



SLOVENSKI STANDARD

SIST EN 932-3:1999

01-junij-1999

Preskusi splošnih lastnosti agregatov - 3. del: Postopek in izrazje poenostavljenega petrografskega opisa

Tests for general properties of aggregates - Part 3: Procedure and terminology for simplified petrographic description

Prüfverfahren für allgemeine Eigenschaften von Gesteinskörnungen - Teil 3: Durchführung und Terminologie einer vereinfachten petrographischen Beschreibung

Essais pour déterminer les propriétés générales des granulats - Partie 3: Procédure et terminologie pour la description pétrographique simplifiée

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Ta slovenski standard je istoveten z: **EN 932-3:1996**

ICS:

91.100.15 Mineralni materiali in izdelki Mineral materials and products

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EUROPEAN STANDARD

EN 932-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1996

ICS 19.120; 91.100.20

Descriptors: aggregates, tests, characteristics, petrography, rocks, samples, nomenclature

English version

Tests for general properties of aggregates - Part 3: Procedure and terminology for simplified petrographic description

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This European Standard was approved by CEN on 1996-07-26. 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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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 February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

This European Standard is one of a series of standards for tests for general properties of aggregates as listed below.

EN 932-1:	Tests for general properties of aggregates Part 2: Methods for sampling
prEN 932-2:	Tests for general properties of aggregates Part 2: Methods for reducing laboratory samples
prEN 932-4:	Tests for general properties of aggregates ¹⁾ Part 4: Quantitative and qualitative system for description and petrography
prEN 932-5:	Tests for general properties of aggregates Part 5: Common equipment and calibration
prEN 932-6:	Tests for general properties of aggregates Part 6: Definitions of repeatability and reproducibility
prEN 932-7:	Tests for general properties of aggregates Part 7: Conformity criteria for test results ¹⁾

Test methods for other properties of aggregates are covered by Parts of the following European Standards:

EN 933	Tests for geometrical 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

References specific to the petrographic examination are given in annex B (informative).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1) In course of preparation

1 Scope

This European standard specifies a basic procedure for the petrographic examination of aggregates for the purposes of general classification. The procedure is not suitable for the detailed petrographical study of aggregates for specific end uses.

NOTE: The examination should be carried out by a qualified geologist (petrographer), with experience of materials used in civil engineering.

This European standard covers only natural aggregates, sand and gravel or crushed rock aggregate as well as their source materials.

2 Normative references

This European Standard incorporates by dated or by 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 932-1 Tests for general properties of aggregates - Part 1: Methods for sampling

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3 Definitions

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

NOTE: Rocks can be classified into three major divisions, according to their origin: igneous, sedimentary and metamorphic.

3.1 igneous rocks: Rocks formed from molten rock (magma) either at or below the earth's surface. The latter can be divided into two classes, plutonic and hypabyssal. Plutonic rocks are formed at depth in large bodies and typically have a coarse crystalline texture, with crystals clearly visible to the naked eye. Hypabyssal rocks are formed in smaller bodies near, but not at, the earth's surface and have a fine crystalline texture. Extrusive or volcanic rocks are formed as lavas and pyroclastics at the earth's surface and have a very fine or glassy texture.

3.2 sedimentary rocks: Rocks formed at the earth's surface by the accumulation, or precipitation, of the products of weathering and erosion of existing rocks. They can also be formed by the accumulation of organic debris. Such accumulated material can remain unconsolidated or it can be lithified into rock. Sedimentary rocks are usually layered.

3.3 metamorphic rocks: Rocks formed from pre-existing rocks by the action of heat and/or pressure in the earth's crust, which has caused mineralogical and structural transformations. Metamorphic rocks frequently have anisotropic texture.

4 Apparatus

- 4.1 Handlens.
- 4.2 Pen knife.
- 4.3 Stereoscopic microscope, (magnification : typically 10 X to 100 X).
- 4.4 Polarizing microscope.
- 4.5 Reagent, diluted hydrochloric acid.

5 Sampling

The sample to be examined can comprise material from drill cores, aggregate from stock piles, or the exposed faces of quarries. In order to ensure that the sample is representative, it shall be selected in accordance with a recognized sampling procedure.

In the case of a rock sample, the mass of material delivered for the examination shall be not less than 5 kg.

In the case of aggregates, the minimum sample mass Q delivered for examination depends on the largest particle size D , and shall be as given in table 1.

