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Preskusi geometričnih lastnosti agregatov - 8. del: Ugotavljanje finih delcev - Ekvivalent peska

Tests for geometrical properties of aggregates - Part 8: Assessment of fines - Sand equivalent test

Prüfverfahren für geometrische Eigenschaften von Gesteinskörnungen - Teil 8: Beurteilung von Feinanteilen - Sandäquivalent-Verfahren

Essais pour déterminer les caractéristiques géométriques des granulats - Partie 8 : Evaluation des fines - Equivalent de sable

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English Version

Tests for geometrical properties of aggregates - Part 8: Assessment of fines - Sand equivalent test

Essais pour déterminer les caractéristiques géométriques
des granulats - Partie 8 : Evaluation des fines - Equivalent
de sable

Prüfverfahren für geometrische Eigenschaften von
Gesteinskörnungen - Teil 8: Beurteilung von Feinanteilen -
Sandäquivalent-Verfahren

This draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 154.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (FprEN 933-8:2011) has been prepared by Technical Committee CEN/TC 154 “Aggregates”, the secretariat of which is held by BSI.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 933-8:1999.

This revised standard differs from EN 933-8:1999 for 0/2 mm size aggregates where the fines content was not limited to 10 %.

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, *Tests for geometrical properties of aggregates*, 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 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 9: Assessment of fines — Methylene blue test*
- *Part 10: Assessment of fines — Grading of filler aggregates (air jet sieving)*
- *Part 11: Classification test for the constituents of coarse recycled aggregate*

FprEN 933-8:2011 (E)

1 Scope

This European Standard describes the reference method used for type testing and in case of dispute for the determination of the sand equivalent value of 0/2 mm fraction (for 0/4 mm, see Annex A) in fine aggregates or all-in aggregates. For other purposes, in particular factory production control, other methods may be used provided that an appropriate working relationship with the reference method has been established.

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

EN 1097-5:2008, *Tests for mechanical and physical properties of aggregates — Part 5: Determination of the water content by drying in a ventilated oven*

3 Terms and definitions

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

3.1

finer

particle size fraction of an aggregate which passes the 0,063 mm sieve

3.2

laboratory sample

sample intended for laboratory testing

3.3

particle size fraction

fraction of an aggregate passing the larger of two sieves and retained on the smaller

NOTE The lower limit can be zero.

3.4

subsample

sample obtained by means of a sample reduction procedure

3.5

test portion

sample used as a whole in a single test

3.6

test specimen

sample used in a single determination when a test method requires more than one determination of a property

4 Principle

A 0/2 mm test specimen of aggregate with a maximum fines content of 10 % (either natural or obtained after grading curve adjustment) and a small quantity of washing and flocculating solution are poured into a graduated cylinder and are agitated to loosen the clay coatings from the coarser particles in the test portion. The aggregate is then 'irrigated' using additional washing and flocculating solution forcing the fine particles into suspension. After a fixed time, the sand equivalent value ($SE(10)$) is calculated as the height of sediment expressed as a percentage of the total height of sediment and suspension in the cylinder.

5 Reagents

5.1 Concentrated solution, made up from:

- a) crystalline calcium chloride, $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ or anhydrous calcium chloride, CaCl_2 ;
- b) glycerine, 99 % glycerol, laboratory reagent quality;
- c) formaldehyde solution, 40 % by volume, laboratory reagent quality;
- d) distilled or demineralised water.

Dissolve (219 ± 2) g of crystalline calcium chloride in (350 ± 50) ml of distilled or demineralised water, cool to room temperature and if necessary filter through a medium or coarse grade filter paper. Add (480 ± 5) g of glycerine and $(12,5 \pm 0,5)$ g of formaldehyde solution and dilute to 1 l of solution with distilled or demineralised water and mix thoroughly.

NOTE 1 219 g $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ is equivalent to 111 g anhydrous calcium chloride CaCl_2 .

NOTE 2 It is recommended that the concentrated solution is stored protected from light in glass or plastics flasks containing (125 ± 1) ml.

NOTE 3 Sodium hypochlorite (bleach) with 2,6 % active chloride can be used instead of formaldehyde. In case of dispute, use formaldehyde.

5.2 Washing and flocculating solution, prepared by diluting (125 ± 1) ml of concentrated solution (5.1) to $(5,00 \pm 0,01)$ l using distilled or demineralised water.

NOTE In preparing the washing solution, the concentrated solution should first be vigorously shaken and subsequently its container should be rinsed several times using distilled or demineralised water, pouring the rinsing water into the 5 l flask before diluting to 5 l.

Washing solution shall not be used more than 28 days after preparation or if it is cloudy or contains any precipitate or mould.

6 Apparatus

6.1 All apparatus, unless otherwise stated, shall conform to the general requirements of EN 932-5.

6.2 Two graduated cylinders, of glass or clear plastic (see Figure 1) complete with rubber bungs and with the following dimensions:

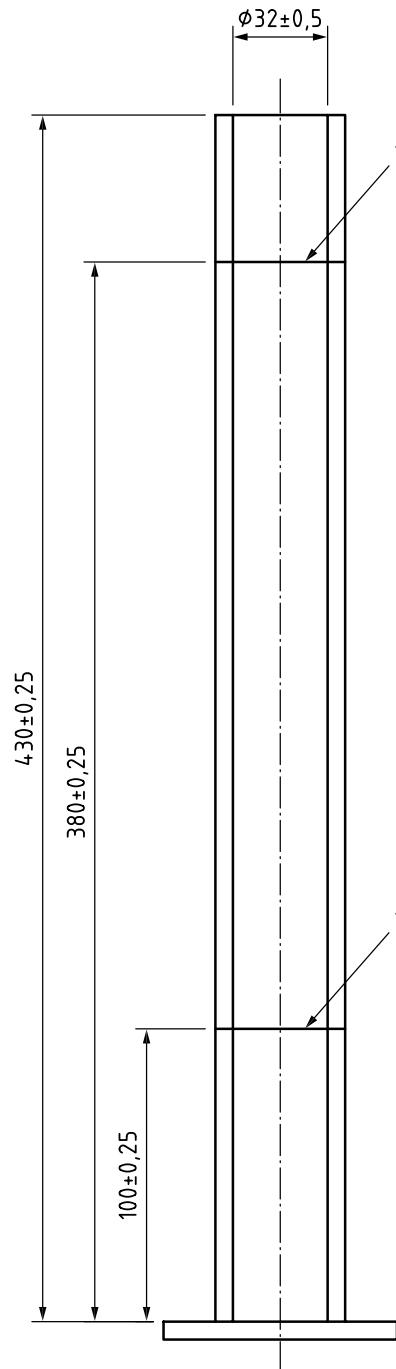
- a) wall thickness, about 3 mm;
- b) inside diameter $(32,0 \pm 0,5)$ mm;
- c) height $(430,00 \pm 0,25)$ mm.

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Each cylinder shall be clearly marked in two positions:

- d) at $(100,00 \pm 0,25)$ mm from the base; and
- e) at $(380,00 \pm 0,25)$ mm from the base.

Dimensions in millimetres



1 Circle mark

Figure 1 — Graduated cylinder

6.3 Test plunger assembly (see Figure 2) comprising: