BRITISH STANDARD

BS EN
197-4:2004

Cement —

Part 4: Composition, specifications and conformity criteria for low early strength blastfurnace cements

The European Standard EN 197-4:2004 has the status of a British Standard

ICS 91.100.10

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 197-4:2004.

EN 197-4 is a candidate "harmonized" European standard and fully takes into account the requirements of the European Commission mandate M/114, Cement, building limes and other hydraulic binders, given under the EU Construction Products Directive (89/106/EEC), an intended to lead to CE marking. The date of applicability of EN 197-4 as a "harmonized" European standard, i.e. the date after which this standard may be used for CE marking purposes, is subject to an announcement in the *Official Journal of the European Communities*.

The Commission in consultation with Member States has agreed a transition period for the co-existence of "harmonized" European Standards and their corresponding national standard(s). It is intended that this period will comprise a period, usually nine months, after the date of availability of the European Standard, during which any required changes to national regulations are to be made, followed by a further period, usually of 12 months, for the implementation of CE marking. At the end of this co-existence period, the national standard(s) will be withdrawn.

EN 197-4 is the subject of transitional arrangements agreed under the Commission mandate. In the UK, the corresponding national standard is:

— BS 146:2002, *Specification for blastfurnace cements with strength properties outside the scope of BS EN 197-1*;

and based on this transition period of twenty-one months, BS 146:2002 would be withdrawn in January 2006.

NOTE This date is approximate. Users of this standard should contact BSI Customer Services for confirmation of withdrawal.

The UK participation in its preparation was entrusted by Technical Committee B/516, Cement and lime, to Subcommittee B/516/6, Cement specifications, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 22, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 19 July 2004

ISBN 0 580 44106 7

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 197-4

April 2004

ICS 91.100.10

English version

Cement - Part 4: Composition, specifications and conformity criteria for low early strength blastfurnace cements

Ciment - Partie 4 : Composition, spécification et critères de conformité des ciments de haut fourneau et à faible résistance à court terme

Zement - Teil 4: Zusammensetzung, Anforderungen und Konformitätskriterien von Hochofenzement mit niedriger Anfangsfestigkeit

This European Standard was approved by CEN on 19 September 2003.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 197-4:2004: E

Contents

Foreword

This document (EN 197-4:2004) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by IBN.

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 October 2004, and conflicting national standards shall be withdrawn at the latest by October 2004.

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.

Annex A is informative.

This document includes a Bibliography.

The various stages in the development of a European Standard for common cement, in response to the preliminary Mandate given to CEN by the EC and the EFTA, are described in EN 197-1. It is indicated that, in view of the large numbers of different cements involved, it was considered necessary to separate the "common cements", which are now covered by EN 197-1, from special cements i.e. those with additional or special properties or those having hardening processes not mainly dependent on the hydration of calcium silicates.

The strength attained at 28 days is the important criterion in classifying cement for most uses. In order to achieve a specific strength class at 28 days the early strength, at 2 days or at 7 days, can vary and some types of cement may not attain the minimum early strengths specified in EN 197-1 for common cements. The heat of hydration is linked to the early reactivity and lower early strengths indicate lower heat evolution and lower temperatures in concrete. For these cements additional precautions in use can be necessary to ensure adequate curing and safety in construction. The purpose of this EN 197-4 is to specify the composition requirements and conformity requirements for low early strength blastfurnace cements and low early strength blastfurnace cements with low heat of hydration.

The requirements in EN 197-4 are based on the results of tests on cement in accordance with EN 196 Parts 1, 2, 3, 7, 8, 9 and 21. The scheme for the evaluation of conformity of low early strength blastfurnace cements to EN 197-4 is included in EN 197-2.

