BRITISH STANDARD

BS EN
12192-2:1999

Products and systems for the protection and repair of concrete structures — Granulometry analysis —

Part 2: Test method for fillers for polymer bonding agents

The European Standard EN 12192-2:1999 has the status of a British Standard

ICS 91.080.40; 91.100.10

National foreword

This British Standard is the English language version of EN 12192-2:1999.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/8, Repair and protection of concrete, 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

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 13 and a back cover.

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ICS 83.180; 91.080.40

English version

Products and systems for the protection and repair of concrete structures — Granularity analysis — Part 2:Test method for fillers for polymer bonding agents

Produits et systèmes pour la protection et la réparation des structures en béton —Analyse granulométrique — Partie 2: Méthode d'essai pour les charges de produits de collages structuraux à base de polymères	Produkte und System für den Schutz und die Instandsetzung von Betontragwerken — Korngrößenanalyse — Teil 2:Prüfverfahren für Füllstoffe für Polymerklebstoffe

This European Standard was approved by CEN on 16 April 1999.

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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 Central Secretariat has the same status as the official versions.

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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 12192-2:1999 E

Contents

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 November 1999, and conflicting national standards shall be withdrawn at the latest by November 1999.

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.

It has been prepared by Subcommittee 8, Products and systems for the protection and repair of concrete structures (Secretariat AFNOR).

This European Standard describes several types of test methods:

— prEN 12192–1, *Products and systems for the protection and repair of concrete structures — Test methods — Granulometry size grading — Part 1: Method for dry components of premixed mortars;*

— EN 12192–2, *Products and systems for the protection and repair of concrete structures — Test methods — Granulometry size grading — Part 2: Method for fillers for polymer bonding agents*.

Specifications for the products and systems for the repair and the protection of concrete structures will be the subject of separate standards.

1 Scope

This European Standard specifies a method for determining the maximum particle size of fillers in structural bonding agents by the use of a suitable gauge, graduated in micrometres.

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 21512, *Paints and varnishes — Sampling of products in liquid or paste form* (ISO 1512:1991).

EN ISO 1514, *Paints and varnishes — Standard panels for testing* (ISO 1514:1993).

3 Test method

The maximum particle size of the filler is the reading obtained on a standard gauge under specified conditions of test, indicating the depth of the groove of the gauge at which discrete solid particles in the product are readily discernible.

4 Apparatus

4.1 *Gauge*, consisting of a block of stainless steel approximately 175 mm long, 65 mm wide and 13 mm thick.

The top surface of the block shall be both plane and ground smooth and shall contain one or two grooves approximately 140 mm long and 12,5 mm wide parallel to the longer sides of the block. The depth of each groove shall be uniformly tapered along its length from a suitable depth (for example 50 µm, 100 µm, 250 µm or 500 µm) at one end to zero depth at the other end and shall be graduated as specified in Table 1. Diagrams of typical gauges are given in Figure 1.

The depth of the groove at any position along its length shall not depart from its nominal value at any position across the groove by more than 2,5 µm. A method of checking the groove depth is described in annex A.

Table 1 — Graduation of typical gauges and the ranges for which gauges are recommended

Maximum depth of groove µm	Interval of graduation µm	Recommended range µm
500	50	150 to 400
250	25	50 to 150
100	10	40 to 90
50	5	15 to 40

The top surface of the block shall be finished by fine grinding or lapping; it shall be flat so that all points lie between two parallel planes 12 µm apart and, in addition, at every position along the surface, the transverse generator shall be straight so that all points along it lie between two parallel straight lines 1 µm apart. The top and bottom surfaces of the block shall be parallel within 25 µm.

NOTE The precision of the maximum particle size determination depends in part on which gauge is used (see clause **6**). Therefore it is essential to identify the gauge (500 µm, 250 µm, 100 µm, 50 µm) when reporting results or specifying requirements.

