounded to 0,000 1 m².

The test result is the mean value of individual results, expressed in kilopascals rounded to the nearest integer.

6.5 Extrusion

6.5.1 Procedure

Place the test specimen in the mould with the template placed in the base of the testing machine.

Give the test specimen one application of a load sufficient to compress it to 50 % of its initial thickness. Apply the load without shock and at such a rate that the test specimen is compressed at approximately 1,3 mm/min.

Measure in the dial comparator the maximum movement of the free edge of the test specimen during its compression.

6.5.2 Calculation and expression of results

The extrusion, X , of the test specimen is given by the following formula:

$$X = b_2 - b_1$$

where

b_1 is the side length of the test specimen before the test, expressed in millimetres rounded to the nearest 0,1 mm;

b_2 is the maximum distance reached during compression by the free edge of the test specimen, expressed in millimetres rounded to the nearest 0,1 mm.

The test result is the mean value of individual results, expressed in millimetres rounded to the nearest 0,1 mm.

6.6 Water absorption

6.6.1 Procedure

Use one of the test specimens prepared as described in 5.1 and determine its mass (m_1) to the nearest 0,1 g. Immerse the test specimen in water at a temperature of 18 °C to 25 °C for 24 h. Maintain the test specimen in a horizontal position supported from the bottom of the container, with 25 mm of water above the test specimen.

Remove the test specimen from the water and remove excess surface water from all sides of the test specimen with a paper towel. Quickly weigh the test specimen to the nearest 0,1 g.

6.6.2 Calculation and expression of results

Calculate the water absorption, A , as a percentage by volume using the following formula:

$$A = \frac{m_2 - m_1}{d_1} \times 10^{-2}$$

where

m_1 is the mass of the test specimen before immersion, expressed in grams rounded to the nearest 0,1 g;

m_2 is the mass of the test specimen after immersion, expressed in grams rounded to the nearest 0,1 g;

d_1 is the nominal thickness of test specimen (see 6.1), expressed in millimetres rounded to the nearest 0,1 mm.

The test result is the mean value of individual results, expressed as a percentage by volume rounded to the nearest integer.

6.7 Apparent density

6.7.1 Procedure

Use one of the test specimens prepared as defined in 5.1. Determine its mass (m) to the nearest 0,1 g.

6.7.2 Calculation and expression of results

The apparent density, ρ , of the test specimen is given by the following formula:

$$\rho = \frac{m}{l \times b \times d} \times 10^6$$

where

m is the mass of the test specimen, expressed in grams rounded to the nearest 0,1 g;

l , b and d are the nominal length, width and thickness of the test specimen (see 6.1), expressed in millimetres rounded to the nearest 0,1 mm.

The test result is the mean value of individual results, expressed in kilograms per cubic metre rounded to the nearest integer.

7 Test report

The test report shall include the following information:

- a) reference to this International Standard, i.e. ISO 3867;
- b) the complete identification of the product tested, including the type, source and the manufacturer's references;
- c) the sampling report;
- d) the results obtained;
- e) any deviation from this International Standard that may have affected the results.

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001. Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001. Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.