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*Corrigendum No. 1*

# Tests for geometrical properties of aggregates —

## Part 5: Determination of percentage of crushed and broken surfaces in coarse aggregate particles

The European Standard EN 933-5:1998, with the incorporation of amendment A1:2004, has the status of a British Standard

ICS 91.100.15

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This British Standard is the official English language version of EN-933-5:1998, including amendment A1:2004 and corrigendum May 2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A1}$   $\langle A1 \rangle$ . Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by  $\boxed{A1}$   $\langle A1 \rangle$ .

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#### Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 8, an inside back cover and a back cover.

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#### Amendments issued since publication

Amd. No.	Date	Comments
15524	6 April 2005	See national foreword
15664 Corrigendum No. 1	11 May 2005	Errors omitted from previous amendment to Scope, subclauses <b>3.9</b> , <b>5.4</b> , <b>8.2.1</b> and Annex A

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Descriptors: Aggregates, tests, geometric, characteristics, determination, area, fractures, materials, settings, rates per unit time, gravel, computation

English version

## Tests for geometrical properties of aggregates — Part 5: Determination of percentage of crushed and broken surfaces in coarse aggregate particles

(includes amendment A1:2004)

Essais pour déterminer les caractéristiques géométriques des granulats —  
Partie 5: Détermination du pourcentage de surfaces cassées dans les gravillons  
(inclut l'amendement A1:2004)

Prüfverfahren für geometrische Eigenschaften von Gesteinskörnungen —  
Teil 5: Bestimmung des Anteils an gebrochenen Körnern in groben Gesteinskörnungen  
(enthält Änderung A1:2004)

This European Standard was approved by CEN on 26 December 1997; amendment A1 was approved by CEN on 16 September 2004.

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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**

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 154, Aggregates, 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 July 1998, and conflicting national standards shall be withdrawn at the latest by December 1999.

This European Standard forms part of a series of tests for geometrical properties of aggregates. Test methods for other properties of aggregates will be covered by parts of the following European Standards:

EN 932, *Tests for general properties of aggregates.*

EN 1097, *Tests for mechanical and physical properties of aggregates.*

EN 1367, *Tests for thermal and weathering properties of aggregates.*

EN 1744, *Tests for chemical properties of aggregates.*

A European Standard *Tests for filter aggregate used in bituminous mixtures* is in preparation.

The other parts of EN 933 will be:

Part 1, *Determination of particle size distribution — Sieving method.*

Part 2, *Determination of particle size distribution — Test sieves, nominal size of apertures.*

Part 3, *Determination of particle shape — Flakiness index.*

Part 4, *Determination of particle shape — Shape index.*

Part 6, *Assessment of surface characteristics — Flow coefficient for coarse aggregates.*

Part 7, *Determination of shell content — Percentage of shells in coarse aggregates.*

Part 8, *Assessment of fines — Sand equivalent test.*

Part 9, *Assessment of fines — Methylene blue test.*

Part 10, *Assessment of fines — Grading of fillers (air jet sieving).*

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.

## Foreword to amendment A1

This document (EN 933-5:1998/A1:2004) has been prepared by Technical Committee CEN/TC 154, Aggregates, the Secretariat of which is held by BSI.

This amendment to the European Standard EN 933-5:1998 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

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## 1 Scope

This European Standard specifies a method for the determination of the percentage of particles with crushed and broken surfaces in a sample of natural coarse aggregate. It applies to gravel or mixed aggregate containing gravel.

The test method specified in this part of this European Standard is applicable to particle size fractions  $d_i/D_i$  where  $D_i \leq 63$  mm and  $d_i \geq 4$  mm.

**A1** NOTE 1 For aggregate sizes with  $D > 63$  mm and/or  $d < 4$  mm the test may be carried out on particle size fractions  $d_i/D_i$  where  $D_i \leq 63$  mm and  $d_i \geq 4$  mm.

NOTE 2 For coarse aggregate between 4 mm and 20 mm the percentage of crushed or broken surfaces is linked to the flow coefficient and can therefore be used in association with the test method specified in EN 933-6. **A1**

## 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.

prEN 932-2, *Tests for general properties of aggregates — Part 2: Methods for reducing laboratory samples.*

prEN 932-5, *Tests for general properties of aggregates — Part 5: Common equipment and calibration.*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method.*

EN 933-2, *Tests for geometrical properties of aggregates — Part 2: Determination of particle size distribution — Test sieves, nominal size of apertures.*

## 3 Definitions

For the purposes of this standard, the following definitions apply.

### 3.1

#### **aggregate size**

a designation of aggregate in terms of lower ( $d$ ) and upper ( $D$ ) sieve sizes

NOTE This designation accepts the presence of some particles which will be retained on the upper sieve (oversize) and some which will pass the lower sieve (undersize).

### 3.2

#### **particle size fraction $d_i/D_i$**

fraction of an aggregate passing the larger ( $D_i$ ) of two sieves and retained on the smaller ( $d_i$ )

### 3.3

#### **test portion**

the sample used as a whole in a single test

### 3.4

#### **constant mass**

successive weightings after drying at least 1 h apart not differing by more than 0,1 %

NOTE In many cases constant mass can be achieved after a test portion has been dried for a pre-determined period in a specified oven at  $(110 \pm 5)$  °C. Test laboratories can determine the time required to achieve constant mass for specific types and sizes of sample dependent upon the drying capacity of the oven used.

### 3.5

#### **totally crushed or broken particle**

particle with more than 90 % of its surface crushed or broken (tc)

### 3.6

#### **crushed or broken particle**

particle with more than 50 % of its surface crushed or broken (c)