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

Introduction

It is recognised that different cements have different properties and performance. Those performance tests now available (i.e. setting time, strength, soundness and heat of hydration), have been included in this EN 197-4. In addition, work is being carried out by CEN/TC 51 to identify any additional tests which are needed to specify further performance characteristics of cement. Until further performance tests are available it is highly recommended that the choice of cement, especially the type and/or strength class in relation to the requirements for durability depending on exposure class and type of construction in which it is incorporated, follows the appropriate standards and/or regulations for concrete valid in the place of use.

1 Scope

This EN 197-4 defines and gives the specifications of 3 distinct low early strength blastfurnace cement products and their constituents. The definition of each cement includes the proportions in which the constituents are to be combined to produce these distinct products in a range of three strength classes. The definition also includes requirements the constituents have to meet and the mechanical, physical, chemical, including where appropriate, heat of hydration, requirements and strength classes. This EN 197-4 also states the conformity criteria and the related rules. Necessary durability requirements are also given.

NOTE 1 In addition to the specified requirements, an exchange of additional information between the cement producer and user can be helpful. The procedures for such an exchange are not within the scope of EN 197-4 but should be dealt with in accordance with national standards or regulations or can be agreed between the parties concerned.

NOTE 2 The word "cement" in this EN 197-4 is used to refer only to low early strength blastfurnace cements unless otherwise indicated.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 196-1, *Methods of testing cement — Part 1 : Determination of strength*.

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

EN 196-3, *Methods of testing cement — Part 3 : Determination of setting time and soundness*.

EN 196-7, *Methods of testing cement — Part 7 : Methods of taking and preparing samples of cement*.

EN 196-8, *Methods of testing cement —- Part 8 : Determination of heat of hydration — Solution method*.

EN 196-9, *Methods of testing cement — Part 9 : Determination of heat of hydration — Semi-adiabatic method.*

EN 196-21[1)] , *Methods of testing cement — Part 21 : Determination of the chloride, carbon dioxide and alkali content of cement*.

---

1) EN 196-21 is currently being incorporated into EN 196-2.

EN 197-1:2000, *Cement — Part 1 : Composition, specifications and conformity criteria for common cements*.

EN 197-1:2000/A1:2004, *Cement — Part 1 : Composition, specifications and conformity criteria for common cements*.

EN 197-2:2000, *Cement — Part 2 : Conformity evaluation.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 197-1:2000 and the following apply.

3.1
type of low early strength blastfurnace cement
one of the 3 products (see Table 1) in the family of low early strength cements

3.2
heat of hydration
quantity of heat developed by the hydration of a cement within a given period of time

3.3
low heat low early strength blastfurnace cement
low early strength blastfurnace cement with a limited heat of hydration

4 Low early strength blastfurnace cement

Low early strength blastfurnace cement is a hydraulic binder, i.e. a finely ground inorganic material which, when mixed with water, forms a paste which sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water. It has hydration reactions and processes identical to those of common cements (see EN 197-1) but through composition, fineness or reactivity of constituents the early hydration process is slower.

5 Constituents

For the purpose of this European Standard the requirements for constituents specified in clause 5 of EN 197-1:2000 apply.

6 Composition and notation

The 3 products in the family of low early strength blastfurnace cements, covered by this European Standard, and their notation are given in Table 1. They are grouped into one main cement type:

— CEM III Blastfurnace cement

The composition of the different low early strength blastfurnace cements shall be in accordance with Table 1.

NOTE For clarity in definition, the requirements for the composition refer to the sum of all main and minor additional constituents. The final cement should be understood as the main and minor additional constituents plus the necessary calcium sulfate (see 5.4 of EN 197-1:2000) and any additives (see 5.5 of EN 197-1:2000).

Table 1 — The 3 products in the family of low early strength blastfurnace cements

Main types	Notation of the 3 products (types of low early strength blastfurnace cements)		Composition (proportion by mass, in % [a])		
			Main constituents		Minor additional constituents
			Clinker	Blastfurnace Slag	
			K	S	
CEM III	Blastfurnace cement	CEM III/A	35-64	36-65	0-5
		CEM III/B	20-34	66-80	0-5
		CEM III/C	5-19	81-95	0-5

[a] The values in the table refer to the sum of the main and minor additional constituents.

7 Mechanical, physical, chemical and durability requirements

7.1 Mechanical requirements

7.1.1 Standard strength

The standard strength of cement is the compressive strength determined in accordance with EN 196-1 at 28 days and shall conform to the requirements in Table 2, which are identical to those in EN 197-1.

Three classes of standard strength, as defined in EN 197-1, are included; class 32,5, class 42,5 and class 52,5 (see Table 2).

7.1.2 Early strength

The early strength of cement is the compressive strength determined in accordance with EN 196-1 at either 2 days or 7 days and shall conform to the requirements in Table 2.

One class of early strength is included for each class of standard strength indicated by L (see Table 2).

NOTE The requirements for early strength class (L) for these cements are the only requirements that differ from those in EN 197-1.

Table 2 — Mechanical and physical requirements given as characteristic values

Strength class	Compressive strength MPa				Initial setting time	Soundness (Expansion)
	Early strength		Standard strength			
	2 days	7 days	28 days		min	mm
32,5 L	–	≥ 12,0	≥ 32,5	≤ 52,5	≥ 75	≤ 10
42,5 L	–	≥ 16,0	≥ 42,5	≤ 62,5	≥ 60	
52,5 L	≥ 10,0	–	≥ 52,5	–	≥ 45	

7.2 Physical requirements

7.2.1 Initial setting time

The initial setting time, determined in accordance with EN 196-3, shall conform to the requirements in Table 2, which are identical to those in EN 197-1.

7.2.2 Soundness

The expansion, determined in accordance with EN 196-3, shall conform to the requirement in Table 2, which is identical to that in EN 197-1.

7.2.3 Heat of hydration

The heat of hydration of low heat low early strength blastfurnace cements shall not exceed the characteristic value of 270 J/g, determined in accordance with either EN 196-8 at 7 days or in accordance with EN 196-9 at 41 h and is identical to that in EN 197-1: 2000/A1:2004.

NOTE A pre-normative research project has demonstrated the equivalence of test results for EN 196-8 at 7 days and EN 196-9 at 41 h. Nevertheless, in case of dispute between laboratories, the method to be applied should be agreed.

Low heat low early strength blastfurnace cements are indicated by LH.

7.3 Chemical requirements

The properties of the cements of the cement type and strength class shown in columns 3 and 4 respectively of Table 3 shall conform to the requirements listed in column 5 of this table when tested in accordance with the standard referred to in column 2. These requirements are identical to those in EN 197-1 for the cement types CEM III.

NOTE Some European countries have regulations for the content of water-soluble hexavalent chromium (see informative annex A).

Table 3 — Chemical requirements given as characteristic values

1	2	3	4	5
Property	**Test reference**	**Cement type**	**Strength class**	**Requirements** [a]
Loss on ignition	EN 196-2	CEM III	all	≤ 5,0 %
Insoluble residue	EN 196-2 [b]	CEM III	all	≤ 5,0 %
Sulfate content (as SO_3)	EN 196-2	CEM III [c]	all	≤ 4,0 %
Chloride content	EN 196-21	CEM III [d]	all	≤ 0,10 %

[a] Requirements are given as percentage by mass of the final cement.

[b] Determination of residue insoluble in hydrochloric acid and sodium carbonate.

[c] Cement type CEM III/C may contain up to 4,5 % sulfate.

[d] Cement type CEM III may contain more than 0,10 % chloride but in that case the maximum chloride content shall be stated on the packaging and/or the delivery note.

7.4 Durability requirements

In many applications, particularly in severe environmental conditions, the choice of cement has an influence on the durability of concrete, mortar and grouts, e. g. frost resistance, chemical resistance and protection of reinforcement.

The choice of cement, from this European Standard, particularly as regards type and class for different applications and exposure classes shall follow the appropriate standards and/or regulations for concrete or mortar valid in the place of use.

These cements will have lower early strength compared with a common cement of the same standard strength class and may require additional precautions in their use such as extension of formwork stripping times and protection during adverse weather. In all other respects their performance and suitability of application will be similar to those of common cements, conforming to EN 197-1, of the same type and standard strength class.

8 Standard designation

Low early strength blastfurnace cements shall be identified by at least the notation of the cement type as specified in clause 6 and the figures 32,5, 42,5, or 52,5 indicating the strength class (see 7.1). In order to indicate the low early strength the letter L shall be added (see 7.1). For cements having a low heat of hydration this shall be indicated by adding the letters LH (see 7.2.3).

EXAMPLE 1 Blastfurnace cement with a granulated blastfurnace slag (S) content between 66 % and 80 %, a strength class 32,5 and low early strength is identified by:

Low early strength blastfurnace cement EN 197-4 – CEM III/B 32,5 L.

EXAMPLE 2 Blastfurnace cement with a granulated blastfurnace slag (S) content between 81 % and 95 %, a strength class 32,5, low early strength and low heat of hydration is identified by:

Low early strength low heat blastfurnace cement EN 197-4 – CEM III/C 32,5 L - LH.

9 Conformity criteria

9.1 General requirements

Conformity of the 3 products to this European Standard shall be continually evaluated on the basis of testing of spot samples. The properties, test methods and the minimum testing frequencies for the autocontrol testing by the manufacturer are specified in Table 4. Concerning testing frequencies for cement not being dispatched continuously and other details, see EN 197-2.

For certification of conformity by an approved certification body, conformity of cement with this European Standard shall be evaluated in accordance with the scheme specified in EN 197-2.

NOTE This European Standard does not deal with acceptance inspection at delivery.

Table 4 — Properties and test methods and minimum testing frequencies for the autocontrol testing by the manufacturer and the statistical assessment procedure

Property	Cements to be tested	Test method [a] [b]	Autocontrol testing			
			Minimum testing frequency		Statistical assessment procedure	
			Routine situation	Initial period for a new type of cement	Inspection by	
					Variables [e]	Attributes
1	*2*	*3*	*4*	*5*	*6*	*7*
Early strength Standard strength	All	EN 196-1	2/week	4/week	x	
Initial setting time	All	EN 196-3	2/week	4/week		x [f]
Soundness (expansion)	All	EN 196-3	1/week	4/week		x
Loss on ignition	All	EN 196-2	2/month [c]	1/week		x [f]
Insoluble residue	All	EN 196-2	2/month [c]	1/week		x [f]
Sulfate content	All	EN 196-2	2/week	4/week		x [f]
Chloride content	All	EN 196-21	2/month [c]	1/week		x [f]
Heat of hydration	Low heat cements	EN 196-8 or EN 196-9	1/month	1/week		x [f]
Composition	All	– [d]	1/month	1/week		

[a] Where allowed in the relevant part of EN 196, other methods than those indicated may be used providing they give results equivalent to those obtained with the reference method.

[b] The methods used to take and prepare samples shall be in accordance with EN 196-7.

[c] When none of the test results within a period of 12 months exceeds 50 % of the characteristic value the frequency may be reduced to one per month.

[d] Appropriate test method chosen by the manufacturer.

[e] If the data are not normally distributed then the method of assessment may be decided on a case by case basis.

[f] If the number of samples is at least one per week during the control period, the assessment may be made by variables.

9.2 Conformity criteria for mechanical, physical and chemical properties and evaluation procedure

9.2.1 General

Conformity of cement to the requirements for mechanical, physical and chemical properties in this European Standard is assumed if the conformity criteria specified in 9.2.2 and 9.2.3 are met. Conformity shall be evaluated on the basis of continual sampling using spot samples taken at the point of release and on the basis of the test results obtained on all autocontrol samples taken during the control period.

