



SLOVENSKI STANDARD

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Ocenjevanje ter preverjanje nespremenljivosti lastnosti (AVCP) agregatov - Preskušanje tipa in kontrola proizvodnje v obratu

Assessment and Verification of the Constancy of Performance (AVCP) of aggregates -
Type testing and Factory Production Control

Bewertung der Konformität von Gesteinskörnungen - Erstprüfung und werkseigene
Produktionskontrolle

Evaluation et Vérification de la Constance des Performances (EVCP) des granulats -
Essais de types et Maîtrise de la production en usine

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Assessment and Verification of the Constancy of Performance (AVCP) of aggregates - Type testing and Factory Production Control

Evaluation et Vérification de la Constance des Performances (EVCP) des granulats - Essais de types et Maîtrise de la production en usine

Bewertung der Konformität von Gesteinskörnungen - Erstprüfung und werkseigene Produktionskontrolle

This European Standard was approved by CEN on 24 April 2017.

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European foreword

This document (EN 16236:2018) 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of an identical text or by endorsement, at the latest by January 2019, and conflicting national standards shall be withdrawn at the latest by April 2020.

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

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard is intended for use with future revisions (currently in preparation) of the standards listed below. It is not for use with the versions of these standards dated 2002 (plus amendment A1).

EN 12620, *Aggregates for concrete*;

EN 13043, *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*;

EN 13139, *Aggregates for mortar*;

EN 13242, *Aggregates for unbound and hydraulic bound materials for use in civil engineering work and road construction*;

EN 13383-1, *Armourstone — Part 1: Specification*;

EN 13450, *Aggregates for railway ballast*.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard has been written as the system for the Assessment and Verification of the Constancy of Performance (AVCP) of aggregates.

This European Standard is intended for use with future revisions (currently in preparation) of the standards listed below. It is not for use with the versions of these standards dated 2002 (plus amendment A1).

It is intended to be used in conjunction with the future aggregate product standards: EN 12620, EN 13043, EN 13139, EN 13242, EN 13383-1 and EN 13450 and will be called up by these standards. This European Standard and the corresponding product standards have been written under the Construction Products Regulation (CPR).

According to Annex ZA of these standards, the tasks relative to AVCP for the manufacturer comprise Type Testing (TT) and Factory Production Control (FPC).

This standard has been compiled from the TT and FPC clauses, annexes and tables previously found in the aggregate product standards. A further revision of this standard is currently under preparation, which will provide more detailed TT procedures and clear, detailed procedures for product conformity (e.g. statistical conformity criteria, number of samples, tolerances, time limits of validity, etc).

The type testing and factory production control procedures are designed to be applied to European Standards for aggregates. When the appropriate “conformity” clauses are applied, it forms part of the system of assessment and verification of constancy of performance as required by the Construction Products Regulation. It provides the minimum provisions for TT and FPC for CE Marking.

The testing procedures, using the reference test methods, have the function of providing assurance that a particular aggregate product conforms to each of the selected specified characteristics in the product standard. The type testing procedure is designed to be applied to all harmonized elements of European Harmonized Standards for aggregates.

The factory production control system describes control of the sourcing and processing of the aggregate combined with routine sampling and testing to provide ongoing assurance that the aggregates product continues to conform to those characteristics determined through TT. Testing within FPC may use either the standard reference tests called up by the aggregate product standards or other test procedures which have been shown to correlate with those tests.

For commercial and/or contractual reasons, the manufacturer can choose to perform more testing and inspection than the minimum specified.

1 Scope

This European Standard specifies both type testing and factory production control procedures for use during the assessment and verification of constancy of performance of aggregates.

Additional testing carried out within contracts is beyond the scope of this standard.

This European Standard is applicable to European Standards for aggregates if regulatory marking of conformity is to be applied. It is also applicable to European Standards for aggregates where regulatory marking does not apply.

This European Standard is applicable to the type testing and factory production control of aggregates within the scope of EN 12620, EN 13043, EN 13242, EN 13139, EN 13383-1 and EN 13450.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-2, *Method of testing cement — Part 2: Chemical analysis of cement*

EN 196-6, *Methods of testing cement — Part 6: Determination of fineness*

EN 459-2, *Building lime — Part 2: Test methods*

EN 932-1, *Tests for general properties of aggregates — Part 1: Methods for sampling*

EN 932-3, *Tests for general properties of aggregates — Part 3: Procedure and terminology for simplified petrographic description*

EN 932-5, *Tests for general properties of aggregates — Part 5: Common equipment and calibration*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution - Sieving method*

