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**TESTS FOR GEOMETRICAL PROPERTIES OF  
AGGREGATES - PART 4: DETERMINATION OF  
PARTICLE SHAPE - SHAPE INDEX**

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English Version

## Tests for geometrical properties of aggregates - Part 4: Determination of particle shape - Shape index

Essais pour déterminer les caractéristiques géométriques  
des granulats - Partie 4: Détermination de la forme des  
granulats - Coefficient de forme

Prüfverfahren für geometrische Eigenschaften von  
Gesteinskörnungen - Teil 4: Bestimmung der Kornform -  
Kornformkennzahl

This European Standard was approved by CEN on 4 February 2008.

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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 Management Centre has the same status as the official versions.

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## **Foreword**

This document (EN 933-4:2008) 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

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

This document supersedes EN 933-4:1999.

This European Standard is one of a series of standards for tests for geometrical properties of aggregates. Test methods for other properties of aggregates are 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  
EN 13179, Tests for filler aggregate used in bituminous mixtures

The other parts of EN 933 are:

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 5 - Determination of percentage of crushed and broken surfaces in coarse aggregate particles  
Part 6 - Assessment of surface characteristics - Flow coefficient of 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, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This standard describes the reference method used for type testing and in cases of dispute, for the determination of the shape index of coarse aggregates. For other purposes, in particular factory production control, other methods may be used provided an appropriate working relationship with the reference method has been established.

The test method specified in 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.

## 2 Normative references

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

EN 932-2, *Test for general properties of aggregates - Part 2: Methods for reducing laboratory samples*

EN 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*

EN 1097-6, *Tests for mechanical and physical properties of aggregates - Part 6: Determination of the particle density and water absorption*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **aggregate size**

designation of aggregate in terms of lower ( $d$ ) and upper ( $D$ ) sieve sizes, expressed as  $d/D$

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**

sample used as a whole in a single test

### 3.4

#### **constant mass**

successive weighings 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 (see 5.5) 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.

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