Table 1: Relationship between largest particle size D and minimum sample mass Q

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Largest particle size D mm	Minimum sample mass Q kg
$31,5 < D \leq 63$	50
$16 < D \leq 31,5$	25
$8 < D \leq 16$	8
$4 < D \leq 8$	2
≤ 4	0,5

For aggregates, the sample used for the examination shall be taken in accordance with the procedures described in EN 932-1.

6 Description of a rock sample

6.1 Examination

The sample shall be first subjected to a visual examination to determine the constituent rock or mineral types. It can be appropriate to wash the sample.

Each rock type shall then be carefully inspected using a handlens or a stereoscopic microscope and other appropriate means.

NOTE 1: If necessary, where appropriate, thin sections should be examined using a polarizing microscope (more than one section can be necessary if the rock is coarse-grained or heterogeneous).

NOTE 2: Some physical properties, like density or ultrasonic pulse velocity, can also be usefully determined.

The description shall also include comments on the following:

- a) grain size of the main constituents, texture, anisotropy, porosity, vesicularity (in volcanic rocks), colour;
- b) mineralogical composition (quartz, feldspars, calcite, dolomite, etc) and approximate determination of their respective proportions;
- c) state of alteration and weathering.

NOTE 3: The description can also include comments on the presence, even in small quantities, of some constituents which can be of concern in particular circumstances (such as opal, micas or other phyllosilicates, sulfates, iron sulfides and organic materials).

6.2 Nomenclature

From the examination specified in 6.1, assign if possible, an appropriate name to the rock, preferably selected from the nomenclature given in annex A.

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7 Description of an aggregate sample

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7.1 General

Aggregates derived from natural deposits consist mainly of:

- a) mineral particles; and
- b) rock fragments.

The method of description and the nomenclature described in 7.2 and 7.3 shall be used only for particle sizes between 0,1 mm and 63 mm. It can be appropriate to wash the sample.

NOTE: The composition of aggregates often varies between size fractions. Hence, before carrying out the examination, it can be necessary to divide the aggregate into closely sized fractions which can be examined separately. The proportions of constituents can then be estimated by counting the particles in size fractions.

7.2 Examination

The description of the sample (or grain size fraction) shall include:

- a) brief information about the shape, surface conditions (roughness etc) and roundness of particles;
- b) a petrographic identification based on counting a sufficiently representative number of particles.

Particles retained on a 4 mm sieve can be examined with the naked eye, or preferably with a hand lens or stereoscopic microscope; the stereoscopic microscope shall be used for finer grains (in some cases, it can be necessary to use other methods such as thin sections for use with the polarizing microscope, or an acid test for the calcite identification, etc).

The degree of weathering of the particles, and the presence of an exterior coating on the surface of the grains, shall be noted.

7.3 Description

7.3.1 Individual particles in an aggregate shall be described in the following terms:

7.3.1.1 Rocks, see annex A for the preferred nomenclature. In some cases, for a first description level, the classification can be simplified, for instance limited to : sedimentary (siliceous/carbonate rocks), plutonic, hypabyssal, volcanic, metamorphic.

7.3.1.2 Minerals, quartz, feldspars, micas, calcite, etc.

7.3.1.3 Shell fragments.

7.3.2 The aggregate as a whole shall be described as follows:

7.3.2.1 When a rock or mineral is predominant, (more than 50 %), its presence shall be reflected in the name of the material. For example: [log/standards/sist/15e8ad05-e152-4e6f-a489-b591677a26cd/sist-en-932-3-1999](https://standards.sist/15e8ad05-e152-4e6f-a489-b591677a26cd/sist-en-932-3-1999)

- a) quartzose sand (sand in which more than 50 % of the grains are quartz grains);
- b) basaltic gravel (gravel in which more than 50 % of the particles consist of basalt fragments), etc.

7.3.2.1 When no single type is predominant, the material is said to be "heterogeneous" and its name can include the most frequent type(s). For example:

- a) heterogeneous quartzo-feldspathic sand;
- b) heterogeneous siliceous gravel etc.

8 Test report

The test report shall include:

8.1 Essential data needed to identify the sample.

8.2 The petrographic description of the different rock types (see 6.1) or of the different aggregate size fractions (see 7.2), including the results of any particle counting.

8.3 Geological information on source, i.e. on sample origin as follows: