BS EN 13139:2013

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BSI Standards Publication

Aggregates for mortar

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National foreword

This British Standard is the UK implementation of EN 13139:2013. It supersedes BS EN 13139:2002 which is withdrawn.

The CEN correction notice 9 October 2013 provided a revised English language text, incorporating the following editorial corrections:

1) Scope, 3rd paragraph;
2) Clause 3, definitions 3.11, 3.13, 3.14 and 3.15;
3) 4.2, 2nd, 3rd and last paragraphs;
4) 4.3.1, 5th and 7th paragraphs;
5) 4.3.2, 2nd paragraph;
6) 4.3.5, last sentence of the 1st paragraph and 2nd paragraph;
7) 4.3.6, 1st and 2nd paragraphs;
8) 4.3.7 deleted;
9) 4.5, Tables 8 and 9;
10) 4.6.1, last paragraph;
11) 5.2.1 and 5.2.2;
12) 6.2 deleted;
13) 6.3.1 and 6.3.2, 1st paragraph;
14) 6.6.2, Table 13;
15) 7.2.1, 1st paragraph and the note;
16) Clause 9;
17) Clause 10 a);
18) Table A.1;
19) Table B.2;
20) Annex B, note 2;
21) C.6.2.

The UK participation in its preparation was entrusted to Technical Committee B/502, Aggregates.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13139

May 2013

ICS 91.100.15

English Version

Aggregates for mortar

Granulats pour mortiers

Gesteinskörnungen für Mörtel

This European Standard was approved by CEN on 5 September 2011.

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Foreword

This document (EN 13139:2013) 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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by February 2015.

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 13139:2002.

The main changes compared to the previous edition are:

- In line with EN 12620, EN 13043, and EN 13242 Annex A has been introduced in EN 13139 to indicate which type of materials could fall in the scope of this standard. The content of this annex is the same for each of those standards. However, using gray shading part of the materials mentioned in Annex A are excluded for being used as aggregate for mortars;
- The content of EN 12620, EN 13043, EN 13139 and EN 13242 have been brought in line with each other as much as possible. Parts that are not relevant for mortars are grey shaded;
- Editorial errors present in the previous standard have been removed;
- An explanation concerning the grading categories is now given in 3.7;
- The definition for "added filler" and others not present in the previous standard are introduced;
- The chapter concerning requirements for initial type testing and factory production control has been changed. These items are now mentioned in a separate standard (EN 16236).

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.

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

— EN 12620, *Aggregates for concrete;*

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

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

— 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 13450, *Aggregates for railway ballast.*

Requirements for evaluation of conformity are specified in EN 16236, Evaluation of Conformity.

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

Contents

page

1 Scope

This European Standard specifies the properties of aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in mortars, renders and screeds, e.g.

a) masonry mortar,

b) floor/screed mortar,

c) surfacing of internal walls (plastering mortar),

d) rendering of external walls,

e) special bedding materials,

f) repair mortar,

g) grouts,

for buildings, roads and civil engineering works.

It covers aggregates having an oven dried particle density greater than 2,00 Mg/m^3 (2 000 kg/m^3). It also covers recycled aggregate with densities between 1,50 Mg/m^3 (1 500 kg/m^3) and 2,00 Mg/m^3 (2 000 kg/m^3).

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

Requirements for the evaluation of conformity of the products to this European Standard are given in EN 16236.

It incorporates a general requirement that aggregates will not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

The tables in this standard include categories that are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242. Not all of these categories are appropriate for aggregates for use in mortars, renders and screeds.

Categories, notes, comments etc., which are grey shaded, should not be used for mortars.

Aggregates used in construction should comply with all the relevant requirements of the appropriate 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.

For materials from some other secondary sources, however, work is on-going and the requirements are incomplete. In the meantime such materials, when placed on the market as aggregates, will comply fully with this standard but may also be required to comply with specific relevant additional requirements at the place of use. Additional characteristics and requirements may be specified on a case-by-case basis depending upon experience of use of the product, and defined in specific contractual documents.

NOTE Requirements for lightweight aggregates are specified in prEN 13055.

Requirements for the declaration of the potential of aggregates to release regulated dangerous substances are currently under development. Until such time as these are finalized, attention should be paid to requirements at the place of use.

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 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 933-7, *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*

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

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 1744-1:2009, *Tests for chemical properties of aggregates — Part 1: Chemical analysis*

EN 16236:2013, *Evaluation of conformity of aggregates — Initial Type Testing and Factory Production Control*

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

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
category
level of a property of an aggregate expressed as a range of values or a limiting value

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

3.6
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).

3.7
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 GnX/Y in which:

n: type of grading

where: C = coarse;

CA = coarse for asphalt only;

G = grit (D<4 and d>1);

F = fine;

NG = natural graded;

A = all-in

X: lower limit passing D

Y: upper limit passing d

3.8
fines
particle size fraction of an aggregate that passes the 0,063 mm sieve

3.9
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 1/3, 1/4 or 2/4mm) are treated as coarse aggregate.

3.10
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.

3.11
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.

3.12
filler aggregate
aggregate, most of which passes a 0,063 mm sieve, which can be added to construction materials to provide certain properties

3.13
added filler
filler aggregate of mineral origin, which has been produced separately

3.14
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.

3.15
oversize
part of the aggregate retained on the larger of the limiting sieves used in aggregate size description

3.16
undersize
that part of the aggregate passing the smaller of the limiting sieves used in aggregate size description

3.17
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 Geometrical requirements

4.1 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 4 to determine the relevant geometrical properties.

When the value of a property is required but not defined by specified limits the value should be declared as an $XX_{Declared}$ category.

NOTE 1 When a property is not required, a “No requirement” category can be used.

NOTE 2 Guidance on selection of appropriate categories for specific applications can be found in national provisions in the place of use of the aggregate.

NOTE 3 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 with 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 with all less severe categories (lower values).

The tables in this standard include categories which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242. Categories, notes, comments, etc., which are shown grey shaded should not be used for mortars.

4.2 Aggregate sizes

All aggregates shall be described in terms of aggregate sizes using the designations *d/D* except for aggregates added as fillers, which shall be described as filler aggregate and shall conform to the grading requirements specified in 4.3.

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.). Aggregates according to this standard are limited in their grading to D ≤ 8 mm.