4.2 *Scraper*, consisting of a single- or doubled-edged steel blade approximately 90 mm long, 40 mm wide and 6 mm thick. The edge(s) on the long side(s) shall be straight and rounded to a radius of approximately 0,25 mm. A drawing of a suitable scraper is shown in Figure 2.

The scraper shall be periodically checked for wear, damage or warping by placing the edge of the scraper on the reference plane surface (see **A.2.3**) and inspecting the contact edge against a strong light.

Reject the scraper if poor contact between the edge of the scraper and the reference plane surface is revealed when the scraper is rocked backwards and forwards.

NOTE 1 The top surface of the gauge can be used for routine checking of the scraper, provided that it itself is not worn or warped and verified by use of the reference plane surface.

NOTE 2 When not in use, the scraper should be stored in a container lined with velvet or similar soft material.

5 Sampling

Take a representative sample of the product to be tested as specified in EN 21512.

Examine and prepare the sample for testing as specified in EN ISO 1514.

6 Test procedure

6.1 Carry out a preliminary determination to establish the size of gauge most suitable for the test and the approximate maximum particle size of the test sample (see Table 1 and the note to **6.5**). This approximate determination shall not be included in the results of the test.

Then carry out the determination in triplicate.

6.2 Place the gauge (**4.1**), which shall be thoroughly clean and dry, on a flat, horizontal, non–slip surface.

6.3 Pour a sufficient amount of sample into the deep end of the groove so that it overflows the groove slightly. Take care that during pouring the sample does not trap any air.

6.4 Grasp the scraper (**4.2**) between the thumbs and fingers of both hands and place it edgewise in contact with the surface of the gauge at the extreme deep end of the groove with the length of the scraper parallel to the width of the gauge. While holding the scraper perpendicular to the surface of the gauge and at right angles to the length of the groove, draw it at a uniform rate over the surface of the gauge to a point beyond the zero depth of the groove in 1 s to 2 s. Apply sufficient downward pressure on the scraper to ensure that the groove is filled with the sample and that any surplus is removed.

6.5 In a time not exceeding 3 s from the completion of the drawdown, view the gauge from the side in such a manner that the line of vision is at right angles to the long dimension of the groove and at an angle of not more than 30° nor less than 20° to the surface of the gauge while it is in a light that will make the pattern on the sample in the groove readily visible.

NOTE If the rheology of the sample is such that a smooth pattern is not obtained after drawdown, a minimal quantity of an appropriate thinner or blinder solution can be added to the sample by hand stirring, and the test repeated. Any dilution should be stated in the test report. In some instances, the dilution of the sample can lead to flocculation and the fineness of grind can be affected.

6.6 Observe the point where the product first shows a predominantly speckled appearance and, in particular, where a 3 mm wide band across the groove contains five to ten particles (see Figures 3 and 4). Disregard any scattered specks that may appear prior to the point where the predominantly speckled appearance begins. Estimate the position of the upper limit to the nearest:

a) 20 µm for the 500 µm gauge;

b) 10 µm for the 250 µm gauge;

c) 5 µm for the 100 µm gauge;

d) 2 µm for the 50 µm gauge.

6.7 Clean the gauge and scraper carefully with a suitable solvent immediately after each reading.

7 Expression of results

Calculate the mean of the three determinations and record the result to the same precision as the original readings (see **6.6**).

8 Test report

The test report shall contain at least the following information:

a) the type and identification of the product tested;

b) designation of the gauge used;

c) details of any dilution (see note to **6.5**);

d) the results of the test, expressed in micrometres;

e) any deviation, by agreement or otherwise, from the test procedure specified;

f) the date of the test;

g) reference to this European Standard.