EN 933-3, *Tests for geometrical properties of aggregates — Part 3: Determination of particle shape — Flakiness index*

EN 933-4, *Tests for geometrical properties of aggregates — Part 4: Determination of particle shape — Shape index*

EN 933-5, *Tests for geometrical properties of aggregates — Part 5: Determination of percentage of crushed and broken surfaces in coarse aggregate particles*

EN 933-6, *Tests for geometrical properties of aggregates — Part 6: Assessment of surface characteristics — Flow coefficient of aggregates*

EN 933-7, *Tests for geometrical properties of aggregates — Part 7: Determination of shell content — Percentage of shells in coarse aggregates*

EN 933-8, *Tests for geometrical properties of aggregates — Part 8: Assessment of fines — Sand equivalent test*

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EN 933-9, *Tests for geometrical properties of aggregates — Part 9: Assessment of fines — Methylene blue test*

EN 933-10, *Tests for geometrical properties of aggregates — Part 10: Assessment of fines — Grading of filler aggregates (air jet sieving)*

EN 933-11, *Tests for geometrical properties of aggregates — Part 11: Classification test for the constituents of coarse recycled aggregate*

EN 1097-1, *Tests for mechanical and physical properties of aggregates — Part 1: Determination of the resistance to wear (micro-Deval)*

EN 1097-2, *Tests for mechanical and physical properties of aggregates — Part 2: Methods for the determination of resistance to fragmentation*

EN 1097-3:1998, *Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids*

EN 1097-4, *Tests for mechanical and physical properties of aggregates — Part 4: Determination of the voids of dry compacted filler*

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

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

EN 1097-7, *Tests for mechanical and physical properties of aggregates — Part 7: Determination of the particle density of filler — Pycnometer method*

EN 1097-8:2009, *Tests for mechanical and physical properties of aggregates — Part 8: Determination of the polished stone value*

EN 1097-9, *Tests for mechanical and physical properties of aggregates — Part 9: Determination of the resistance to wear by abrasion from studded tyres — Nordic test*

EN 1097-10, *Tests for mechanical and physical properties of aggregates — Part 10: Determination of water suction height*

EN 1367-1, *Tests for thermal and weathering properties of aggregates — Part 1: Determination of resistance to freezing and thawing*

EN 1367-2, *Tests for thermal and weathering properties of aggregates — Part 2: Magnesium sulfate test*

EN 1367-3, *Tests for thermal and weathering properties of aggregates — Part 3 : Boiling test for "Sonnenbrand basalt"*

EN 1367-4, *Tests for thermal and weathering properties of aggregates — Part 4: Determination of drying shrinkage*

EN 1367-5, *Tests for thermal and weathering properties of aggregates — Part 5: Determination of resistance to thermal shock*

EN 1367-6, *Tests for thermal and weathering properties of aggregates — Part 6: Determination of resistance to freezing and thawing in the presence of salt (NaCl)*

EN 1744-1, *Tests for chemical properties of aggregates — Part 1: chemical analysis*

EN 1744-4, *Tests for chemical properties of aggregates — Part 4: Determination of water susceptibility of fillers for bituminous mixtures*

EN 1744-5, *Tests for chemical properties of aggregates — Part 5: Determination of acid soluble chloride salts*

EN 1744-6, *Tests for chemical properties of aggregates — Part 6: Determination of the influence of recycled aggregate extract on the initial setting time of cement*

EN 1926:2006, *Natural stone test methods — Determination of uniaxial compressive strength*

EN 12620, *Aggregates for concrete*

EN 12697-11, *Bituminous mixtures — Test methods for hot mix asphalt — Part 11: Determination of the affinity between aggregate and bitumen*

EN 13043, *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*

EN 13139, *Aggregates for mortar*

EN 13179-1, *Tests for filler aggregate used in bituminous mixtures — Part 1: Delta ring and ball test*

EN 13179-2, *Tests for filler aggregate used in bituminous mixtures — Part 2: Bitumen number*

EN 13242, *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*

EN 13383-1, *Armourstone — Part 1: Specification*

EN 13383-2, *Armourstone — Part 2: Test methods*

EN 13450, *Aggregates for railway ballast*

3 Terms and definitions

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

3.1

type testing

complete set of tests or other procedures, determining the performance of samples of aggregates representative of the product type

3.2

Declaration of Performance

DoP

expression of the performance of an aggregate in relation to its essential characteristics in accordance with the relevant harmonised standards

EN 16236:2018 (E)**3.3****category**

level or class of a characteristic of an aggregate expressed as a range of values (class) or a threshold value (level for individual value or declared category)

Note 1 to entry: There is no relationship between the categories of different characteristics.