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)	–
–	–	6,3 (6)
8	**8**	**8**
–	–	10
–	11,2 (11)	–
–	–	12,5 (12)
–	–	14
16	**16**	**16**
–	–	20
–	22,4 (22)	–
31,5 (32)	31,5 (32)	31,5 (32)
–	–	40
–	45	–
–	56	–
63	63	63
–	–	80
–	90	–

NOTE Rounded sizes shown in parentheses can be used as simplified descriptions of aggregate sizes.

The following aggregate sizes are preferred: 0/1 mm, 0/2 mm, 0/4 mm, 0/8 mm, 2/4 mm, 2/8 mm.

4.3 Grading

4.3.1 General

The grading of the aggregate, when determined in accordance with EN 933-1, shall conform to the requirements of 4.3.2 to 4.3.5 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.

When assessing aggregates within a system of factory production control, at least 90 % of gradings, taken on different batches within a maximum period of 6 months, shall fall within the limits specified in Tables 2 to 4 for tolerances on manufacturer declared typical gradings.

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

Table 2 — General grading requirements

Aggregate	Size [mm]	Percentage passing by mass					Category G
		2D [a]	1,4D	D [b]	d	d/2	
Coarse	D>4 d ≥1	100	100	90 to 99	0 to 10	0 to 2	G_C90/10
		100	98 to 100	90 to 99	0 to 15	0 to 5	G_C90/15
		100	98 to 100	85 to 99 [c]	0 to 15	0 to 5	G_C85/15
		100	**98 to 100**	**85 to 99 [c]**	**0 to 20**	**0 to 5**	**G_C85/20**
		100	98 to 100	80 to 99	0 to 20	0 to 5	G_C80/20
		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_G85/15
		100	**98 to 100**	**85 to 99**	**0 to 20**	**0 to 5**	**G_G 85/20**
Fine	D≤4 d=0	**100**	**95 to 100**	**85 to 99**	**-**	**-**	**G_F85**
Natural graded 0/8 mm aggregate	D=8 and 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_A90**
		100	98 to 100	85 to 99	-	-	G_A85
		100	98 to 100	80 to 99	-	-	G_A80
		100	-	75 to 99	-	-	G_A75

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 GC85/15, GC85/20 and GCA85/15, the value of the percentage passing by mass at D may be lowered by 5 % according to the particular application or end use.

4.3.2 Coarse aggregates

Coarse aggregates shall conform to the general grading requirements specified in Table 2 appropriate to their size designation d/D and grading category G_CX/Y and G_GX/Y.

For graded aggregates, defined as those where $D/d \geq 2$, all gradings shall conform to the overall limits in Table 3 appropriate to their grading category.

The typical grading passing the mid size sieve shall be declared and the tolerances selected from Table 3 appropriate to the grading category shall be applied.

Table 3 — Overall limits and tolerances for coarse aggregate grading at mid-size sieves

D/d	**Mid-size sieve** [mm]	**Overall limits and tolerances at mid-size sieves** Percentage passing by mass		**Category** G
		Overall limits	Tolerances on manufacturer's declared typical grading	
< 4	$D/1,4$	25 to 80	$\pm$ 15	$G_{25/15}$
		20 to 70	$\pm$ 15	$G_{20/15}$
≥ 4	$D/2$	20 to 70	$\pm$ 17,5	$G_{20/17,5}$
No requirement				G_{NR}

4.3.3 Fine aggregates

Fine aggregates shall conform to the general grading requirements of Table 2 appropriate to their upper sieve size D and grading category G_F85.

When required, the typical grading, in terms of the percentages passing the 4 mm, 2 mm, 1 mm, 0,250 mm and 0,063 mm sieves shall be declared.

When required, the grading of the fine aggregates shall comply with the tolerances in Table 4 applied around the declared typical grading.

4.3.4 All-in aggregates

All-in aggregates shall conform to the general grading requirements of Table 2 appropriate to their upper sieve size D and grading category G_AX/Y.

When required, the typical grading passing the mid size sieve shall be declared and the tolerances selected from Table 4 appropriate to the grading category shall be applied.

Table 4 — Tolerances on declared typical grading for fine and all-in aggregates

Sieve size [mm]	D	$D/2$	0,250 [b]	0,063 [a]	**Category** G_{TC}
Tolerances on percentage passing by mass	**± 5**	**± 10** [a]	**± 20** [e]	**± 3** [c]	G_{TC}**10**
	± 5	**± 20** [d]	**± 25** [e]	**± 5**	G_{TC}**20**
	± 7,5	± 25	± 25	± 5	G_{TC}25
	No requirement				G_{TC}**NR**

[a] In all cases the upper limit determined by fines category takes preference.

[b] Requirements on 0,250 mm sieve are only for fine aggregates.

[C] For 0/8 the requirement on 0,063 mm is replaced by a requirement of ± 2%;

[d] For 0/4 there is no requirement on $D/2$ and is replaced by a requirement of ± 20% on the 1 mm sieve;
For 0/1 there is no requirement on the D/2 sieve

[e] For 0/8 the requirement on 0,250 mm is replaced by ± 10%;
For 0/4 the requirement on 0,250 mm is replaced by ± 20%;

NOTE 1 Recommendations for the description of the coarseness of the aggregates are given in Annex B.

NOTE 2 The majority of fine aggregates in regular satisfactory use for most applications conform to general use grading requirements. It is not intended that special use gradings should apply except where essential for particular applications.

4.3.5 Special use aggregates and declared grading categories

When special aggregates gradings are required for a particular end use, or to define a specific source special grading envelopes shall be defined using the appropriate sieves from Table 1. The general principles of Clause 4 shall be applied using appropriate requirements at $2D$, $1{,}4D$, D, d, $d/2$. The grading category shall be quoted as D_GX/Y to indicate clearly that it is a declared or special use category.

4.3.6 Grading of added filler

The grading is determined in accordance with EN 933-10 and shall conform to the values specified in Table 5.

The typical grading for each filler aggregate size produced shall, when required, be documented and declared.

Table 5 — Grading requirements for added filler

Sieve size [mm]	**Percentage passing by mass**	
	Overall range for individual results	Manufacturer's maximum declared grading range[a]
2	**100**	**–**
0,125	**85 to 100**	**10**
0,063	**70 to 100**	**10**

[a] Declared grading range on the basis of the last 20 values. 90 % of the results shall be within this range, but all the results shall be within the overall grading range.

4.4 Fines content

When required, the fines content shall be determined in accordance with EN 933-1 and the results declared in accordance with the relevant category specified in Table 6.

Table 6 — Categories for maximum values of fines content

Aggregate	**0,063 mm sieve** Percentage passing by mass	**Category** f
Coarse	≤ 0,5	$f_{0,5}$
	≤ 1	f_1
	≤ 1,5	$f_{1,5}$
	≤ 2	f_2
	≤ 4	$\boldsymbol{f_4}$
	> 4	$\boldsymbol{f_{Declared}}$
	No requirement	$\boldsymbol{f_{NR}}$
Natural graded 0/8 mm aggregate	≤ 3	f_3
	≤ 5	f_5
	≤ 7	f_7
	≤ 10	f_{10}
	≤ 16	f_{16}
	> 16	$f_{Declared}$
	No requirement	$\boldsymbol{f_{NR}}$
All-in	**≤ 3**	$\boldsymbol{f_3}$
	≤ 5	$\boldsymbol{f_5}$
	≤ 7	f_7
	≤ 9	f_9
	≤ 11	$\boldsymbol{f_{11}}$
	≤ 12	f_{12}
	≤ 15	f_{15}
	> 15	$\boldsymbol{f_{Declared}}$
	No requirement	$\boldsymbol{f_{NR}}$
Fine	**≤ 3**	$\boldsymbol{f_3}$
	≤ 4	f_4
	≤ 5	**f5**
	≤ 7	f_7
	≤ 10	f_{10}
	≤ 16	f_{16}
	≤ 22	f_{22}
	> 22	$\boldsymbol{f_{Declared}}$
	No requirement	$\boldsymbol{F_{NR}}$
For fine aggregate a category f_8 and f_{11} with requirement resp. ≤ 8 and ≤ 11 can also be used.		

4.5 Fines quality

When required, the fines quality of fine or all-in aggregates shall be evaluated and declared as follows:

When the fines content in the fine aggregate, or in the all-in aggregate 0/D with $D \leq 8$ mm, is not greater than 3 %, or any other value according to the provisions valid in the place of use of the aggregate, no further testing is required.

If the fines content is greater than 3 %, the fines of fine or all-in aggregate shall be considered non-harmful (e.g. swelling of clay) when one of the two following conditions apply:

a) The sand equivalent value (SE) of the required size fraction, when tested in accordance with EN 933-8 and declared in accordance with the relevant size fraction and category in Table 7, is higher than a specified limit.

b) The methylene blue value *(MB)* on the required size fraction, when tested in accordance with EN 933-9 and declared in accordance with the relevant size fraction and category in Table 8, is lower than a specified limit.

The compliance requirements for the sand equivalent test and the methylene blue test should normally be expressed with a probability of 90 %.

NOTE If the fines content is greater than 3 % by mass and there is documented evidence of satisfactory use, further testing might not be necessary.

Table 7 — Categories for minimum sand equivalent (SE) values

Sand equivalent	Category SE
≥ 65	SE_{65}
≥ 60	SE_{60}
≥ 55	SE_{55}
≥ 45	SE_{45}
≥ 40	SE_{40}
≥ 35	SE_{35}
≥ 30	SE_{30}
< 30	$SE_{Declared}$
No requirement	SE_{NR}

Table 8 — Categories for maximum methylene blue *(MB)* values

Aggregate	Methylene blue values	Category MB
Fine	MB value g/kg	
	≤ 1	MB_1
	≤ 1,5	$MB_{1,5}$
	≤ 2	MB_2
	≤ 2,5	$MB_{2,5}$
	≤ 3	MB_3
	> 3	$MB_{Declared}$
	No requirement	MB_{NR}
All-in	$MB_{0/D} = MB \times$ passing the 2 mm sieve [a] g/kg	
	≤ 0,8	$MB_A0{,}8$
	≤ 1	MB_A1
	> 1	$MB_ADeclared$
	No requirement	MB_ANR

[a] $MB_{0/D}$ is MB measured on 0/2 mm fraction and reported on 0/D mm.

4.6 Particle shape and shell content

4.6.1 Particle shape

The particle shape of fine aggregates smaller than 4 mm is not normally relevant in the behaviour of mortars.

When required, the shape shall be determined in accordance with EN 933-3 in terms of the flakiness index and the results declared in accordance with the relevant category specified in Table 9 according to the particular application or end use.

For all-in aggregates the flakiness index shall be measured on the fraction 4/D.

Table 9 - Categories for maximum values of flakiness index

Flakiness index	Category *FI*
≤ 10	FI_{10}
≤ 15	FI_{15}
≤ 20	FI_{20}
≤ 25	FI_{25}
≤ 30	FI_{30}
≤ 35	FI_{35}
≤ 40	FI_{40}
≤ 50	FI_{50}
> 50	$FI_{Declared}$
No requirement	FI_{NR}

4.6.2 Shell content

When exceptionally required the shell content for aggregate fractions coarser than 4 mm of marine origin shall be determined in accordance with EN 933-7 and the results declared in accordance with the relevant category specified in Table 10 according to the particular application or end use.

NOTE It is usually not necessary to specify requirements for the shell content. No European test method is available for the determination of shell content in fine aggregates.

Table 10 — Category for maximum value of shell content of aggregates >4 mm

Shell content [%]	Category *SC*
≤ 10	SC_{10}
> 10	$SC_{Declared}$
No requirement	SC_{NR}

5 Physical 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 tests specified in Clause 5 shall be carried out to determine the relevant physical properties.

When the value of a property is required but not defined by specified limits the value should be declared as an $XX_{Declared}$ category.

NOTE 1 When a property is not required, a “No requirement” category can be used.

NOTE 2 Guidance on selection of appropriate categories for specific applications can be found in national provisions in the place of use of the aggregate.

NOTE 3 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 with 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 with all less severe categories (lower values).

The tables in this standard include categories which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242. Categories, notes, comments, etc., which are shown grey shaded should not be used for mortars.

5.2 Particle density and water absorption

5.2.1 Particle density

The particle density shall be determined in accordance with the appropriate article of EN 1097-6 (apparent density) and the results declared.

5.2.2 Water absorption

The water absorption shall be determined in accordance with the appropriate article of EN 1097-6 and the results declared.

6 Chemical requirements

6.1 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 tests as specified in Clause 6 shall be carried out to determine the appropriate chemical properties.

When the value of a property is required but not defined by specified limits the value should be declared by the manufacturer as an XY_{Declared} category, e.g. in Table 11 for air-cooled blast furnace slag a value of say 1,2 % corresponds to AS1,2(Declared value).

NOTE 1 When a property is not required, a “No requirement” category can be used.

NOTE 2 Guidance on selection of appropriate categories for specific applications can be found in national provisions in the place of use of the aggregate.

NOTE 3 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 with 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 with all less severe categories (lower values).

The tables in this standard include categories which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242. Categories, notes, comments, etc., which are shown grey shaded should not be used for mortars.

NOTE 4 The chemical requirements specified in 6.2, 6.3, 6.4 and 6.5 apply only to aggregates and filler aggregates for use in mortars in which the binder contains cements within the scope of EN 197-1.

NOTE 5 Guidance on the effects of chemical constituents in aggregates and filler aggregates, including alkali-silica reactivity, related to the durability, appearance and surface properties of the mortar in which they are incorporated is given in Annex C.

6.2 Chlorides

When required the water-soluble chloride ion content of aggregates and filler for mortar shall be determined in accordance with EN 1744-1, and the results declared.

NOTE The requirements for water soluble chloride ion content in mortars apply to the total chloride content derived from all components in the mortar. Requirements for the maximum permissible chloride content in masonry mortars are specified in e.g. EN 998-2 and depending upon the end use of the mortar and for other mortars in EN 206-1. Further guidance is given in Annex C.

6.3 Sulphur containing compounds

6.3.1 Acid-soluble sulphate

The acid-soluble sulphate content of the aggregates and filler aggregates for mortar determined in accordance with EN 1744-1:2009, clause 12, shall be declared in accordance with the relevant category specified in Table 11.

Table 11 — Categories for maximum values of acid-soluble sulphate content

Aggregate	**Acid soluble sulphate content** Percentage loss by mass	**Category** *AS*
Aggregates other than air-cooled blast furnace slag	**≤ 0,2** **≤ 0,8** **> 0,8**	$AS_{0,2}$ $AS_{0,8}$ $AS_{Declared}$
	No requirement	AS_{NR}
Air-cooled blast furnace slag	**≤ 1,0** **> 1,0**	$AS_{1,0}$ $AS_{Declared}$
	No requirement	AS_{NR}

6.3.2 Total sulphur

The total sulphur content of the aggregate and filler aggregates, determined in accordance with EN 1744-1:2009, clause 11, shall not exceed:

a) 1 % S by mass for natural aggregates;

b) 2 % S by mass for air-cooled blast furnace slag.

Special precautions are necessary if pyrrhotite, (an unstable form of iron sulphide FeS), is present in the aggregate. If this mineral is known to be present, a maximum total sulphur content of 0,1 % as S shall apply.

6.4 Constituents which alter the rate of setting and hardening of mortar

The presence of organic matter shall be determined in accordance with EN 1744-1 (determination of potential presence of humus). If the results indicate the presence of humic acid, the presence of fulvo acids shall be determined in accordance with EN 1744-1. If the supernatant liquid in these tests is lighter than the standard colours, the aggregates shall be considered to be free from organic matter.

NOTE Some inorganic compounds, which discolour the supernatant liquid in the sodium hydroxide test, do not adversely affect the setting and hardening of mortar.

Sugars do not affect the colour of the supernatant liquid in the sodium hydroxide test or the fulvo acid test. If it is suspected that sugars or sugar type materials are present, the aggregate should be tested using the mortar specimen test (see EN 1744-1). The stiffening time and compressive strength requirements shown above should apply.

Aggregates and filler aggregates that contain organic or other substances in proportions that alter the rate of setting and hardening of mortar shall be assessed for the effect on stiffening time and compressive strength in accordance with EN 1744-1.

The proportions of such materials shall be such that they do not:

a) increase the stiffening time of mortar test specimens by more than 120 min;

b) decrease the compressive strength of mortar test specimens by more than 20 % at 28 days.

When required the presence of lightweight organic contaminators shall be tested in accordance with EN 1744-1 and the results declared.

6.5 Additional requirements for manufactured aggregates

6.5.1 Water solubility

When determined in accordance with EN 1744-1 water solubility shall not exceed 1 % by mass.

6.5.2 Loss on ignition

When required, the loss on ignition determined in accordance with EN 1744-1 shall not exceed the limits specified in Table 12.

Table 12 — Limits for loss on ignition

Loss on ignition (by mass)
Air cooled blast furnace slag %
3

7 Durability

7.1 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 tests specified in Clause 7 shall be carried out to determine the appropriate properties for the durability of aggregates.

NOTE 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 with 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 with all less severe categories (lower values).

The tables in this standard include categories which are common across the four main aggregate standards: EN 12620, EN 13043, EN 13139 and EN 13242. Categories, notes, comments, etc., which are shown grey shaded should not be used for mortars.

7.2 Freeze-thaw resistance

7.2.1 Water absorption as a screening test for freeze-thaw resistance

If the water absorption, determined in accordance with EN 1097-6 (water absorption 24 h), is not greater than the value selected as one of the categories specified in Table 13, the aggregate shall be assumed to be freeze-thaw resistant.

Table 13 — Categories for maximum values of water absorption (EN 1097-6 water absorption 24 h)

Water absorption Percentage by mass	**Category** WA_{24}
≤ 1	$WA_{24}1$
≤ 2	$WA_{24}2$
NOTE The water absorption test is not applicable for blast furnace slag and unaltered porous basalt.	

7.2.2 Resistance to freezing and thawing

When required, the resistance to freezing and thawing of aggregate fractions coarser than 4 mm shall be determined in accordance with either EN 1367-1 or derived from the 10 mm to 14 mm aggregate fraction from the same source in accordance with EN 1367-2, and the results declared in accordance with the relevant category specified in Table 14.

When the resistance to freezing and thawing of aggregates of 4 mm or less and filler aggregates is required in the end use situation, it shall be derived from a freeze-thaw test on the mortar in accordance with the provisions valid at the place of use and the results declared.

Table 14 — Categories for maximum freeze-thaw resistance values

Freeze-thaw Percentage loss of mass	**Category** F
≤ 1	F_1
≤ 2	F_2
≤ 4	F_4
> 4	$F_{Declared}$
No requirement	F_{NR}

7.3 Alkali-silica reactivity

When required the alkali-silica reactivity of aggregates and filler aggregates shall be assessed in accordance with the provisions valid in the place of use and the results declared.

NOTE Guidance on the effects of alkali-silica reactivity is given in Annex C.

8 Evaluation of conformity

The conformity of the product with the requirements of this standard shall be demonstrated by initial type testing and factory production control by the manufacturer in accordance with EN 16236.

9 Designation and description

Aggregates shall be identified in the following terms:

a) source and manufacturer - if the material has been re-handled in a depot both source and depot shall be given;

b) type of aggregate, as described in Annex A;

c) aggregate size.

NOTE 1 The necessity for other information depends on the situation and end use, for example:

a) a code to relate the designation to the description;

b) any other additional information needed to identify the particular aggregate.

The purchaser should inform the manufacturer at the time of order of any special requirements associated with a particular end use and of requirements for extra information not covered in Table ZA.1a and Table ZA.1b.

10 Marking and labelling

The delivery ticket shall contain at least the following information:

a) designation;

b) date of dispatch;

c) serial number of the ticket;

d) reference to this European Standard.

NOTE For CE marking and labelling see ZA.3 to have additional information included on the delivery ticket.

Annex A
(normative)

Source materials considered in the development of EN 13139 and their status in respect of the scope of the standard

A.1 General

The source types listed in this annex have been considered in the preparation of this standard. Their status within the standard is indicated in Table A.1. Source materials not described here are outside the scope of EN 13139.

Sources with no history of use in mortars, renders or screeds are outside the scope of the standard and should not be used as aggregate in conformity with this standard and are therefore shown grey shaded in Table A.1.

Sources with positive history of use and no identification of the need for additional requirements are within the scope of the standard.

Sources with a positive history of use and where the need for additional requirements has been identified are provisionally within scope pending the inclusion of suitable test methods and requirements.

In all cases, there is an obligation to control the potential release of regulated dangerous substances (RDS).

The information in this annex is based on a comprehensive survey of the use of aggregates from secondary sources in European member states undertaken between 2000 and 2005. CEN/TC154 intends to keep this inventory under continual review. Any relevant information to assist in the updating of this annex including any proposal for the inclusion of new source types should be submitted to the secretariat of CEN/TC154.

In situations where the need for additional requirements has been identified, such materials, when placed on the market as aggregates, should comply fully with this standard but may also be required to comply with specific relevant additional requirements at the place of use. Additional characteristics and requirements may be specified on a case-by-case basis depending upon experience of use of the product, and defined in specific contractual documents.

Under an extension to its Mandate, CEN/TC154 is currently developing requirements for the declaration of the potential of aggregates to release regulated dangerous substances under Essential Requirement 3. It is anticipated that the source classifications in this annex will be used as the basis of families for the collation of data and the development of source specific requirements for regulated dangerous substances. Any input to this process should be made through the secretariat of CEN/TC 154.

Table A.1 — Inventory list with classification codes and status for source materials for EN 13139 aggregates

Nr.	Source	Subnr.	Specific material	History of use	Special requirements in standard	Additional requirements identified for inclusion
P	Natural aggregates	P	All petrographic types included in EN 932-3	Yes	Yes	No
A	Construction and demolition recycling industries	A1	Reclaimed asphalt	No	-	-
		A2	Crushed concrete	No	-	-
		A3	Crushed bricks, masonry	No	-	-
		A4	Mix of A1, A2 and A3	No	-	-
B	Municipal solid waste incineration industry	B1	Municipal incinerator bottom ash[a] (excluding fly ash) (MIBA)	No	-	-
		B2	Municipal incinerator fly ash (MIFA)	No	-	-
C	Coal Power generation industry	C1	Coal fly ash	Yes	Yes	No
		C2	Fluidized bed combustion fly ash (FBCFA)	No	-	-
		C3	Boiler slag	No	-	-
		C4	Coal bottom ash	No	-	-
		C5	Fluidized bed combustion bottom ash (FBC bottom ash)	No	-	-
D	Iron and steel industry	D1	BOF steel slag (LD steel slag)	No	-	-
		D2	Air-cooled blast furnace slag (ABS) (crystallized)	Yes	Yes	No
		D3	Granulated blast furnace slag (GBS) (vitrified)	No	-	-
		D4	EAF steel slag	No	-	-
		D5	Stainless steel slag	No	-	-
E	Non ferrous steel industry	E1	Copper slag	No	-	-
		E2	Molybdenum slag	No	-	-
		E3	Zinc slag	No	-	-
		E4	Phosphorus slag	No	-	-
F	Foundry industry	F1	Foundry sand	No	-	-
		F2	Foundry cupola furnace slag	No	-	-
G	Mining and quarry industry	G1	Red coal shale	No	-	-
		G2	Refuse from hard coal mining (black coal shale)	No	-	-
		G3	Pre-selected all-in from quarry/mining	No	-	-

Table A.1 — Inventory list with classification codes and status for source materials for EN 13139 aggregates

Nr.	Source	Subnr.	Specific material	History of use	Special requirements in standard	Additional requirements identified for inclusion
		G4	Spent oil shale	No	-	-
H	Maintenance dredging works	H1	Dredge spoil sand	No	-	-
		H2	Dredge spoil clay	No	-	-
I	Miscellaneous	I1	–	No	-	-
		I2	Paper sludge ash	No	-	-
		I3	Sewage sludge incineration ash (municipal)	No	-	-
		I4	Biomass ash	No	-	-
		I5	Crushed glass	No	-	-
		I6	Expanded clay	See prEN 13055		
[a] Requirements on MSWI bottom ash are based on experience with grated installations						

Annex B
(informative)

Guidance on the description of coarseness/fineness of aggregates for mortars

Table B.1 and Table B.2 should be used when additional descriptions for the coarseness or fineness of aggregates for particular end-uses are specified. Either table, but not both, may be used for such descriptions.

In Table B.1 and Table B.2, coarse graded aggregates are denoted by the letter C, medium graded by M and fine graded by F.

Additionally when Table B.1 is selected, a "*P*" for percentage passing the 0,500 mm sieve is added after *C*, *M* or *F* (e.g. for medium grading sands *MP*).

Similarly when Table B.2 is selected, an "*F*" for fineness modulus is added after C, M or F (e.g. for fine grading sands FF).

Table B.1 — Coarseness or fineness based on the percentage passing the 0,500 mm sieve

Percentage passing by mass		
CP	*MP*	*FP*
5 to 45	30 to 70	55 to 100

Table B.2 — Coarseness or fineness based on the fineness modulus

Fineness modulus		
CF	*MF*	*FF*
4,0 to 2,4	2,8 to 1,5	2,1 to 0,6

Fineness modulus (*FM*) is used to check constancy. Where additionally required, the *FM* of a delivery should be within the limits of the declared *FM* ± 0,25 or other specified limit.

