



**SLOVENSKI STANDARD**  
**SIST EN 933-8:2000**

**01-september-2000**

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

Prüverfahren 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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**Ta slovenski standard je istoveten z: EN 933-8:1999**

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**ICS:**

91.100.15 Mineralni materiali in izdelki Mineral materials and products

**SIST EN 933-8:2000**

**en**

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EUROPEAN STANDARD  
 NORME EUROPÉENNE  
 EUROPÄISCHE NORM

**EN 933-8**

March 1999

ICS 91.100.15

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 European Standard was approved by CEN on 19 February 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## 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 September 1999, and conflicting national standards shall be withdrawn at the latest by December 2003.

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.

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

A European Standard "Tests for filler aggregate used in bituminous mixtures" is in preparation.

The other parts of EN 933 will be:

[SIST EN 933-8:2000](#)

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- 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: Determination of 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 fillers (air jet sieving)

## 1 Scope

This European Standard specifies a method for the determination of the sand equivalent value of the 0/2 mm fraction in fine aggregates and all-in aggregates. It applies to natural aggregates.

## 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 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 1097-5	Tests for mechanical and physical properties of aggregates - Part 5 : Determination of the water content by drying in a ventilated oven

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## 3 Definitions

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

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**3.1 laboratory sample:** Sample intended for laboratory testing.

**3.2 test portion:** Sample used as a whole in a single test.

**3.3 test specimen:** Sample used in a single determination when a test method requires more than one determination of a property.

**3.4 fines:** Particle size fraction of an aggregate which passes the 0,063 mm sieve.

**3.5 particle size fraction:** Fraction of an aggregate passing the larger of two sieves and retained on the smaller; the lower limit can be zero.

## 4 Principle

A test portion of sand and a small quantity of flocculating solution are poured into a graduated cylinder and are agitated to loosen the clay coatings from the sand particles in the test portion. The sand is then 'irrigated' using additional flocculating solution forcing the fine particles into suspension above the sand. After 20 min, the sand equivalent value (*SE*) is calculated as the height of sediment expressed as a percentage of the total height of flocculated material in the cylinder.

## 5 Reagents

### 5.1 Concentrated solution, made up from:

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

Dissolve  $(219 \pm 2)$  g of crystalline calcium chloride in  $(350 \pm 50)$  ml of distilled or demineralised water, cool to room temperature and if necessary filter through a medium or coarse grade filter paper. Add  $(480 \pm 5)$  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  $\text{CaCl}_2$ .