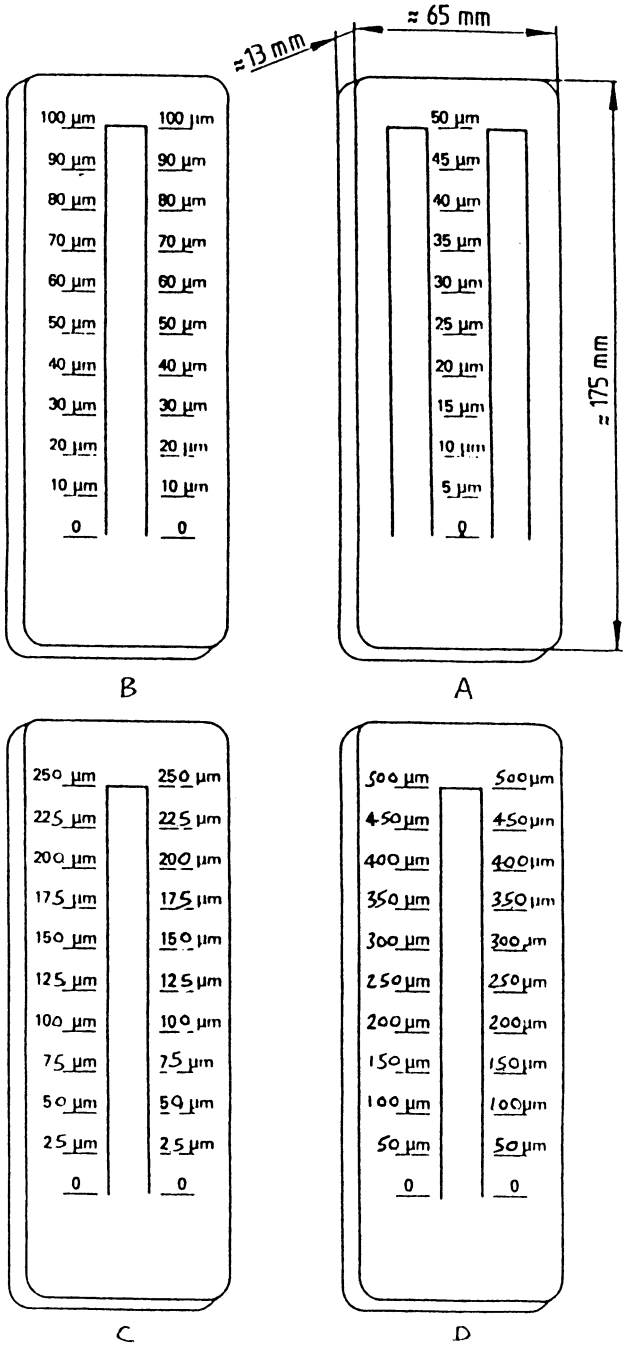


Figure 1 — Typical gauges

Dimensions (approximate) in millimetres

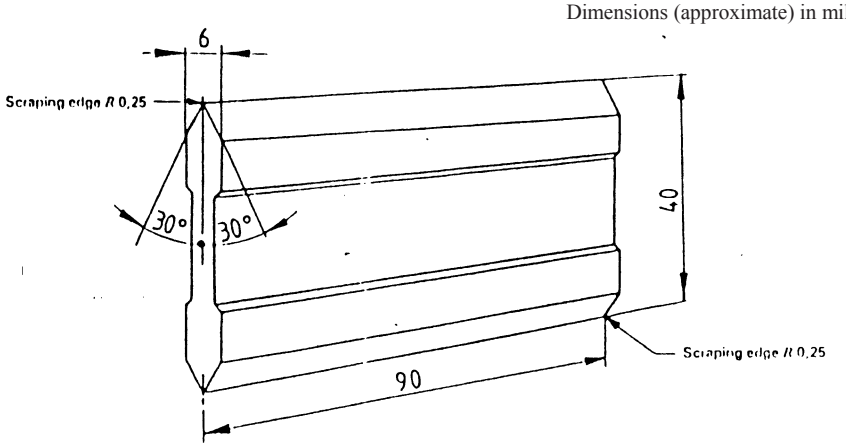


Figure 2 — Suitable scraper

