SLOVENSKI STANDARD
oSIST prEN 13043:2015

01-julij-2015

Agregati za bitumenske zmesi in površinske prevleke za ceste, letališča in druge prometne površine

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

Gesteinskörnungen für Asphalt und Oberflächenbehandlungen für Straßen, Flugplätze und andere Verkehrsflächen

Granulats pour mélanges hydrocarbonés et pour enduits superficiels utilisés dans la construction des chaussées, aérodromes et autres zones de circulation

Ta slovenski standard je istoveten z: **prEN 13043**

ICS:

91.100.15	Mineralni materiali in izdelki	Mineral materials and products
93.080.20	Materiali za gradnjo cest	Road construction materials

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English Version

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

Gesteinskörnungen für Asphalt und Oberflächenbehandlungen für Straßen, Flugplätze und andere Verkehrsflächen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 154.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (prEN 13043:2015) has been prepared by Technical Committee CEN/TC 154 “Aggregates”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13043:2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

The most significant technical changes compared to the previous edition include:

a) Harmonization of vocabulary and Annex ZA to be consistent with Construction Products Regulation;

b) Unification of categories which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242;

c) Description of assessment and verification of conformity of performance of aggregates (AVCP) — type testing and factory production control in a separate new standard prEN 16236;

d) Implementing general sentences on dangerous substances and adding a new normative Annex A dealing with all source materials considered;

e) Unification of definitions which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242, i.e. for coarse, fine, all-in aggregates and natural graded 0/8 aggregates;

f) Adding categories for the sand equivalent value for fines quality;

g) Adding categories for the methylene blue value for fines quality;

h) Adding categories for angularity and water suction height.

i) Inserting a new clause „General Requirements”

In this document the wordings ‘property’ and ‘characteristic’ have the same meaning.

Requirements for assessment and verification of constancy of performance are given in prEN 16236.

Requirements for other end uses of aggregates are specified in the following European Standards:

— prEN 12620, *Aggregates for concrete*

— prEN 13055, *Lightweight aggregates*

— prEN 13139, *Aggregates for mortar*

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

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

— prEN 13450, *Aggregates for railway ballast*

Note: Due to fact that the EC has not yet been able to confirm the financial commitment for the New Approach Consultants' work in 2015, there are currently no New Approach Consultants in place for 2015. Therefore the provisions of CEN-CENELEC Guide 15 cannot be met.

This shall not prevent the processing of draft standards nor the offering of harmonized standards to the European Commission. In particular, draft standards can be sent to vote without Consultant assessment.

This note will be removed from the Foreword of the finalized publication.

1 Scope

This European Standard specifies the properties of aggregates and filler aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.

It covers aggregates having an oven dried particle density greater than 2,00 Mg/m^3. It also covers coarse recycled aggregates with particle densities greater than 1,50 Mg/m^3 with appropriate caveats and recycled fine aggregate with appropriate caveats (see Annex A).

NOTE 1 Requirements for lightweight aggregates are specified in prEN 13055.

This European Standard does not cover the use of reclaimed bituminous mixtures (see NOTE 2).

A list of the source materials that have been considered and indicating those which are within the scope of this European Standard is given in Annex A (normative).

Requirements for the Assessment and Verification of the Constancy of Performance (AVCP) of aggregates to this European Standard are given in prEN 16236.

Aggregates used in construction shall conform with all the requirements of the relevant European Standards for aggregates. These standards include comprehensive and specific requirements for natural aggregates, iron and steel making slag and recycled aggregates, dealing with, for example, the stability of certain basalts, the expansion of certain slags and the constitution of recycled aggregates.

NOTE 2 Requirements for reclaimed asphalt for use as a constituent of asphalt mixtures are specified in prEN 13108-8 and are therefore not covered in detail in this standard. prEN 13108-8 does however call up the general requirements of prEN 13043 for the aggregate component of reclaimed asphalt.

NOTE 3 Guidance on selection of appropriate categories for specific applications can be found in national provisions in the place of use of the aggregate.

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

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

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 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 1097-6:2013, *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 - Pyknometer method*

EN 1097-8, *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 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 1367-5, *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 12697-11, *Bituminous mixtures - Test methods for hot mix asphalt - Part 11: Determination of the affinity between aggregate and bitumen*

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*

prEN 12620, *Aggregates for concrete*

prEN 13055, *Lightweight aggregates for concrete, mortar, grout, bituminous mixtures, surface treatments and for unbound and bound applications*

prEN 13139, *Aggregates for mortar*

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

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

prEN 13450, *Aggregates for railway ballast*

prEN 16236, *Assessment and Verification of the Constancy of Performance (AVCP) of aggregates — Type Testing and Factory Production Control*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 9277, *Determination of the specific surface area of solids by gas adsorption — BET method*

3 Terms and definitions

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

3.1
aggregate
granular material of natural, manufactured or recycled origin used in construction

3.2
natural aggregate
aggregate from mineral sources which has been subjected to nothing more than mechanical processing

3.3
manufactured aggregate
aggregate of mineral origin resulting from an industrial process involving thermal or other modification

3.4
recycled aggregate
aggregate resulting from the processing of inorganic or mineral material previously used in construction

3.5
level
result of the assessment of the performance of an aggregate in relation to its essential characteristics, expressed as a numerical value

EXAMPLE $WA_{24\ Declared}$ = 0,5 %

3.6
class
range of levels, delimited by a minimum and a maximum value, of performance of an aggregate

EXAMPLE $G_C85/15$

3.7
category
level or class of a property of an aggregate expressed as a range of values (class) or a threshold value (level for individual value or declared category)

EXAMPLE FI 50, $f_{Declared}$ 25 (Declared Category)

3.8
declared value
level of a property declared by the manufacturer

EXAMPLE $\rho_{rd\ Declared}$ 1,5 (Declared value)

3.9
aggregate size
designation of aggregate in terms of lower (d) and upper (D) sieve sizes expressed as d/D

Note 1 to entry: This designation accepts the presence of some particles which are retained on the upper sieve (oversize) and some which pass the lower sieve (undersize).

3.10
grading
particle size distribution expressed as the percentages by mass passing a specified set of sieves

Note 1 to entry: In this standard grading categories are used and expressed as G_n X/Y in which:

n = type of grading defined below:

C = coarse

CA = coarse for aggregates for bituminous mixtures only;

G = Grit ($D \leq 4$ and $d \geq 1$)

F = fine

NG = natural graded

A = all-in

X = lower limit passing D

Y = upper limit passing d

3.11
fines
particle size fraction of an aggregate that passes the 0,063 mm sieve

3.12
coarse aggregate
designation given to the larger aggregate sizes with *D* greater than 4 mm and *d* greater than or equal to 1 mm

Note 1 to entry: Aggregates that do not fit the definitions for fine or coarse (like grit — see 3.10) are treated as coarse aggregate.

3.13
fine aggregate
designation given to the smaller aggregate sizes with *D* less than or equal to 4 mm and *d* = 0

Note 1 to entry: Fine aggregate can be produced from natural disintegration of rock or gravel and/or by the crushing of rock or gravel or processing of manufactured aggregates.

3.14
natural graded 0/8 mm aggregate
designation given to natural aggregate of glacial and/or fluvial origin with *D* less than or equal to 8 mm

Note 1 to entry: This aggregate can also be produced by blending processed aggregate.

3.15
all-in aggregate
aggregate consisting of a mixture of coarse and fine aggregates with *D* greater than 4 mm and *d* = 0

Note 1 to entry: It can be produced without separating into coarse and fine fractions or it can be produced by combining coarse and fine aggregates.

3.16
filler aggregate
aggregate, most of which passes a 0,063 mm sieve

3.17
added filler
filler aggregate of mineral origin, that has been produced separately, which can be added to construction materials to provide certain properties

3.18
mixed filler
filler aggregate of mineral origin, which has been mixed with calcium hydroxide

3.19
particle size fraction
fraction of an aggregate passing the larger of two sieves and retained on the smaller

Note 1 to entry: The lower limit can be zero.

3.20
oversize
that part of the aggregate retained on the larger of the limiting sieves used in aggregate size description

3.21
undersize
part of the aggregate passing the smaller of the limiting sieves used in aggregate size description

3.22
batch
production quantity, a delivery quantity, a partial delivery quantity (railway wagon, load, lorry load, ship's cargo) or a 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 General requirements

The Tables in this European Standard include categories which are common across the four main aggregates standards: prEN 12620, prEN 13043, prEN 13139 and prEN 13242. Categories, NOTES, comments etc., which are grey shaded, are not used for aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.

NOTE Guidance on selection of appropriate categories for specific applications can be found in provisions in the place of use of the aggregate.

Where conformity with a category is based on a value of a property being less than or equal to a given value, conformity with a more severe category (lower value) automatically confers conformity to all less severe categories (higher values). Similarly for categories based on the value of a property being greater than or equal to a given value, conformity with a more severe (higher value) automatically confers conformity to all less severe categories (lower values).

When the value of a property is required but not defined by specified limits the value should be declared as an $XX_{Declared}$ category, e.g., a value of, say, 55 for the flakiness index corresponds to $FI_{Declared55}$ (Declared category).

When a property is not required, a "No requirement" category may be used.

5 Geometrical requirements

5.1 General

The necessity for testing and declaring all properties specified in this Clause shall be limited according to the particular application at end use or origin of the aggregate. When required, the aggregates shall be tested as specified in Clause 5 to determine the relevant geometrical properties.

5.2 Aggregate sizes

All aggregates shall be described in terms of aggregate sizes using the designations *d*/*D* and shall conform to the grading requirements specified in 5.3, except for aggregates added as fillers which shall be specified as filler aggregate.

