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Tests for geometrical properties of aggregates - Part 6: Assessment of surface characteristics - Flow coefficient of aggregates

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This standard includes the English version of the European Standard.

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English Version

Tests for geometrical properties of aggregates - Part 6: Assessment of surface characteristics - Flow coefficient of aggregates

Essais pour déterminer les caractéristiques géométriques des granulats - Partie 6 : Evaluation des caractéristiques de surface - Coefficient d'écoulement des granulats

Prüfverfahren für geometrische Eigenschaften von Gesteinskörnungen - Teil 6: Beurteilung der Oberflächeneigenschaften - Fließkoeffizienten von Gesteinskörnungen

This European Standard was approved by CEN on 7 November 2022.

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European foreword

This document (EN 933-6:2022) has been prepared by the 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of an identical text or by endorsement, at the latest by June 2023, and conflicting national standards shall be withdrawn at the latest by June 2023.

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

This document supersedes EN 933-6:2014.

In comparison with the previous edition EN 933-6:2014, the following technical modifications have been made:

a) amendment to the Scope, clarifying that the standard does not apply to lightweight aggregates;

b) amendment to the Scope according to the current rules, introducing the three annexes and adding a warning about potential hazardous materials, operations and equipment;

c) change of the dated normative references to Annex A of EN 1097-6:2013 to undated references. The references are given for the calculations of masses in 7.2.2, 7.3.1 and 8.2.2. As a consequence, new notes to 7.2.2 and 8.2.2 have been added, informing that the test method generally applies to aggregates with water absorption less than about 1,5 %;

d) rewording of Clause 5 Reference materials, using the same text structure as in EN 1097-8. The information about alternative sources of reference materials has been moved to a new Note;

e) amendment to 6.4.1, including Figure 3, to clarify the verification of aperture dimension;

f) updating of the test reports in 7.5 and 8.5 according to the current rules;

g) amendment to the expressions of numerical results in 8.3, 8.4 and Annex C, for a better precision of the final result.

This document forms part of a series of tests for geometrical properties of aggregates. Test methods for other properties of aggregates are covered by the following European standards:

— EN 932 (all parts), *Tests for general properties of aggregates*

— EN 1097 (all parts), *Tests for mechanical and physical properties of aggregates*

— EN 1367 (all parts), *Tests for thermal and weathering properties of aggregates*

— EN 1744 (all parts), *Tests for chemical properties of aggregates*

— EN 13179 (all parts), *Tests for filler aggregate used in bituminous mixtures*

The other parts of EN 933 include:

— *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 particles in coarse and all-in natural 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 filler aggregates (air jet sieving)*

— *Part 11: Classification test for the constituents of coarse recycled aggregate*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies the reference method used for type testing, and in case of dispute, for determining the flow coefficient of coarse and fine aggregates. Other methods can be used for other purposes, such as factory production control, provided that an appropriate working relationship with the reference method has been established. Examples of advanced test methods can be found in the Bibliography.

This document applies to coarse aggregate of sizes between 4 mm and 20 mm and to fine aggregate of size up to 2 mm. It does not apply to lightweight aggregates.

NOTE 1 For coarse aggregates between 4 mm and 20 mm, the flow coefficient is linked with the percentage of crushed or broken surfaces of an aggregate and can therefore be used in association with the method specified in EN 933–5. Shape and surface texture characteristics also influence the result.

NOTE 2 Experience of this test has been generally limited to natural aggregates.

Examples of test data sheets are given in informative Annexes A and C.

Annex B (informative) contains precision data.

WARNING — The use of this part of EN 933 can involve hazardous materials, operations and equipment (such as dust, noise and heavy lifts). It does not purport to address all of the safety or environmental problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel and the environment prior to application of the standard, and fulfil statutory and regulatory requirements for this purpose.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 933-3, *Tests for geometrical properties of aggregates — Part 3: Determination of particle shape — Flakiness index*

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