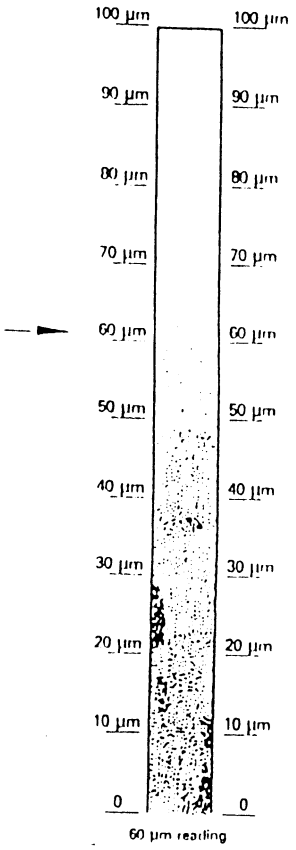


Figure 3 — Typical reading on gauge

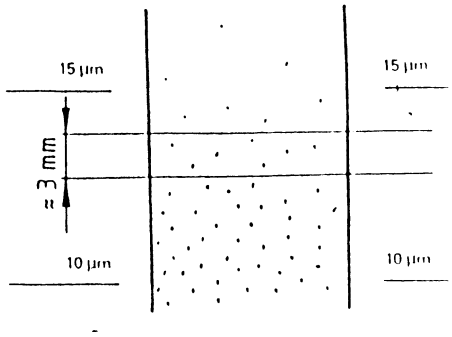
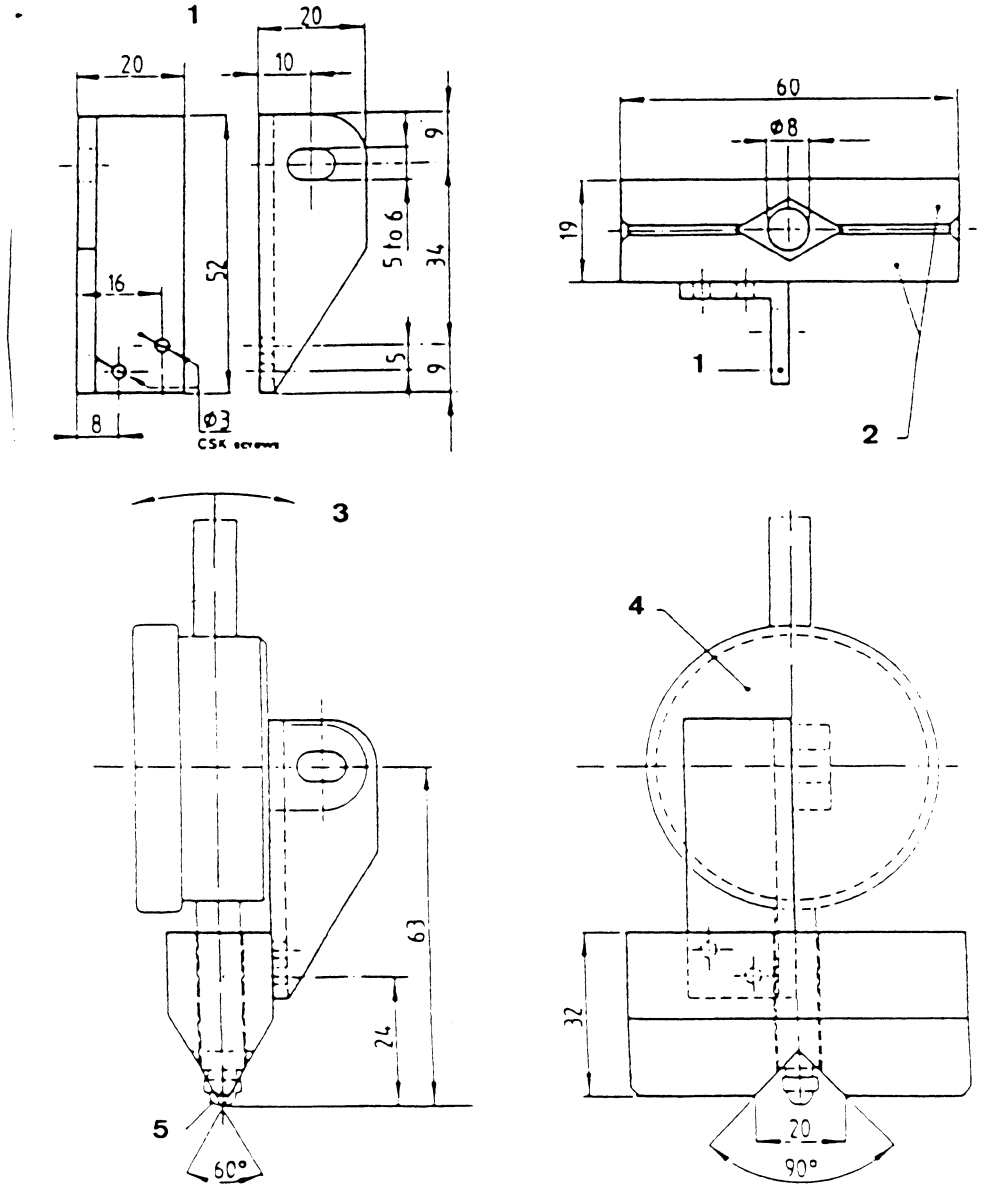