Aggregate sizes shall be described by the pair of sieve sizes in millimetres selected from the basic set or the basic set plus set 1 or the basic set plus set 2 in Table 1 with *d* as the lower limit designation and *D* as the upper limit designation sieve between which most of the particle size distribution lies, (e.g. 0/4 mm, 0/2 mm, 2/4 mm etc.).

A combination of sizes from set 1 and set 2 is not permissible.

Aggregate sizes shall have *D*/*d* not less than 1,4.

Table 1 — Sieve sizes for specifying aggregate sizes

Basic set mm	Basic set plus set 1 mm	Basic set plus set 2 mm
0	0	0
1	1	1
2	2	2
4	4	4
–	5,6 (5)[a]	–
–	–	6,3 (6)[a]
8	8	8
–	–	10
–	11,2 (11)[a]	–
–	–	12,5 (12)[a]
–	–	14
16	16	16
–	–	20
–	22,4 (22)[a]	–
31,5 (32) [a]	31,5 (32)[a]	31,5 (32)[a]
–	–	40
–	45	–
–	56	–
63	63	63
–	–	80
–	90[b]	–

[a] Rounded sizes shown in parentheses can be used as simplified descriptions of aggregate sizes.

[b] Greater than 90 mm sieve sizes can be used for particular applications.

NOTE For special end use in surface treatments a sieve size of 2,8 (3) mm can be used in set 2.

5.3 Grading

5.3.1 General

The grading of the aggregate, when determined in accordance with EN 933-1, shall conform to the requirements of 5.3.2 to 5.3.5 as appropriate to its aggregate size *d*/*D*.

Aggregates may comprise single sizes, all-in aggregates or combinations of two or more than two sizes.

Aggregates supplied as a mixture of different sizes or types should be uniformly blended. When aggregates of significantly different density are blended, caution is necessary to avoid segregation.

Size designations and grading categories are essentially categories of convenience and different declared sizes and grading categories may be agreed for use.

Where the specification requires the use of sieves which are a fraction or a multiple of the upper sieve size (e.g. *D*/2 or *D*/1,4 or 1,4*D*, 2*D*) the sieve chosen shall be the next nearest from basic set plus set 1 or basic set plus set 2.

When a sieve size of the ISO 565-R20 series is closer to the calculated (e.g. *D*/2, *D*/1,4 or 1,4*D*, 2*D*) size, the manufacturer may choose to use this R20 size.

Table 2 — General grading requirements

Aggregate	Size mm	Percentage passing by mass					Category *G*
		2*D*[a]	1,4*D*	*D*[b]	*d*	*d*/2	
Coarse	*D* > 4 *d* ≥ 1	100	100	90 to 99	0 to 10	0 to 2	G_C 90/10
		100	98 to 100	90 to 99	0 to 15	0 to 5	G_C 90/15
		100	98 to 100	90 to 99	0 to 20	0 to 5	G_C 90/20
		100	98 to 100	85 to 99 [c]	0 to 15	0 to 5	G_C 85/15
		100	98 to 100	85 to 99 [c]	0 to 20	0 to 5	G_C 85/20
		100	98 to 100	80 to 99	0 to 20	0 to 5	G_C 80/20
		100	98 to 100	85 to 99	0 to 35	0 to 5	G_C 85/35
		100	98 to 100	85 to 99 [c]	0 to 15	0 to 2	G_{CA} 85/15
	D ≤ 4 *d* ≥ 1	100	95 to 100	85 to 99	0 to 15	–	G_G 85/15
		100	98 to 100	85 to 99	0 to 20	0 to 5	G_G85/20
		100	98 to 100	85 to 99	0 to 35	0 to 5	G_G 85/35
Fine	*D* ≤ 4 *d* = 0	100	95 to 100	85 to 99	–	–	G_F 85
		100	98 to 100	80 to 99	–	–	G_F 80
Natural graded aggregate	*D* = 8 *d* = 0	100	98 to 100	90 to 99	–	–	G_{NG} 90
All-in	*D* > 4 *d* = 0	100	98 to 100	90 to 99	–	–	G_A 90
		100	98 to 100	85 to 99	–	–	G_A 85
		100	98 to 100	80 to 99	–	–	G_A 80
		100	–	75 to 99	–	–	G_A 75

[a] For aggregate sizes where *D* is greater than 63 mm (e.g. 80 mm and 90 mm) only the oversize requirements related to the 1,4 *D* sieve apply since there is no ISO 565/R20 series sieve above 125 mm.

[b] If the percentage retained on *D* is < 1 % by mass the producer shall document and declare the typical grading including the sieves *D*, *d*, *d*/2 and sieves in the basic set plus set 1 or basic set plus 2 intermediate between *d* and *D*.

[c] For single size coarse aggregates *d*/*D*, where *D*/*d* < 2, of the categories G_C 85/15, G_C 85/20 and G_{CA} 85/15, the value of the percentage passing by mass at *D* may be lowered by 5 % according to the particular application or end use.

[d] Limits for the percentage passing d can be modified to 1 to 15 for G_C 85/15 and 1 to 20 for G_C 80/20 where necessary to ensure a well graded aggregate.