BS EN 14216:2015

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Cement — Composition, specifications and conformity criteria for very low heat special cements

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National foreword

This British Standard is the UK implementation of EN 14216:2015. It supersedes BS EN 14216:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/516/6, Cement specifications.

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

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Cement - Composition, specifications and conformity criteria for very low heat special cements

Ciments - Composition, spécifications et critères de conformité de ciments speciaux à très faible chaleur d'hydratation

Zement - Zusammensetzung, Anforderungen und Konformitätskriterien von Sonderzement mit sehr niedriger Hydratationswärme

This European Standard was approved by CEN on 10 April 2015.

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European foreword

This document (EN 14216:2015) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2016, and conflicting national standards shall be withdrawn at the latest by April 2017.

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 14216:2004.

Compared to the version EN 14216:2004 the following major changes have been included in this document:

— use of the terminology given by the Construction Products Regulation (Regulation (EU) No 305/2011);

— a clause “Dangerous substances” has been added;

— the former Annex A (informative) “Water-soluble hexavalent chromium” has been deleted;

— Annex ZA has been revised in accordance with the Construction Products Regulation (Regulation (EU) No 305/2011).

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

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

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 special properties or those having hardening processes not mainly dependent on the hydration of calcium silicates.

The low heat property for common cements is covered by EN 197-1.

A need for control of heat development during hydration of concrete is referred to in EN 206. Classification of cements with respect to heat of hydration is one method whereby heat development of concrete can be controlled. The purpose of this European Standard is therefore to specify the heat of hydration for very low heat special cements. Composition and other requirements are those specified in EN 197-1 for common cements. Conformity criteria are additionally specified.

The requirements in this European Standard are based on the results of tests on cement in accordance with EN 196-1, EN 196-2, EN 196-3, EN 196-5, EN 196-7, EN 196-8 and EN 196-9. The scheme for the evaluation of conformity in EN 197-2 is applicable to very low heat special cements.

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.

Introduction

It is recognized 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 European Standard. 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 European Standard defines and gives the specifications of six distinct very low heat special 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 single strength class having a limited heat of hydration value. The definition also includes requirements the constituents have to meet and the mechanical, physical, chemical and heat of hydration requirements for these products. This European Standard also states the conformity criteria and the related rules. Necessary durability requirements are also given.

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 this European Standard but should be dealt with in accordance with national standards or regulations or can be agreed between the parties concerned.

NOTE 1 The word "cement" in this European Standard is used to refer to very low heat special cement unless otherwise indicated.

NOTE 2 The risk of early-age thermal cracking in concrete depends upon the properties and execution and is, therefore, also dependent on factors other than the heat of hydration of the cement.

2 Normative references

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

EN 196-1, *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 196-5, *Methods of testing cement - Part 5: Pozzolanicity test for pozzolanic cement*

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: Heat of hydration - Solution method*

EN 196-9, *Methods of testing cement - Part 9: Heat of hydration - Semi-adiabatic method*

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

EN 197-2:2014, *Cement - Part 2: Conformity evaluation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 197-1 apply.

4 Very low heat special cement

Very low heat special 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 hydration process is slower.

Very low heat special cement is particularly suitable for dams and other similar massive construction, where the dimensions of the structure have a low surface/volume ratio. In this case, the dispersion of heat, developed during the hydration of the cement, is very slow and therefore it is possible to have large increases in temperature. Thermal gradients then develop between internal and external zones of the concrete setting up internal stress which can be greater than the tensile strength of the concrete and lead to cracking and breakdown. These same properties make very low heat special cement unsuitable for use in reinforced, elevated, concrete structures, e.g. bridges or buildings.

NOTE Low heat common cements or low heat low early strength blastfurnace cements conforming to EN 197-1 are suitable for dams and other similar massive construction, depending on the design of the concrete and method of construction.

5 Constituents

The constituents of very low heat special cements shall conform to the requirements of the constituents of common cements specified in EN 197-1.

6 Composition and notation

The six products in the family of very low heat special cements, covered by this European Standard, and their notation are given in Table 1. They are grouped into three main cement types as follows:

— VLH III Blastfurnace cement;

— VLH IV Pozzolanic cement;

— VLH V Composite cement.

The composition of each of the six products in the family of very low heat special cements shall be in accordance with Table 1.

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 and any additives.