Figure 4 — Enlarged view of gauge reading 14 µm

Dimensions in millimetres



1 Bracket
2 Harden and grind base so that knife edges are central with ø8 ream hole
3 Rock backwards and forewords on “knife edges” to find minimum deflection on dial guage
4 Outline of Marcer type 54 dial guage
5 Plunger contact point

Figure 5 — Dial gauge mounting block

Annex A (informative)
Method of checking groove depth

A.1 General

Prolonged use can cause wear of the top surface of a gauge, thereby altering the effective groove depth. Thus the groove depth shall be periodically checked, and a suitable method is described below.

A.2 Apparatus

A.2.1 *Dial indicator gauge,* plunger type, reading to 2 µm or better and fitted with a stylus having a radius of less than 0,25 mm.

A.2.2 *Dial gauge mounting block*, of length approximately 60 mm and of similar section to the working edge of the scraper (**4.2**), i.e. with an edge of diameter 0,25 mm and with an included angle of 60° (see Figure 5). The block shall provide means of rigidly holding the dial gauge so that its plunger can pass perpendicularly through the centre of the block. A vertical line shall be scribed or machined on the end faces of the block. It is recommended that the block be fitted with heat insulating pads.

A.2.3 *Reference plane surface,* consisting of an accurately lapped surface or a rigid plate of optically plane glass to the accuracy of a toolmakers' flat.

A.2.4 *Set square,* 100 mm side or greater.

A.3 Procedure

A.3.1 Extend the graduations of the maximum particle size gauge using the set square (**A.2.4**) and a pencil or lightweight marker.

A.3.2 Mount the dial indicator (**A.2.1**) in the mounting block (**A.2.2**) such that its plunger or stylus protrudes at least 0,1 mm from the contact edge of the block. Set the pointer of the gauge to zero when the mounting block is placed on the reference plane surface (**A.2.3**).

A.3.3 Align the mounting block on the maximum particle size gauge such that the scribed lines correspond with the extensions of a graduation mark (see **A.3.1**) and so that the plunger rests in the groove of the maximum particle size gauge. Rock the mounting block about its contact edge and record the minimum dial gauge readings.

A.3.4 Repeat the procedure **A.3.2** and **A.3.3** at the chosen graduation and calculate the mean of three readings.

Perform the test at a number of graduations, calculating mean readings for each test position chosen.

A.3.5 If the mean value differs from the nominal value at any graduation by more than 3 µm, the maximum particle size gauge shall be returned to the manufacturer for checking and rectification.

Annex B (informative)
Bibliography

[1] EN 21524, *Paints and varnishes — Determination of fineness of grind* (ISO 1524:1983).

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