NOTE 1 Fineness modulus (*FM*) is calculated as the sum of cumulative percentages by mass retained on the following sieves (mm) expressed as a percentage, i.e.

$$FM = \frac{\Sigma \{(> 4) + (> 2) + (> 1) + (> 0{,}5) + (> 0{,}25) + (> 0{,}125)\}}{100}$$

NOTE 2 The result of the fineness modulus calculation is strongly influenced by the fines content. Crushed rock aggregate could be classified as a fine aggregate although the aggregate without the fines is to be considered as a typical coarse aggregate.

Annex C
(informative)

Guidance on the effects of some chemical constituents of aggregates on the mortar in which they are incorporated

C.1 Chlorides

Chlorides can be present in aggregates; the quantity present being largely dependent on the source of the aggregate. Chloride salts can contribute to the formation of efflorescence on exposed surfaces of mortar. In addition, to minimize the risk of corrosion of metals embedded in mortar (wall ties, etc.) it is usual to limit the amount of chloride in mortar contributed from all constituents.

The chloride ion content requirements of EN 998-2 are usually achieved when the water-soluble chloride ion content of the aggregate does not exceed 0,15 % for plain mortar and 0,06 % for mortars with embedded metals. These values are intended for the guidance of aggregate manufacturers.

C.2 Sulphates

Sulphates in aggregates can give rise to the expansive disruption of mortar. Such salts can also lead to the production of unsightly deposits on exposed surfaces of mortar. Under certain circumstances, other sulphur compounds can oxidize in the mortar to produce sulphates. These can also give rise to the expansive disruption of the mortar.

C.3 Staining and pop-outs

Some constituents of aggregates can cause staining and discoloration or swelling and pop-outs of the mortar in which they are incorporated. Iron pyrite and lignite are two examples of such harmful constituents.

C.4 Damage to exposed surfaces

Impurities that can cause damage to exposed surfaces include particles of wood, coal, clay bound products, reactive waste materials and harmful residues from former loads in the means of transport.

C.5 Other harmful constituents

Where appearance is an essential feature of the mortar, aggregates should not contain materials in proportions that cause damage to exposed mortar surfaces. Since very small percentages by mass of contaminators in aggregates can have a considerable effect on exposed mortar surfaces, attention should be given to the suitability of a source for a particular end use.

Other constituents can adversely affect the rate of hydration of cement, altering the rate of setting and hardening of mortar. Humus and sugar-type materials are two examples of substances that affect the rate of setting and hardening of mortar. Certain clay minerals also adversely affect the rate of development of strength and the strength and durability of mortar in which they are incorporated.

C.6 Alkali–silica aggregate reaction

C.6.1 Alkali-silica reaction with natural aggregate

Certain aggregates can react with alkaline hydroxides present in the pore fluids of mortar. Under adverse conditions and in the presence of moisture this can lead to expansion and subsequent cracking or disruption of the mortar. The most common form of reaction occurs between alkalis and certain forms of silica (alkali-silica reaction). Another less common form of reaction is alkali-carbonate reaction.

In the absence of previous long-term experience of a lack of disruptive reactivity of a particular combination of cement and aggregate, it can be necessary to take one of the following precautions:

— limit the total alkali content of the mortar mix;

— use a cement with a low effective alkali content;

— use a non-reactive aggregate combination;

— limit the degree of saturation of the mortar with water.

The combination of aggregates and cement can be assessed using Regulations applying at the place of use when compliance with one of the above procedures is not possible.

Where aggregate are imported across national boundaries, the purchaser should take account of experience in the country of origin.

C.6.2 Alkali-silica reaction with recycled aggregates

The use of recycled aggregates can influence the suitability of the above precautions. In the case of recycled concrete aggregates, it will be necessary to ascertain that the original concrete does not contain reactive (or reacting) aggregate and, where the alkali content of the new concrete (or the cement therein) is being limited, the alkali content of the recycled concrete aggregates will need to be determined and taken into account. In the case of general recycled aggregates, it will be appropriate to regard the material as being a potentially reactive aggregate, unless it has been specifically established to be non-reactive. In both cases, the possibility of unpredictable compositional variability should be considered.

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/125 “Aggregates”, given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the aggregates and fillers covered by this annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

WARNING — Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the aggregates and fillers falling within the scope of this European Standard.

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through http://ec.europa.eu/enterprise/construction/cpd-ds).

This annex has the same scope as Clause 1 of this standard with regard to the products covered. It establishes the conditions for the CE marking of aggregates and fillers intended for the use indicated below and shows the relevant clauses applicable (see Table ZA.1a and Table ZA.1b).

Table ZA.1a — Characteristics meeting Mandate M/125 and relevant clauses — aggregates

Construction product:	Aggregates obtained by processing natural or manufactured or recycled materials as covered by the scope of this standard.
Intended uses:	Mortars for buildings, roads and civil engineering works

Essential Characteristics	Requirement clauses in this and/or another standard(s)	Level(s) and/or class(es):	Notes
Fineness/particle, size and density	4.2 Aggregate sizes	None	Designation *d*/*D*
	4.3 Grading	None	Category
	4.6.1 Particle shape	None	Category
	5.2.1 Particle density	None	Declared value
Composition/content	6.2 Chlorides	None	Declared value
	6.3.1 Acid soluble sulphates	None	Category
	6.3.2 Total sulphur	None	Pass/fail threshold value
	6.4 Constituents which alter the rate of setting and hardening of mortar	None	Pass/fail threshold value
Cleanliness	4.6.2 Shell content	None	Category
	4.4 Fines content	None	Category
	4.5 Fines quality	None	Category
Volume stability (applicable to manufactured aggregates only)	6.5.1 Water soluble matter	None	Pass/fail threshold value
Water absorption	5.2.2 Water absorption	None	Declared value
Dangerous substances: Emission of radioactivity Release of heavy metals Release of polyaromatic hydro carbons Release of other dangerous substances	 NOTE in ZA.1 above EN 16236:2013, 5.3.4 Knowledge of the raw material EN 16236:2013, 5.3.5 Management of the production	None	
Durability against freeze-thaw	7.3 Resistance to freezing and thawing	None	Category
Durability against alkali-silica reactivity	7.2 Alkali-silica reactivity	None	Declared value

Table ZA.1b — Characteristics meeting Mandate M/125 and relevant clauses — fillers

Construction product: Fillers obtained by processing natural or manufactured or recycled materials as covered by the scope of this standard. **Intended uses:** Mortars for buildings, roads and civil engineering works			
Essential Characteristics	**Requirement clauses in this and/or another standard(s)**	**Level(s) and/or class(es):**	**Notes**
Fineness/particle, size and density	4.2 Aggregate sizes	None	Designation *d*/*D*
	4.3 Grading	None	Category
	5.2.1 Particle density	None	Declared value
Composition/content	6.2 Chlorides	None	Declared value
	6.3.1 Acid soluble sulphates	None	Category
	6.3.2 Total sulphur	None	Pass/fail threshold value
	6.4 Constituents which alter the rate of setting and hardening of mortar	None	Pass/fail threshold value
Cleanliness	4.6.2 Shell content	None	Category
	4.4 Fines content	None	Category
	4.5 Fines quality	None	Category
Loss on ignition (Applicable to manufactured aggregates only)	6.5.2 Loss on ignition	None	Pass/fail threshold value
Release of dangerous substances			
Emission of radioactivity	NOTE in ZA.1	None	
Release of heavy metals	EN 16236:2013, 5.3.4 Knowledge of the raw material		
Release of polyaromatic hydro carbons			
Release of other dangerous substances	EN 16236:2013, 5.3.5 Management of production		
Durability against freeze-thaw	7.2.2 Resistance to freezing and thawing	None	Category

*) The requirement on a certain characteristic is not applicable in those Member States where there are no regulatory requirements on that characteristic for the intended end use of the product. In this case, manufacturers placing their products on the market of these Member States are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option “No performance determined” (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold value.

ZA.2 Procedures for attestation of conformity of aggregates and fillers

ZA.2.1 System(s) of attestation of conformity

The systems of attestation of conformity for the aggregates and fillers indicated in Table ZA.1a and Table ZA.1b, in accordance with the decision of the Commission 98/598/EC of 9 October 1998 amended by 2002/592/EC of 15 July 2002 (Official Journal L192) and as given in Annex 3 of the mandate M125 "Aggregates", "as amended", is shown in Table ZA.2a and Table ZA.2b for the indicated intended use(s):

Table ZA.2a — System(s) of attestation of conformity for aggregates and fillers for uses with high safety requirements[1] (where third party intervention is required)

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Aggregates for mortar and grout	In buildings, roads and other civil engineering works	-	2+
Fillers for mortar and grout	In buildings, and roads and other civil engineering works	-	2+
System 2+: See Directive 89/106/EEC (CPD) Annex III.2.(ii), First possibility, including certification of the factory production control by an approved body on the basis of initial inspection of factory and of factory production control as well as of continuous surveillance, assessment and approval of factory production control			

Table ZA.2b — System(s) of attestation of conformity for aggregates and fillers for uses without high safety requirements (where no third party intervention is required)

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Aggregates for mortar and grout	In buildings, roads and other civil engineering works	-	4
Fillers for mortar and grout	In buildings and roads and other civil engineering works	-	4
System 4: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility			

The attestation of conformity of the aggregates and fillers in Table ZA.2a and Table ZA.2b shall be based on the evaluation of conformity procedures indicated in Table ZA.3a and Table ZA.3b resulting from application of the clauses of this European Standard indicated therein.

[1] Safety requirements are to be defined by Member States in their national laws, regulations and administrative provisions.

Table ZA.3a — Assignment of evaluation of conformity tasks (for aggregates and fillers under system 2+)

Tasks			Coverage of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)		Parameters related to all relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 5 of EN 16236:2013
	Initial type testing		All relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 4 of EN 16236:2013
Tasks for the notified body	Certification of F.P.C on the basis of	Initial inspection of factory and of F.P.C	Parameters related to all relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 5 of EN 16236:2013
		Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 5 of EN 16236:2013

Table ZA.3b — Assignment of evaluation of conformity tasks (for aggregates and fillers under system 4)

Tasks		Coverage of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 5 of EN 16236:2013
	Initial type testing	All relevant characteristics of Table ZA.1a or Table ZA.1b	Clause 8 of EN 13139:2013 and Clause 4 of EN 16236:2013

ZA.2.2 EC Certificate and Declaration of conformity in case of products following Table ZA.3a

When compliance with the conditions of this annex is achieved, and once the notified body has drawn up the certificate mentioned below, the manufacturer or his agent established in the EEA shall draw up and retain a declaration of conformity, which entitles the manufacturer to affix the CE marking. This declaration shall include:

— name and address of the manufacturer, or his authorized representative established in the EEA, and the place of production;

NOTE 1 The manufacturer may also be the person responsible for placing the product onto the EEA market, if he takes responsibility for CE marking.

— description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

NOTE 2 Where some of the information required for the Declaration is already given in the CE marking information, it does not need to be repeated.

— provisions to which the product conforms (Annex ZA of this EN)), and a reference to the ITT report(s) and factory production control records (if appropriate);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

— the number of the accompanying factory production control certificate, FPC records, and name and address of the notified body where applicable;

— name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorized representative.

The declaration shall be accompanied by a factory production control certificate, drawn up by the notified body, which shall contain, in addition to the information above, the following:

— name and address of the notified body;

— the number of the factory production control certificate;

— conditions of validity of the certificate, where applicable;

— name of, and position held by, the person empowered to sign the certificate.

The abovementioned declaration shall be presented in the official language or languages of the Member State in which the product is to be used.

ZA.2.3 Declaration of conformity in case of products following Table ZA.3b

When compliance with this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the manufacturer to affix of the CE marking. This declaration and certificate shall include:

— name and address of the manufacturer, or his authorized representative established in the EEA, and place of production;

NOTE 1 The manufacturer may also be the person responsible for placing the product onto the EEA market, if he takes responsibility for CE marking.

— description of the product (type, identification, use,...), and a copy of the information accompanying the CE marking;

NOTE 2 Where some of the information required for the Declaration is already given in the CE marking information, it does not need to be repeated.

— provisions to which the product conforms (Annex ZA of this EN);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);

— name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorized representative.

The abovementioned declaration shall be presented in the official language or languages of the Member State in which the product is to be used.

ZA.3 CE marking and labelling

The manufacturer or his authorized representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the accompanying label, the packaging or on the accompanying commercial documents. The following information shall accompany the CE marking symbol:

- identification number of the certification body (in case of products following Table ZA.3a);
- name or identifying mark and registered address of the manufacturer;
- the last two digits of the year in which the marking is affixed;
- the number of the EC certificate of factory production control (in case of products following Table ZA.3a);
- reference to this European Standard (EN 13139), with date of version;
- description of the product: generic name, material, dimensions, … and intended use;
- information on the relevant essential characteristics in Table ZA.1a or Table ZA.1b namely:
  - values and, where relevant, the class to declare for each relevant characteristic;
  - characteristics against which the “No performance determined” (NPD) option is relevant.

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements.

Figures ZA.1, ZA.2, ZA.3 and ZA.4 give examples of the information to be given on the product, label, packaging and/or commercial documents.

CE	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC*
01234	*Identification number of the notified body*
Any Co Ltd, PO Box 21, B-1050	*Name or identifying mark and registered address of the manufacturer*
13	*Last two digits of the year in which the marking was affixed*
0123-CPD-0456	*Number of the EC certificate*
EN 13139:2013	*No. of European Standard with date of version*
Aggregates for mortars	*Description of product and information on product and on regulated characteristics*
Particle size	Designation (d/D) & (e.g. G_c85/15) Tolerance category (e.g. $G_{20/15}$)
Fines content	Category (e.g. f_3)
Fines quality	Category (e.g. MB_1)
Particle shape	Category (e.g. FI_{10})
Shell content	Category (e.g. SC_{10})
Particle density	Declared value (Mg/m^3)
Water absorption	Declared value (*WA*)
Chlorides	Declared value (% *C*)
Acid soluble sulphates	Category (e.g. $AS_{0,2}$)
Total sulphur	Pass/fail threshold value
Constituents which alter the rate of setting and hardening of mortar	Pass/fail threshold value (*Stiffening time in minutes and compressive strength S %*)
Durability against alkali-silica reactivity	Declared value as requested
Durability against freeze/thaw	Category (e.g. WA_1, F_4)
Emission of radioactivity **Release of heavy metals** **Release of polyaromatic hydro carbons**	Threshold values valid in the place of use
Release of other dangerous substances	Threshold values valid in the place of use

Figure ZA.1 — Example of CE marking information for aggregates for mortars under system 2+

CE	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC*
01234	*Identification number of the notified body*
Any Co Ltd, PO Box 21, B-1050	*Name or identifying mark and registered address of the manufacturer*
13	*Last two digits of the year in which the marking was affixed*
0123-CPD-0456	*Number of the EC certificate*
EN 13139:2013	*No. of European Standard with date of version*
Filler aggregate for mortars	*Description of product and information on product and on regulated characteristics*
Particle size	Declared range (% passing by mass)
Particle density	Declared value (Mg/m^3)
Chlorides	Declared value (% *C*)
Acid soluble sulphates	Category (e.g. $AS_{0,2}$)
Total sulphur	Pass/fail threshold value
Constituents which alter the rate of setting and hardening of mortar	Pass/fail threshold value (*Stiffening time in minutes and compressive strength S %*)
Durability against freeze/thaw	Category (e.g. WA_1, F_4)
Emission of radioactivity **Release of heavy metals** **Release of polyaromatic hydro carbons**	Threshold values valid in the place of use
Release of other dangerous substances	Threshold values valid in the place of use

Figure ZA.2 — Example of CE marking information for fillers for mortars under system 2+

CE

Any Co Ltd, PO Box 21, B-1050

13

EN 13139:2013

Aggregates for mortars

Particle size	Designation (d/D) & (e.g. G_c85/15) Tolerance category (e.g. $G_{20/15}$)
Fines content	Category (e.g. f_3)
Fines quality	Category (e.g. MB_1)
Particle shape	Category (e.g. FI_{10})
Shell content	Category (e.g. SC_{10})
Particle density	Declared value (Mg/m^3)
Water absorption	Declared value (*WA*)
Chlorides	Declared value (% *C*)
Acid soluble sulphates	Category (e.g. $AS_{0,2}$)
Total sulphur	Pass/fail threshold value
Constituents which alter the rate of setting and hardening of mortar	Pass/fail threshold value (*Stiffening time in minutes and compressive strength S %*)
Durability against alkali-silica reactivity	Declared value as requested
Durability against freeze/thaw	Category (e.g. WA_1, F_4)
Emission of radioactivity **Release of heavy metals** **Release of polyaromatic hydro carbons**	Threshold values valid in the place of use
Release of other dangerous substances	Threshold values valid in the place of use
Particle size	Designation (d/D) & (e.g. G_c85/15) Tolerance category (e.g. $G_{20/15}$)

CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC

Name or identifying mark and registered address of the manufacturer

Last two digits of the year in which the marking was affixed

No. of European Standard with date of version

Description of product and information on product and on regulated characteristics

Figure ZA.3 — Example of CE marking information for aggregates for mortars under system 4

CE	
Any Co Ltd, PO Box 21, B-1050	
13	
EN 13139:2013	
Filler aggregate for mortars	
Particle size	Declared range (% passing by mass)
Particle density	Declared value (Mg/m^3)
Chlorides	Declared value (% *C*)
Acid soluble sulphates	Category (e.g. $AS_{0,2}$)
Total sulphur	Pass/fail threshold value
Constituents which alter the rate of setting and hardening of mortar	Pass/fail threshold value (*Stiffening time in minutes and compressive strength S %*)
Durability against freeze/thaw	Category (e.g. WA_1, F_4)
Emission of radioactivity **Release of heavy metals** **Release of polyaromatic hydro carbons**	Threshold values valid in the place of use
Release of other dangerous substances	Threshold values valid in the place of use

CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC

Name or identifying mark and registered address of the manufacturer

Last two digits of the year in which the marking was affixed

No. of European Standard with date of version

Description of product and information on product and on regulated characteristics

Figure ZA.4 — Example of CE marking information for fillers for mortars under system 4

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliances is claimed, together with any information required by that legislation.

NOTE 1 European legislation without national derogations need not be mentioned.

NOTE 2 Affixing the CE marking symbol means, if a product is subject to more than one directive, that it complies with all applicable directives.

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[1] EN 197-1, *Cement - Part 1: Composition, specifications and conformity criteria for common cements*

[2] EN 206-1, *Concrete - Part 1: Specification, performance, production and conformity*

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[4] EN 998-1, *Specification for mortar for masonry — Part 1: Rendering and plastering mortar*

[5] EN 998-2, *Specification for mortar for masonry — Part 2: Masonry mortar*

[6] CR 1901, *Regional specifications and recommendations for the avoidance of damaging alkali silica reactions in concrete*

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

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