Table 1 — The 6 products in the family of very low heat special cements

Main type	Notation of the 6 products (types of very low heat special cement)		Composition (percentage by mass in %) [a]							
			Main constituents							Minor additional constituents
			Clinker	Blast-furnace slag	Silica fume	Pozzolana		Fly ash		
						natural	natural calcined	siliceous	calcareous	
			K	S	D [b]	P	Q	V	W	
VLH III	Blastfurnace cement	VLH III/B	20–34	66–80	–	–	–	–	–	0–5
		VLH III/C	5–19	81–95	–	–	–	–	–	0–5
VLH IV	Pozzolanic cement [c]	VLH IV/A	65–89	–	<---------- 11–35 ---------->					0–5
		VLH IV/B	45–64	–	<---------- 36–55 ---------->					0–5
VLH V	Composite cement [c]	VLH V/A	40–64	18–30	–	<-------- 18–30 -------->			–	0–5
		VLH V/B	20–38	31–49	–	<-------- 31–49 -------->			–	0–5

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

[b] The proportion of silica fume is limited to 10 %.

[c] In pozzolanic cements VLH IV/A and VLH IV/B and in composite cements VLH V/A and VLH V/B the main constituents other than clinker shall be declared by designation of the cement (for example see Clause 8).

7 Mechanical, physical, heat of hydration, chemical and durability requirements

7.1 Mechanical requirements - Standard strength

The standard strength of a very low heat special cement is the compressive strength determined in accordance with EN 196-1 at 28 d and shall conform to the requirements in Table 2.

One class of standard strength is included; class 22,5 (see Table 2).

Table 2 — Mechanical and physical requirements given as characteristic values

Strength class	Compressive strength MPa		Initial setting time	Soundness (expansion)
	Standard strength			
	28 d		min	mm
22,5	≥ 22,5	≤ 42,5	≥ 75	≤ 10

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 requirement in Table 2.

7.2.2 Soundness

The expansion, determined in accordance with EN 196-3, shall conform to the requirement in Table 2.

7.2.3 Heat of hydration

The heat of hydration of very low heat special cements shall not exceed the characteristic value of 220 J/g, determined in accordance with either EN 196-8 at 7 d or in accordance with EN 196-9 at 41 h.

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

7.3 Chemical requirements

The properties of the cements of the cement type shown in column 3 of Table 3 shall conform to the requirements listed in column 4 of this table when tested in accordance with the standard referred to in column 2.

Table 3 — Chemical requirements given as characteristic values

1	2	3	4
Property	**Test reference**	**Cement type**	**Requirements** [a]
Loss on ignition	EN 196-2	VLH III	≤ 5,0 %
Insoluble residue	EN 196-2 [b]	VLH III	≤ 5,0 %
Sulfate content (as SO_3)	EN 196-2	VLH IV VLH V	≤ 3,5 %
		VLH III/B	≤ 4,0 %
		VLH III/C	≤ 4,5 %
Chloride content	EN 196-2	All [c]	≤ 0,10 %
Pozzolanicity	EN 196-5	VLH IV	Satisfies the test at 8 d

[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 VLH III may contain more than 0,1 % 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 heat of hydration for different applications and exposure classes shall follow the appropriate standards and/or regulations for concrete or mortar valid in the place of use.

The mortar or concrete made from very low heat special cements requires additional protection from drying out and from carbonation during curing. Frost resistance of very low heat special cement concrete should be suitable for the exposure conditions in the place of use.

7.5 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering 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/.

8 Standard designation

Very low heat special cements shall be identified by the notation of the cement type as specified in Table 1 and the figure 22,5 indicating the standard strength class (see 7.1).

EXAMPLE 1 Very low heat special cement with a granulated blastfurnace slag (S) content between 81 % and 95 % of strength class 22,5, with a very low heat of hydration is identified by:

Very low heat special blastfurnace cement EN 14216 **— VLH III/C 22,5**

EXAMPLE 2 Very low heat special cement with a natural pozzolana (P) content between 36 % and 55 % of strength class 22,5 with a very low heat of hydration is identified by:

Very low heat special pozzolanic cement EN 14216 **— VLH IV/B (P) 22,5**

EXAMPLE 3 Very low heat special composite cement containing between 18 % and 30 % by mass of granulated blastfurnace slag (S) and between 18 % and 30 % by mass of siliceous fly ash (V) of strength class 22,5 with a very low heat of hydration is identified by:

Very low heat special composite cement EN 14216 **— VLH V/A (S-V) 22,5**

9 Conformity criteria

9.1 General requirements

Conformity of the six 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. For cement not being dispatched continuously testing frequencies and other details, see EN 197-2. Alternative test methods could be used provided that they have been validated in accordance with the appropriate provisions in the cited standards of the reference test methods. In the event of a dispute, only the reference methods are used.

NOTE 1 For certification of constancy of performance by a notified body, conformity of cement with this European Standard is evaluated in accordance with EN 197-2.

NOTE 2 This European Standard does not deal with acceptance inspection at delivery.

The compliance of the very low heat special cements with the requirements of this European Standard and with the stated values (including classes) shall be demonstrated by:

— assessment of the performance of the construction product,

— factory production control by the manufacturer, including product assessment.

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*
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	VLH III	EN 196-2	2/month [c]	1/week		x [f]
Insoluble residue	VLH III	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 196-2	2/month [c]	1/week		x [f]
Pozzolanicity	VLH IV	EN 196-5	2/month	1/week		x
Heat of hydration	All	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 with 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 given 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**
	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 Formula (1) and Formula (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 Table 2 and Table 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 %**
	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 Formula (3) is satisfied:

$$c_D \leq c_A \tag{3}$$

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. If the number of test results is n > 136, c_A can be calculated as follows: c_A = 0,075 (n – 30).	

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**
Standard strength (MPa) Lower limit value 28 d		20,0
Initial setting time (min) lower limit value		60
Soundness (expansion mm) upper limit value		10
Sulfate content (as % SO_3) upper limit value	VLH IV, VLH V	4,0
	VLH III/B	4,5
	VLH III/C	5,0
Chloride content (%) [a] upper limit value		0,10
Heat of hydration (J/g) upper limit value		250
Pozzolanicity		Satisfies the test at 15 d
[a] Cement type VLH 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

The composition of the cement shall be checked by the manufacturer at least once per month 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 ZA
(informative)

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

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M114 “Cement, building limes and other hydraulic binders” given to CEN by the European Commission and the European Free Trade Association.

If this European Standard is cited in the Official Journal of the European Union (OJEU), the clauses of this standard, shown in this annex, are considered to meet the provisions of the relevant mandate, under the Regulation (EU) No. 305/2011.

This annex deals with the CE marking of the very low heat special cement intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table ZA.1.

Table ZA.1 — Relevant clauses

Product: 6 different very low heat special cement products (see Table 1) **Intended use:** Preparation of concrete for the manufacture of massive structures (see notes in this table)			
Essential Characteristics	**Clauses in this and other European Standard(s) related to essential characteristics**	**Regulatory classes**	**Notes**
Very low heat special cements (subfamilies) constituents and composition	3, 4, 5, 6, 8	None	Constitutions of the 6 different products (Table 1) in the Product family "Very low heat special cements", defined on the basis of constituent materials and composition; selection of very low heat special 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	7.1, 8	None	Compressive strength requirements expressed in terms of strength classes and limits
Initial setting time	7.2	None	Requirements expressed in terms of lower limits
Insoluble residue	7.3	None	Only for VLH III; requirements expressed in terms of upper limits
Loss on ignition	7.3	None	Only for VLH III; requirements expressed in terms of upper limits
Soundness - Expansion - SO_3 content	7.2, 7.3	None None	Requirements expressed in terms of upper limits
Heat of hydration	7.2.3	None	Requirements expressed in terms of upper limits
Chloride content	7.3	None	Requirements expressed in terms of upper limits
Pozzolanicity	7.3	None	Only for VLH IV; requirements expressed in terms of limits
Durability	4, 5, 7.4		Durability relates to the concrete, mortar, grout and other mixes made from very low heat special cement according to the application rules valid in the place of use
Release of dangerous substances	7.5		See subclause 7.5

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product. In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option “No performance determined” (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

ZA.2 Procedure for AVCP of very low heat special cements

ZA.2.1 System of AVCP

The AVCP system of very low heat special cements indicated in Table ZA.1, established by EC Decision 97/555/EC (OJ L229) amended by EC Decision 2010/683/EU (OJ L293), is shown in Table ZA.2 for the indicated intended use and relevant level(s) or class(es) of performance.

Table ZA.2 — System of AVCP

Product(s)	Intended use	Level(s) or class(es) of performance	AVCP system
Special cements, including: — Low heat cements — Sulfate resisting cement — White cement — Sea water resisting cement — Low alkali cement	Preparation of concrete for massive structures	–	1+
System 1+: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.1 with audit testing of samples taken by the notified product certification body at the manufacturing plant or at the manufacturer’s storage facilities.			

