



**SLOVENSKI STANDARD**  
**SIST EN 933-10:2009**

**01-oktober-2009**

**BUXca Yý U**  
**SIST EN 933-10:2002**

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Tests for geometrical properties of aggregates - Part 10: Assessment of fines - Grading of filler aggregates (air jet sieving)

Prüfverfahren für geometrische Eigenschaften von Gesteinskörnungen - Teil 10: Beurteilung von Feinanteilen - Kornverteilung von Füller (Luftstrahlsiebung)

Essais pour déterminer les caractéristiques géométriques des granulats - Partie 10: Détermination des fines - Granularité des fillers (tamisage dans un jet d'air)

**Ta slovenski standard je istoveten z: EN 933-10:2009**

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**ICS:**

91.100.15 Mineralni materiali in izdelki Mineral materials and products

**SIST EN 933-10:2009**

**en,fr,de**

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EUROPEAN STANDARD

EN 933-10

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2009

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English Version

## Tests for geometrical properties of aggregates - Part 10: Assessment of fines - Grading of filler aggregates (air jet sieving)

Essais pour déterminer les caractéristiques géométriques  
des granulats - Partie 10: Détermination des fines -  
Granularité des fillers (tamisage dans un jet d'air)

Prüfverfahren für geometrische Eigenschaften von  
Gesteinskörnungen - Teil 10: Beurteilung von Feinanteilen -  
Kornverteilung von Füller (Luftstrahlsiebung)

This European Standard was approved by CEN on 12 June 2009.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 933-10:2009) 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 January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

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 933-10:2001.

This standard forms part of a series of 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 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 for 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 11: Classification test for the constituents of coarse recycled aggregate

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.

**EN 933-10:2009 (E)****1 Scope**

This European Standard describes the reference method used for type testing and in cases of dispute for determining the particle size distribution up to 2 mm size of natural or manufactured origin filler aggregate using air jet sieving. 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.

NOTE A wet sieving procedure conforming to EN 933-1 can be used as an alternative method. However, this procedure is not applicable for mixed filler.

**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*

**3 Terms and definitions**

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

**3.1****filler aggregate**

aggregate, most of which passes a 0,063 mm sieve

**3.2****laboratory sample**

sample intended for laboratory testing

**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 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.

**4 Principle**

The test consists of dividing up and separating, by means of a series of sieves, a filler aggregate into several granular classifications of decreasing sizes. The aperture sizes and the number of sieves are

specified in 5.2. The test is in particular well suited for materials which when dry neither tend to agglomeration nor to electrostatic charge.

The method adopted is dry air jet sieving.

The mass of the particles passing each sieve is related to the initial mass of the material. The percentages obtained are used either in their numerical form or in a graphical form.

## 5 Apparatus

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

**5.2 Test sieves**, with round frame of 200 mm nominal diameter and square aperture sizes of 0,063 mm, 0,125 mm and 2 mm in accordance with EN 933-2.

**5.3 Air jet sieving apparatus**, (general form shown in Figure 1) with a pressure difference of  $(3,0 \pm 0,5)$  kPa across the sieve, during the test procedure.

**5.4 Ventilated oven**, thermostatically controlled to maintain a temperature of  $(110 \pm 5)$  °C or other suitable equipment for drying the filler aggregate, if it does not cause any particle breakdown.

**5.5 Balance**, accurate to  $\pm 0,1$  % of the test portion mass.

**5.6** Soft brush.

**5.7** Plastic hammer (optional).

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## 6 Preparation of test portions SIST EN 933-10:2009

Laboratory samples shall be reduced in accordance with EN 932-2 to produce test portions.  
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The test portion shall have a mass of  $(50,0 \pm 1,0)$  g.

Dry the test portion at  $(110 \pm 5)$  °C to constant mass. Allow to cool, weigh and record as  $M_1$ .

## 7 Procedure

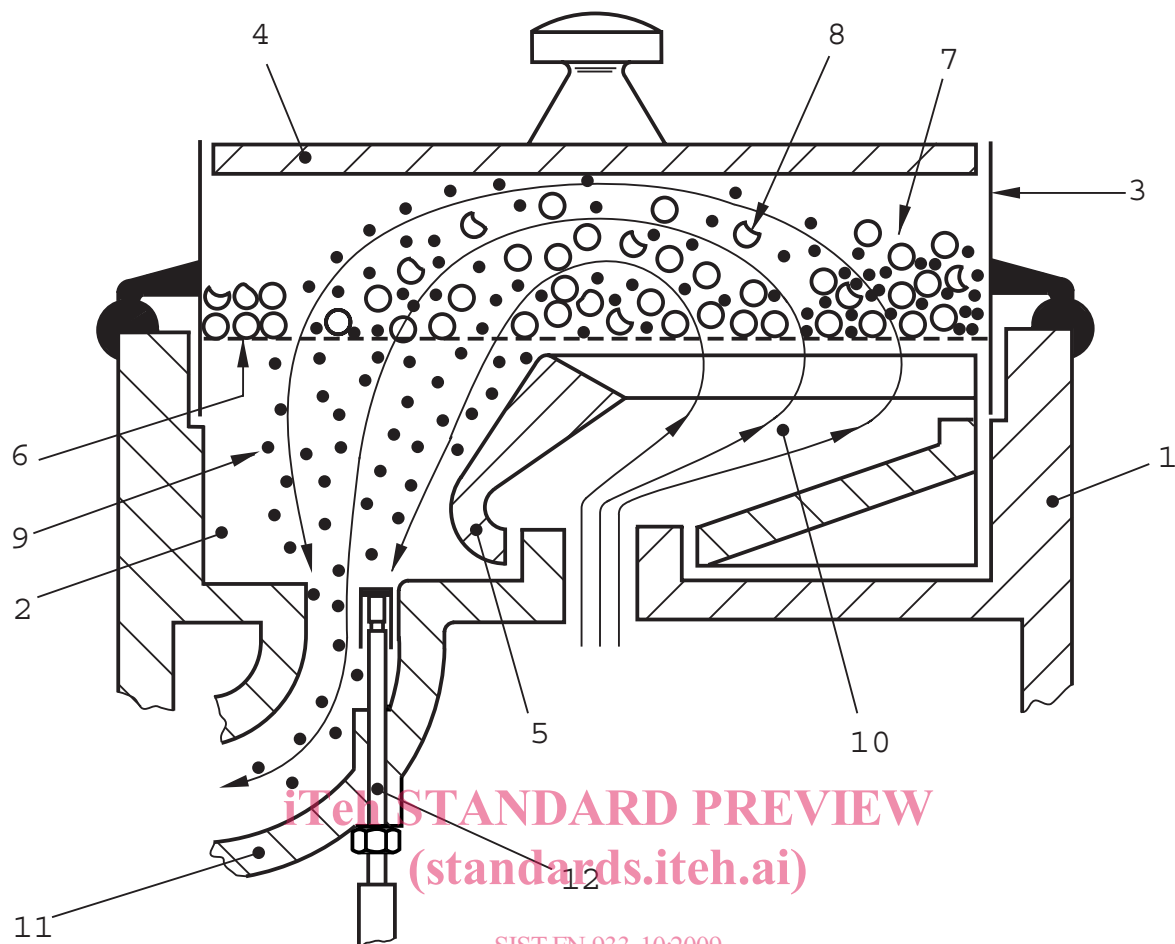
Fit the 0,063 mm test sieve onto the apparatus and transfer all of the test portion onto the sieve.

After covering the sieve with the plexiglass lid, operate the air jet sieving apparatus until complete sieving is achieved. A minimum of 3 min is required. During sieving the pressure difference to normal air pressure in the air jet sieving apparatus shall be  $(3,0 \pm 0,5)$  kPa.

NOTE 1 Any agglomeration of particles during sieving can be alleviated by tapping the plastic hammer at the centre of the plexiglass lid.

NOTE 2 The sieving process is complete when the mass of retained material does not change more than 0,1 % of the mass of the test portion during 1 min of this sieving operation.

NOTE 3 In many cases sieving can be completed after sieving for a pre-determined time. Test laboratories can determine the time required to fulfil the requirements of Clause 7 for completion of sieving for specific types and sizes of test portions in the air jet sieving apparatus used.



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**Key**

1	Housing	7	Test portion
2	Dish	8	Oversize material
3	Sieve frame	9	Undersize material
4	Plexiglass lid	10	Air jet
5	Rotating slit-nozzle	11	Air discharge
6	Test sieve	12	Pressure gauge socket, with dust hood

**Figure 1 — Example of air jet sieving apparatus**

Determine the mass of material retained on the sieve including the filler aggregate brushed from the sieve mesh and record the mass as  $R_1$  to 0,1 g.

Repeat the above procedure with the 0,125 mm sieve and then with the 2 mm sieve, using in each case the retained material from the previous sieve and record the masses retained as  $R_2$  and  $R_3$  respectively to 0,1 g.

## 8 Calculation and expression of results

Record the various masses on a test data sheet, an example of which is given in Annex A.

Calculate the mass retained on each sieve as a percentage of the original dry mass  $M_1$  to the nearest whole number.



Calculate the cumulative percentage of the original dry mass passing each sieve down to the 0,063 mm test sieve.

NOTE A statement on the precision of this test is given in Annex B.

## 9 Test report

### 9.1 Required data

The test report shall include the following information:

- a) reference to this European Standard;
- b) identification of the sample;
- c) identification of the laboratory;
- d) cumulative percentage of the mass of the test portion passing each of the sieves to the nearest whole number;
- e) date of reception of sample;
- f) sampling certificate, if available.

### 9.2 Optional data

The test report can include the following information:

- a) name and location of the sample source;  
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- b) description of the material and of the sample reduction procedure;
- c) mass of test portion;
- d) graphical presentation of results (See Annex C);
- e) date of test.

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