9.2.2 Statistical conformity criteria

9.2.2.1 General

Conformity shall be formulated in terms of a statistical criterion based on:

— the specified characteristic values for mechanical, physical and chemical properties as given in 7.1, 7.2, and 7.3 of this European Standard;

— the percentile P_k on which the specified characteristic value is based, as specified in Table 5;

— the allowable probability of acceptance *CR*, as given in Table 5.

Table 5 — Required values P_k and *CR*

	Mechanical requirements		Physical and chemical requirements
	Early and standard strength (Lower limit)	Standard strength (Upper limit)	
The percentile P_k on which the characteristic value is based	5 %	10 %	
Allowable probability of acceptance *CR*	5 %		

NOTE Conformity evaluation by a procedure based on a finite number of test results can only produce an approximate value for the proportion of results outside the specified characteristic value in a population. The larger the sample size (number of test results), the better the approximation. The selected probability of acceptance *CR* controls the degree of approximation by the sampling plan.

Conformity with the requirements of this European Standard shall be verified either by variables or by attributes, as described in 9.2.2.2 and 9.2.2.3 as specified in Table 4.

The control period shall be 12 months.

9.2.2.2 Inspection by variables

For this inspection the test results are assumed to be normally distributed.

Conformity is verified when equation(s) (1) and (2), as relevant, are satisfied:

$$\bar{x} - k_A \cdot s \geq L \quad (1)$$

and

$$\bar{x} + k_A \cdot s \leq U \quad (2)$$

where

$\bar{x}$ is the arithmetic mean of the totality of the autocontrol test results in the control period;

s is the standard deviation of the totality of the autocontrol test results in the control period;

k_A is the acceptability constant;

L is the specified lower limit given in Table 2 referred to in 7.1.

U is the specified upper limit given in Tables 2 and 3 referred to in clause 7.

The acceptability constant k_A depends on the percentile P_k on which the characteristic value is based, on the allowable probability of acceptance *CR* and on the number n of the test results. Values of k_A are listed in Table 6.

Table 6 — Acceptability constant k_A

Number of test results n	k_A [a]	
	For P_k = 5 %	For P_k = 10 %
	(early and standard strength lower limit)	(other properties)
20 to 21	2,40	1,93
22 to 23	2,35	1,89
24 to 25	2,31	1,85
26 to 27	2,27	1,82
28 to 29	2,24	1,80
30 to 34	2,22	1,78
35 to 39	2,17	1,73
40 to 44	2,13	1,70
45 to 49	2,09	1,67
50 to 59	2,07	1,65
60 to 69	2,02	1,61
70 to 79	1,99	1,58
80 to 89	1,97	1,56
90 to 99	1,94	1,54
100 to 149	1,93	1,53
150 to 199	1,87	1,48
200 to 299	1,84	1,45
300 to 399	1,80	1,42
> 400	1,78	1,40

NOTE Values given in this table are valid for *CR* = 5 %.

[a] Values of k_A valid for intermediate values of n may also be used.

9.2.2.3 Inspection by attributes

The number c_D of test results outside the characteristic value shall be counted and compared with an acceptable number c_A, calculated from the number n of autocontrol test results and the percentile P_k as specified in Table 7.

Conformity is verified when equation (3) is satisfied:

$$c_D \leq c_A \quad (3)$$

The value of c_A depends on the percentile P_k on which the characteristic value is based, on the allowable probability of acceptance *CR* and on a number n of the test results. Values of c_A are listed in Table 7.

Table 7 — Values of c_A

Number of test results n [a]	c_A for P_K = 10 %
20 to 39	0
40 to 54	1
55 to 69	2
70 to 84	3
85 to 99	4
100 to 109	5
110 to 123	6
124 to 136	7

NOTE Values given in this table are valid for *CR* = 5 %.

[a] If the number of test results is n < 20 (for P_k = 10 %) a statistically based conformity criterion is not possible. Despite this, a criterion of c_A = 0 shall be used in cases where n < 20.

9.2.3 Single result conformity criteria

In addition to the statistical conformity criteria, conformity of test results to the requirements of this European Standard requires that it shall be verified that each test result remains within the single result limit values specified in Table 8.

Table 8 — Limit values for single results

Property			Single result limit values		
			Strength class		
			32,5 L	42,5 L	52,5 L
Early strength (MPa)	(lower limit value)	2 day			8,0
		7 day	10,0	14,0	–
Standard strength (MPa)	(lower limit value)	28 day	30,0	40,0	50,0
Initial setting time (min)	(lower limit value)		60	50	40
Soundness (expansion mm)	(upper limit value)		10		
Sulfate content (as SO_3) (%)	(upper limit value)	CEM III/A, CEM III/B	4,5		
		CEM III/C	5,0		
Chloride content (%) [a]	(upper limit value)		0,10		
Heat of hydration (J/g)	(upper limit value)	LH	300		

[a] Cement type CEM III may contain more than 0,10 % chloride but in that case the maximum chloride content shall be declared.

9.3 Conformity criteria for cement composition

At least once per month the composition of the cement shall be checked by the manufacturer, using as a rule a spot sample taken at the point of release of the cement. The cement composition shall meet the requirements specified in Table 1. The limiting quantities of the main constituents specified in Table 1 are reference values to be met by the average composition calculated from the spot samples taken in the control period. For single results, maximum deviations of – 2 at the lower and + 2 at the higher reference value are allowed. Suitable procedures during production and appropriate verification methods to ensure conformity to this requirement shall be applied and documented.

9.4 Conformity criteria for properties of the cement constituents

The cement constituents shall meet the requirements specified in clause 5. Suitable procedures during production to ensure conformity with this requirement shall be applied and documented.

Annex A
(informative)

Water-soluble hexavalent chromium

Some CEN member countries have regulations for the content of water-soluble hexavalent chromium.

Alteration of these national regulations is, for the time being, outside the competence of CEN/CENELEC members. In these countries these regulations are valid in addition to the relevant requirements of this European Standard until they have been removed.

For this European Standard the following national regulations have been applied according to EC-Directive 90/531 by Denmark, Finland, Germany, Iceland, Norway and Sweden:

Denmark: Arbejdstilsynets bekendtgørelse nr. 661 af 28. November 1983 om vandopløseligt chromat i cement.

Finland: Decision of the Council of State concerning the content of chromate in cement for concrete and masonry cement, No. 593, July 24, 1986.

Germany: Gefahrstoffverordnung (Gef Stoff V) together with TRGS 613 “Ersatzstoffe, Ersatzverfahren und Verwendungsbeschränkungen für chromathaltige Zemente und chromathaltige zementhaltige Zubereitungen, April 1993 (BArbBI Nr. 4.1993)”.

Iceland: Reglur nr. 330/1989 um króm i sementi, Order No. 330 of 19 June 1989.

Norway: Directorate of Labour Inspection: Regulations relating to the Working Environment, laid down on 23 October 1987.

Sweden: Kemikalieinspektionens föreskrifter om kemiska produkter och biotekniska organismer, KIFS 1998:8, 9 kapitlet §§ 10-13, Kemikalieinspektionens allmänna råd till föreskrifterna om krom i cement, 1989:1.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under a Mandate M114 “Cement, building limes and other hydraulic binders” 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 this mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the low early strength blastfurnace cements covered by this annex for the intended use 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 use(s), can be applicable to a construction product falling within the scope of this European Standard.

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 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA, accessed through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm.

This annex establishes the conditions for the CE marking of the low early strength blastfurnace cements intended for the uses indicated in table ZA.1 and shows the relevant clauses applicable:

The scope of this annex is defined by table ZA.1.