The AVCP of the six different very low heat special cement products in Table ZA.1 shall be according to the AVCP procedures indicated in Table ZA.3 resulting from application of the clauses of this or other European Standards indicated therein. The content of tasks of the notified body shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

Table ZA.3 — Assignment of AVCP tasks for 6 different very low heat special cement products under system 1+

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use(s) which are declared	Clause 9 of this standard and EN 197-2:2014, Clause 4
	Further testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use(s) which are declared	Clause 9 of this standard and EN 197-2:2014, Clause 4
Tasks for the notified product certification body	Assessment of the performance of the construction product on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use(s)	Clause 9 of this standard and EN 197-2:2014, Clause 5 and Clause 7
	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use(s) which are declared. Documentation of the FPC.	Clause 9 of this standard and EN 197-2:2014, Clause 5 and Clause 7
	Continuing surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use(s) which are declared. Documentation of the FPC.	Clause 9 of this standard and EN 197-2:2014, Clause 5 and Clause 7
	Audit-testing of samples taken by the notified product certification body at the manufacturing plant or at the manufacturer's storage facilities	Essential characteristics of Table ZA.1 relevant for the intended use(s) which are declared	Clause 9 of this standard and EN 197-2:2014, Clause 5 and Clause 7

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No 305/2011:

— the factory production control and the further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

— the certificate of constancy of performance issued by the notified product certification body on the basis of an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control; continuing surveillance,

assessment and evaluation of factory production control and audit-testing of samples taken by the notified product certification body at the manufacturing plant or at the manufacturer's storage facilities.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011.

According to this Regulation, the DoP shall contain, in particular, the following information:

— the reference of the product-type for which the declaration of performance has been drawn up;

— the AVCP system or systems of the construction product, as set out in Annex V of the CPR;

— the reference number and date of issue of the harmonized standard which has been used for the assessment of each essential characteristic;

— where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

a) the intended use or uses for the construction product, in accordance with the applicable harmonized technical specification;

b) the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;

c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;

d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared;

e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;

f) for the listed essential characteristics for which no performance is declared, the letters "NPD" (No Performance Determined).

Regarding the supply of the DoP, Article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006, (REACH) shall be provided together with the DoP.

ZA.2.2.3 Example of DoP

The following gives an example of a filled-in DoP for a very low heat special blastfurnace cement.

Cement type VLH III may contain more than 0,10 % chloride (see Table 3) but in that case the maximum chloride content should be stated in the DoP.

It is recommended to use the number of the certificate of constancy of performance as number of the DoP.

DECLARATION OF PERFORMANCE

No. 0123-CPR-4567

1. Unique identification code of the product-type: **VLH III/C 22,5**
2. Intended use/es: **Preparation of concrete for massive structures**
3. Manufacturer: **AnyCo SA, PO Box 21, B-1050 Brussels, Belgium**
4. System/s of AVCP: **1+**
5. Harmonized standard: EN 14216:2015
6. Notified body/ies: **Name-of-the-notified-body-in-original-language No. 0123**
7. Declared performance

Essential characteristics	Performance
Very low heat special cements (subfamilies) constituents and composition	VLH III/C
Compressive strength	22,5
Initial setting time	Pass
Insoluble residue	Pass
Loss on ignition	Pass
Soundness - Expansion - SO_3 content	 Pass Pass
Heat of hydration	Pass
Chloride content	Pass

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Name: ……

Place: …… Date of Issue: ……

Signature: ……

ZA.3 CE marking and labelling

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

— to the packaging,

or

— to the accompanying documents.

The CE marking shall be followed by:

— the last two digits of the year in which it was first affixed;

— the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity;

— the unique identification code of the product-type;

— the reference number of the declaration of performance;

— the level or class of the performance declared;

— the reference to the harmonized technical specification applied;

— the identification number of the notified body;

— the intended use as laid down in the harmonized technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

Figure ZA.1 gives an example of the information related to very low heat special cements.

CE 0123	*CE marking, consisting of the "CE"-symbol* *Identification number* *of the product certification body*
AnyCo Ltd, PO Box 21, B-1050 Brussels 15 0123-CPR-4567	*Name and the registered address of the manufacturer, or identifying mark* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 14216 VLH III/C 22,5 Preparation of concrete for massive structures The declared performance, by levels and classes, is defined by the cement designation	*No. of European Standard applied,* *as referenced in OJEU* *Unique identification code of the product-type* *Intended use of the product as laid down in the European Standard applied* *Performance declared*

Figure ZA.1 — Example CE marking information related to very low heat special cements

Bibliography

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

[2] EN 934 (all parts), *Admixtures for concrete, mortar and grout*

[3] Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) establishing a European Chemicals Agency amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

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