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

### 5.2 Washing solution, prepared by diluting $(125 \pm 1)$ 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.

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## 6 Apparatus

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

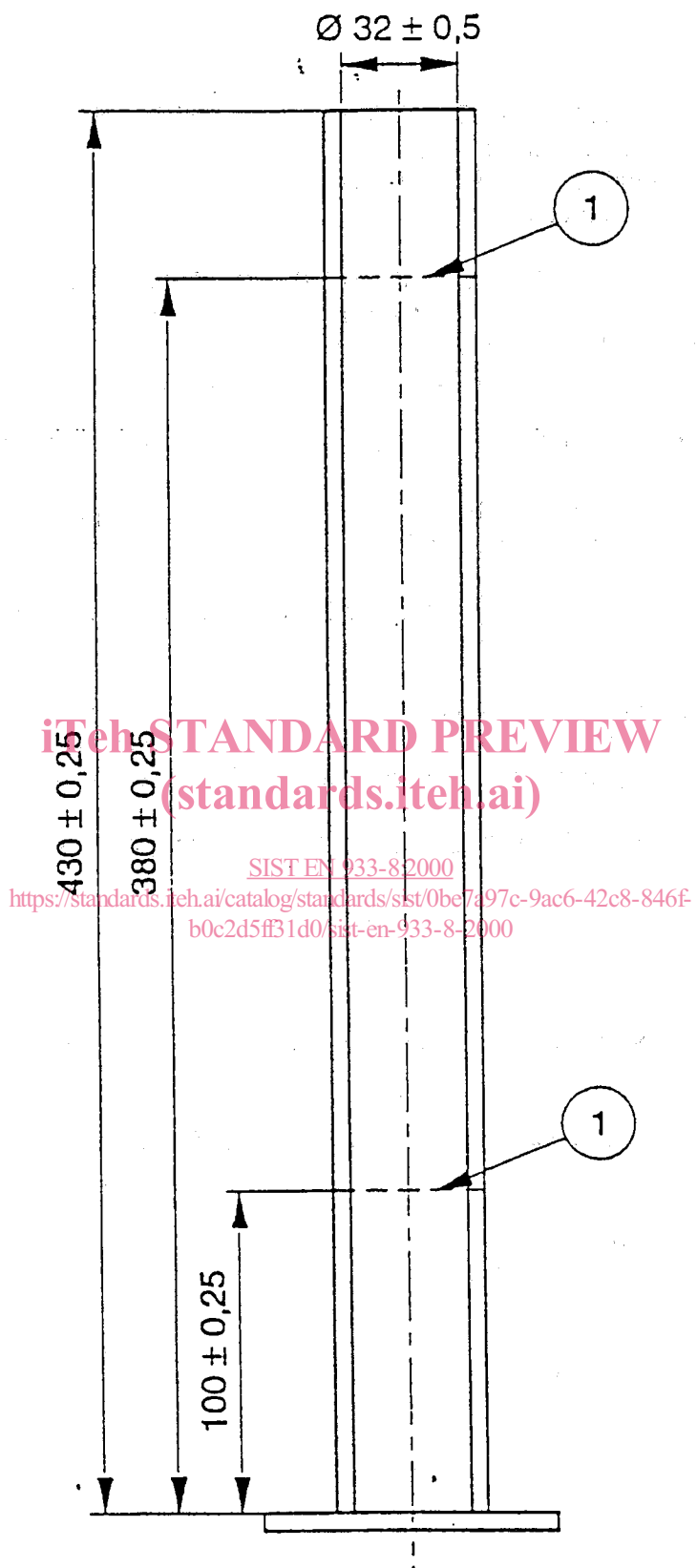
6.2 Two graduated cylinders, of glass or clear plastic (see figure 1) complete with rubber bungs and with the following dimensions:

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

Each cylinder shall be clearly marked in two positions:

- at  $(100,00 \pm 0,25)$  mm from the base; and
- 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:

- a) a rod ( $440,00 \pm 0,25$ ) mm long;
- b) an end piece ( $25,0 \pm 0,1$ ) mm diameter, its lower surface being flat, smooth and perpendicular to the rod axis and which includes three guides at the side for centring the plunger in the cylinder, leaving a small clearance;
- c) a collar, ( $10,0 \pm 0,1$ ) mm thick, suitable for use with the graduated cylinder, acting as a guide for the rod and, at the same time, used to indicate the distance the test plunger is inserted inside the cylinder. The collar shall include a screw which enables it to be locked onto the rod of the test plunger and the collar shall also have a slot for a rule;
- d) a plunger head, fixed to the upper end of the rod, to give the test plunger assembly, excluding the collar, a total mass of ( $1,00 \pm 0,01$ ) kg.

The immersed parts of the plunger assembly shall be made from non-corrodible metal.

NOTE : Before first use of a test plunger or a graduated cylinder, the plunger assembly should be placed in the empty cylinder. With the collar resting on the rim of the cylinder the distance between the upper face of the collar and the lower face of the plunger head should not exceed 0,5 mm. If this clearance exceeds 0,5 mm or if the end piece does not reach the bottom of the cylinder, this combination of test plunger and graduated cylinder should not be used.

**6.4 Stopclock(s)**, readable to 1 s.**6.5 500 mm rule**, graduated in millimetres.**6.6 Test sieve**, 2 mm square aperture with, if necessary, a guard sieve.**6.7 Sieve brush**.**6.8 Spatula**.**6.9 Washing tube**, (see figure 3) comprising a rigid tube of non-corrodible metal with the following dimensions:

- a) outside diameter ( $6,0 \pm 0,5$ ) mm;
- b) inside diameter ( $4,0 \pm 0,2$ ) mm;
- c) length about 500 mm.

The washing tube shall be fitted with a tap at the top. The bottom end of the tube (see figure 4) shall be conical, made from non-corrodible metal and have a threaded (screw) connection. A hole ( $1 \pm 0,1$ ) mm diameter shall be made diametrically in each face of the cone.

**6.10 Flask**, of glass or clear plastic of 5 l capacity fitted with a siphon system, its base being positioned about 1 m above the work bench.**6.11 Rubber or plastic tube**, of length approximately 1,50 m, and inside diameter approximately 5 mm, connecting the washing tube to the siphon.**6.12 Funnel**, for transferring the test portion into the graduated cylinder (see figure 5).