Table ZA.1 — Harmonised clauses

Construction Products:	**3 different low early strength blastfurnace cement products (see Table 1)**			
Intended use(s):	**Preparation of concrete, mortar, grout and other mixes for construction and for the manufacture of construction products (see notes in this table)**			
Requirements/performance characteristics	**Harmonised clauses [a] in this European Standard**		**CPD Article 3.2 level(s) and/or class(es)**	**Notes**
Low early strength blastfurnace cements (Subfamilies) constituents and composition	3 4 5 6 8	Constitutions of the 3 different products (Table 1) in the Product family "Low early strength blastfurnace cements", defined on the basis of constituent materials and composition.	None	Selection of cements by the Member States in technical regulations for particular intended uses shall be possible, based on the different cement products, strength classes and heat of hydration.
Compressive strength (early and standard)	7.1 8	Compressive strength requirements expressed in terms of strength classes and limits. [b]	None	
Setting time	7.2	Requirements expressed in terms of lower limits. [b]	None	
Insoluble residue	7.3	Requirements expressed in terms of upper limits. [b]	None	.
Loss on ignition	7.3	Requirements expressed in terms of upper limits. [b]	None	
Soundness – Expansion – SO_3 content	7.2 7.3	Requirements expressed in terms of upper limits. [b]	None	
Chloride content	7.3	Requirements expressed in terms of upper limits. [b]	None	
Heat of hydration	7.2.3	Requirements expressed in terms of upper limits. [b]	None	Only for low heat low early strength blastfurnace cements
Durability	4 5 7.4			Durability relates to the concrete, mortar, grout and other mixes made from low early strength blastfurnace cement according to the application rules valid in the place of use.

[a] The requirements in these clauses, including the entire contents and tables of the clauses listed, are fully integrated parts of this harmonised European Cement Standard.

[b] These limits are part of the definition of the products covered by this cement standard.

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs 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 Clause ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedure for the attestation of conformity of products

ZA.2.1 System of attestation of conformity

The system of attestation of conformity for the 3 low early strength blastfurnace cements indicated in table ZA.1 is shown in table ZA.2 for the indicated intended uses(s), in accordance with the Commission Decision of 14 July 1997 (97/555/EC) published in the Official Journal of the European Communities and given in Annex 3 of the Mandate for the product family "Cements".

Table ZA.2 — System of attestation of conformity

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Low early strength blastfurnace cements, including: – Blastfurnace cements	Preparation of concrete, mortar, grout and other mixes for construction and for the manufacture of construction products	. . . . .	1+
System 1+: See Annex III Section 2 point (i) of Directive 89/106/EEC, with audit-testing of samples taken at the factory			

The attestation of conformity to low early strength blastfurnace cements in table ZA.1 shall be based on the evaluation of conformity procedures indicated in table ZA.3 resulting from application of the clauses of this European Standard indicated therein. Clause 6 of EN 197-2:2000 gives rules relating to actions in the event of non-conformity.

Clause 9 of EN 197-2:2000, giving rules relating to Dispatching Centres, is not part of the procedure of attestation of conformity for the affixing of the CE marking under the CPD. However, Member States, with their market surveillance obligations, must ensure that CE marking is correctly used (Article 15.1 of the CPD). Clause 9 of EN 197-2:2000 should be used for the corresponding national provisions concerning Dispatching Centres.

Table ZA.3 — Assignment of evaluation of conformity tasks

Tasks		Scope of the tasks	Clauses to apply
Tasks for the manufacturer	Factory production control	Parameters related to all relevant characteristics in Table ZA.1 [a]	clause 9 and EN 197-2:2000, clause 4
	Further testing of samples taken at the factory/depot	All relevant characteristics in Table ZA.1 [a]	
Tasks for the notified body	Initial type testing	All relevant characteristics in Table ZA.1 [a]	clauses 9 and EN 197-2:2000, clauses 5 and 7
	Certification of the factory production control on the basis of: – initial inspection of factory and factory production control – continuous surveillance, assessment and approval of factory production control	Parameters related to all relevant characteristics in Table ZA.1 [a]	
	Audit-Testing of samples taken at the factory/depot	All relevant characteristics in Table ZA. 1 [a]	

[a] except durability

ZA.2.2 EC certificate of conformity and EC declaration of conformity

When compliance with the conditions of this Annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity), which entitles the manufacturer to affix the CE marking. The certificate shall include:

— Name, address and identification number of the certification body,

— Name and address of the manufacturer, or his authorised representative established in the EEA, and place of production,

— Description of the product (type, identification, use, ...)