Note 2 to entry: 'level' is defined in the CPR as "the result of the assessment of the performance of an aggregate in relation to its essential characteristics, expressed as a numerical value". Reference should be made to the latest version of the CPR.

Note 3 to entry: 'class' is defined in the CPR as "a range of levels, delimited by a minimum and a maximum value, of performance of an aggregate". Reference should be made to the latest version of the CPR.

Note 4 to entry: 'Threshold level' is defined in the CPR as "a minimum or maximum performance level of an essential characteristic of an aggregate product.

3.4**declared value**

value or range of values that a manufacturer is confident in achieving, taking into account the precision of test methods used, the variety of the production processes and the product performance

3.5**week of production**

5 cumulative days of production in a period no longer than 3 months

Note 1 to entry: In the Tables 1 to 3 of the present standard, "week" means week of production.

3.6**month of production**

20 cumulative days of production in a period no longer than 6 months

3.7**year of production**

at least one day of production in a period no longer than 12 months

Note 1 to entry: In the Tables 1 to 3 of the present standard, "year" means year of production.

Note 2 to entry: For the purpose of the test frequencies, a year of production is the same as a calendar year.

3.8**batch**

production quantity, delivery quantity, partial delivery quantity (railway wagon, load, lorry load, ship's cargo) or stockpile produced at one time under conditions that are presumed uniform

Note 1 to entry: With a continuous process the quantity produced during a specified period should be treated as a batch.

4 Assessment and Verification of Constancy of Performance - AVCP

4.1 General

The conformity of aggregates within the scope of EN 12620, EN 13043, EN 13242, EN 13139, EN 13383-1 and EN 13450 with the specifications of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

- determination of the product type;
- factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance.

NOTE The assignment of tasks to the notified body and the manufacturer is shown in Annex ZA, Table ZA.3.1 of FprEN 12620:2017 FprEN 13043:2017 FprEN 13242:2017 FprEN 13139:2017 FprEN 13383-1:2017 and FprEN 13450:2017

4.2 Type testing

4.2.1 General

The performance of each characteristic included in this standard shall be determined when the manufacturer intends to declare the respective performance unless the standard gives provisions for declaring them without performing tests, e.g. use of previously existing data, classified without (further) testing and conventionally accepted performance.

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

For the purposes of assessment, the manufacturer's products may be grouped, where it is considered that the results for one or more characteristics from any one product are representative for that same characteristics for all grouped products.

Products may be grouped in different ways for different characteristics.

In addition, the determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance when:

- a) a new source of aggregates is to be used (for recycled aggregates, the processing depot will suffice for the source);
- b) there is a major change in the nature of the raw materials or in the processing conditions that may affect the characteristics of the aggregates.

Where aggregates are used whose characteristics have already been determined, by the aggregate manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed. The specifications of these aggregates shall be documented.

4.2.2 Test samples, testing and conformity criteria

The number of samples of aggregates to be tested shall be determined by the manufacturer. The conformity criteria are given in Tables 1, 2 and 3.

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4.2.3 Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the construction product has been placed on the market.

NOTE Please note the possible existence of local legislation regarding the length of time that such records are kept. "Statutory period" is the period of time during which all the records are kept in accordance with regulations applying at the place of production.

4.2.4 Shared other party results

A manufacturer may use the results of the product type determination obtained by someone else (e.g. by another manufacturer or as a common service to manufacturers), to justify his own declaration of performance regarding aggregates that are manufactured with the same grading and with raw materials, constituents and manufacturing methods of the same kind, provided that:

- the results are known to be valid for aggregates with the same essential characteristics relevant for the aggregate performance;
- in addition to any information essential for confirming that aggregates have such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted to transmit to the manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;
- the manufacturer using other party results accepts to remain responsible for aggregates having the declared performances and he also:
 - ensures that aggregates have the same characteristics relevant for performance as the one that has been subjected to the determination of the product type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for aggregates that were subjected to the determination of the product type; and
 - keeps available a copy of the determination of the product type report that also contains the information needed for verifying that aggregates are manufactured according to the same design and with raw materials and manufacturing methods of the same kind.

4.3 Factory Production Control (FPC)

4.3.1 General

The manufacturer shall establish, document and maintain a FPC system to ensure that the aggregates placed on the market conform to the declared performance of the essential characteristics.

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw materials, equipment, the production process and the product.

All the elements, specifications and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.

The manufacturer shall establish and maintain a factory production control manual setting out the procedures by which the factory production control is fulfilled.