— Provisions to which the product conforms (e. g. Annex ZA of this EN)

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

— The number of the certificate,

— Conditions and period of validity of the certificate, where applicable,

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

In addition, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following:

Name and address of the manufacturer, or his authorised representative established in the EEA,

— Name and address of the certification body,

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

— Provisions to which the product conforms (e. g. Annex ZA of this EN),

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

— Number of the accompanying EC Certificate of conformity,

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

The above mentioned declaration and certificate 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 authorised 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 bag of the low early strength blastfurnace cement (or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note). The following information shall accompany the CE marking symbol:

— Identification number of the certification body ;

— Name or identifying mark and registered address of the producer;

— The last two digits of the year in which the marking is affixed;

— Number of the EC Certificate of conformity or factory production control certificate ;

— Reference to this European Standard;

— Description of the product: generic name, … and intended use;

— Information on those relevant essential characteristics listed in table ZA.1 which are to be declared presented as:

  — declared values and, where relevant, level or class (including “pass” for pass/fail requirements, where necessary) to declare for each essential characteristic as indicated in "Notes" in table ZA.1;

  — as an alternative, standard designation(s) alone or in combination with declared values as above, and;

  — “No performance determined” for characteristics where this 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 in the Member State of destination.

Figure ZA.1 gives an example of the information to be given on the product, label, packaging and/or commercial documents.

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

NOTE European legislation without national derogations need not be mentioned.

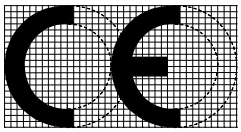	CE conformity marking, consisting of the “CE”-symbol given in directive 93/68/EEC
0123	Identification number of the certification body
Any Company	Name or identifying mark of the producer
The registered address	Registered address of the producer
Any Factory 2)	Name or identifying mark of the factory where the cement was produced2)
Year 03 (or position of date stamping)	The last two digits of the year in which the marking was affixed3)
0123-CPD-0456	Number of the EC certificate of conformity
EN 197-4	Number of European standard
CEM III/A 42,5 L	Example of standard designation, indicating the cement product and the strength class (and, where applicable, the notation for low heat of hydration), as specified in clause 8 of this European Standard
Additional information	Limit for chloride in %4) Standard notation of admixture5)

Figure ZA.1 — Example of CE marking information

2) Considered necessary for the requirements of EN 197-2 but not compulsory.

3) The year of marking should relate to either the time of packing into bags or the time of dispatch from the factory or depot.

4) Only where the CEM III cement is produced to meet a different chloride content limit to the value specified in Table 3 of this European Standard.

5) Only where, in accordance with 5.5 of EN 197-1:2000, an admixture conforming to the EN 934 series is used.

For reasons of practicality, selections from the following alternative arrangements for bagged cement concerning the presentation of the accompanying information may be used:

a) When the CE marking is given on the bag (this is the normal situation and is preferred) the elements shown on the Figure ZA.1 shall be given.

b) Where the last two digits of the year in which the CE marking is affixed is pre-printed on the bag, the year so printed should relate to the date of affixing with an accuracy of within plus or minus three months.

c) Where the last two digits of the year in which the marking is affixed is to be presented but not pre-printed on the bag it may be applied by means of date-stamping of the bag in any easily visible position. This position should be indicated in the information accompanying the CE marking.

In the case of bulk cement, the CE conformity marking, the identification number of the certification body and the accompanying information as listed before for bagged cement should be affixed in some suitable practical form on the accompanying commercial documents.

Bibliography

EN 14216, *Cement — Composition, specifications and conformity criteria for very low heat special cements.*

EN 934 (all parts), *Admixtures for concrete, mortar and grout.*

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL