BS EN 459-1:2015

BSI Standards Publication

Building lime

Part 1: Definitions, specifications and conformity criteria

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National foreword

This British Standard is the UK implementation of EN 459-1:2015. It supersedes BS EN 459-1:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/516/11, Lime.

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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Building lime - Part 1: Definitions, specifications and conformity criteria

Chaux de construction - Partie 1 : Définitions, spécifications et critères de conformité

Baukalk - Teil 1: Begriffe, Anforderungen und Konformitätskriterien

This European Standard was approved by CEN on 16 February 2015.

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Foreword

This document (EN 459-1:2015) 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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by January 2017.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 459-1:2010.

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.

EN 459, *Building lime,* consists of the following parts:

— *Part 1: Definitions, specifications and conformity criteria*;

— *Part 2: Test methods*;

— *Part 3: Conformity evaluation*.

The requirements in EN 459-1 are based on the results of tests on building lime determined in accordance with EN 459-2.

Annexes A and D are normative, Annexes B, C and ZA are informative.

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

Introduction

The revision of this European Standard for building lime was initiated by Decision 4 taken by CEN/TC 51 “Cement and building limes” in 2013.

Different sources of raw materials and different climatic conditions have led to different developments in building construction and civil engineering practices and materials and therefore to different kinds of building lime in different regions of Europe.

The inclusion of a wider range of building lime which exists in Europe has made it necessary to establish a number of classes.

The previous national standards for building lime generally also formed the basis for different areas of application (see Annex C (informative)). The classification chosen therefore also takes into consideration these circumstances as far as possible.

For a better understanding, the standard makes a clear distinction between air lime (Clause 4) and lime with hydraulic properties (Clause 5). Depending on the composition and characteristics of the products, each clause is then divided into sub-paragraphs (calcium lime and dolomitic lime for air lime; natural hydraulic lime, formulated lime and hydraulic lime for lime with hydraulic properties) containing the appropriate definitions, specifications and conformity criteria.

1 Scope

This European Standard applies to building lime used for:

— preparation of binder for mortar (for example for masonry, rendering and plastering);

— production of other construction products (for example calcium silicate bricks, autoclaved aerated concrete, concrete, etc.);

— civil engineering applications (for example soil treatment, asphalt mixtures, etc.).

It gives definitions for the different types of building lime and their classification. It also gives requirements for their chemical and physical properties which depend on the type of building lime and specifies the conformity criteria.

Terms of delivery or other contractual conditions, normally included in documents exchanged between the supplier and the purchaser of building lime, are outside the scope of this European Standard.

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

EN 459-2:2010, *Building lime — Part 2: Test methods*

EN 459-3:2015, *Building lime — Part 3: Conformity evaluation*

3 Terms and definitions

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

NOTE See also Annex C.

3.1
lime
calcium oxide and/or hydroxide, and calcium-magnesium oxide and/or hydroxide produced by the thermal decomposition (calcination) of naturally occurring calcium carbonate (for example limestone, chalk, shells) or naturally occurring calcium magnesium carbonate (for example dolomitic limestone, dolomite)

3.2
building lime
group of lime products, exclusively consisting of two families: air lime and lime with hydraulic properties, used in applications or materials for construction, building and civil engineering

3.3
air lime[1)]
lime (see 3.1) which combines and hardens with carbon dioxide present in air

Note 1 to entry: Air lime has no hydraulic properties. Air lime is divided into two sub-families, calcium lime (CL) and dolomitic lime (DL).

1) Translation of a term used in most European countries.

3.4
lime with hydraulic properties
building lime (see 3.2) consisting mainly of calcium hydroxide, calcium silicates and calcium aluminates

Note 1 to entry: It has the property of setting and hardening when mixed with water and/or under water. Reaction with atmospheric carbon dioxide is part of the hardening process. Lime with hydraulic properties is divided into three sub-families, natural hydraulic lime (NHL), formulated lime (FL) and hydraulic lime (HL).

3.5
allowable probability of acceptance
CR
for a given sampling plan, allowed probability of acceptance of building lime with a characteristic value outside the specified characteristic value

3.6
sampling plan
specific plan which states the (statistical) sample size(s) to be used, the percentile P_k and the allowable probability of acceptance CR

3.7
characteristic value
value of a required property outside which lies a specified percentage, the percentile P_k, of all the values of the population

3.8
specified characteristic value
characteristic value of a strength, physical or chemical property which in the case of an upper limit is not to be exceeded or in the case of a lower limit is, as a minimum, to be reached

3.9
single result limit value
value of a strength, physical or chemical property which − for any single test result − in the case of an upper limit is not be exceeded or in the case of a lower limit is, as a minimum, to be reached

3.10
spot sample
sample taken at the same time and from one and the same place, relating to the intended tests

Note 1 to entry: It can be obtained by combining one or more immediately consecutive increments (see EN 459–2).

3.11
autocontrol testing
continual testing by the manufacturer of building lime spot samples taken at the point(s) of release from the factory/depot

3.12
control period
period of production and dispatch identified for the evaluation of the autocontrol test results

4 Air lime

4.1 General

Air lime is used for the preparation or the production of materials used in building construction as well as in civil engineering.

Air lime (see 3.3) when appropriately batched and mixed with water, forms a paste that improves the workability (values of flow and penetration) and water retention of mortars. The carbonation of hydrates in contact with atmospheric carbon dioxide forms calcium carbonate which develops strength and contributes to the durability of mortars containing building lime (hence the name of air lime).

Sub-families and forms of air lime are given in 4.2 and 4.3 respectively.

4.2 Sub-families of air lime

4.2.1 Calcium lime (CL)

Calcium lime is an air lime consisting mainly of calcium oxide and/or calcium hydroxide without any hydraulic or pozzolanic addition.

4.2.2 Dolomitic lime (DL)

Dolomitic lime is an air lime consisting mainly of calcium magnesium oxide and/or calcium magnesium hydroxide without any hydraulic or pozzolanic addition.

4.3 Forms of air lime

4.3.1 Quicklime (Q)

Quicklime is an air lime mainly in the oxide form which reacts exothermically on contact with water. Quicklime is available in a range of sizes from lump to powder.

4.3.2 Hydrated lime (S, S PL or S ML)

Hydrated lime is an air lime mainly in the hydroxide form produced by the controlled slaking of quicklime. Hydrated lime is available as:

— powder (S);

— putty (S PL); or

— slurry or milk of lime (S ML).

Dolomitic lime is also produced as semi-hydrated dolomitic lime (S1), mainly consisting of calcium hydroxide and magnesium oxide.

4.4 Calcium lime

4.4.1 Classification of calcium lime

Calcium lime shall be classified according to the notation given in Table 1 and its total (CaO + MgO) content in accordance with Table 2.

Table 1 — Types of calcium lime [a]

Designation	Notation
Calcium lime 90	CL 90
Calcium lime 80	CL 80
Calcium lime 70	CL 70

[a] In addition, calcium lime is classified according to the form of the product, quicklime (Q), hydrated lime (S), lime putty (S PL) or milk of lime (S ML).

Conformity with this classification is assessed by means of statistical quality control as described in Annex A of this European Standard.

4.4.2 Chemical requirements for calcium lime

The properties of the type of calcium lime shown in Table 2 determined in accordance with EN 459-2 shall conform to the requirements in that table. All types of calcium lime listed in Table 2 may contain additives in small quantities to improve the manufacture or properties of calcium lime. When the total content exceeds 0,1 %, the actual types and amounts shall be declared.

Table 2 — Chemical requirements of calcium lime given as characteristic values

Type of calcium lime	Values given as mass fraction in percent				
	CaO + MgO	MgO[a]	CO_2[b]	SO_3	Available lime[c]
CL 90	≥ 90	≤ 5	≤ 4	≤ 2	≥ 80
CL 80	≥ 80	≤ 5	≤ 7	≤ 2	≥ 65
CL 70	≥ 70	≤ 5	≤ 12	≤ 2	≥ 55

The values for CaO + MgO, MgO, CO_2 and SO_3 are applicable to all forms of calcium lime. For quicklime these values correspond to the finished product; for all other forms of lime (hydrated lime, lime putty and milk of lime) the values are based on the product after subtraction of its free water and bound water content.

The values for available lime (calcium oxide for quicklime, calcium hydroxide for hydrated lime) refer to the product when tested in accordance with EN 459–2.

[a] MgO content up to 7 % is permitted if the soundness test in accordance with EN 459–2 is passed.

[b] A higher content of CO_2 is permitted, if all other chemical requirements in Table 2 are satisfied and the test frequency satisfies the requirements in Table 7.

[c] Higher values of available lime may be requested.

4.4.3 Physical requirements and other physical properties for quicklime

The physical properties of the type of quicklime shown in Table 3 and Table 4 determined in accordance with EN 459-2 shall conform to the requirements in those tables.

Table 3 — Physical requirements of quicklime

Type of quicklime	**Soundness after slaking in accordance with** EN 459–2:2010, 6.4.4[a]
CL 90	Pass
CL 80	
CL 70	
[a] Slaking according to the instructions of the lime producer.	

Table 4 — Reactivity (R) of quicklime given as characteristic values

Type of quicklime	**Reactivity** (time in min), **in accordance with** EN 459–2:2010**, 6.6**				
	R5	R 4	R3	R2	R_{sv}
CL 90	$t_{60} < 10$	$t_{60} < 25$	—	—	other specified value or no requirement
CL 80	$t_{60} < 10$	$t_{60} < 25$	$t_{50} < 25$	—	
CL 70	—	—	—	$t_{40} < 25$	

The particle size distribution of all types of quicklime shown in Table 1 shall conform to the requirements in Table 5 and shall be determined in accordance with EN 459-2.

Table 5 — Particle size distribution (P) of quicklime given as characteristic values

Sieve size	**Particle size distribution[a] (mass fraction passing the sieve in percent), in accordance with** EN 459–2:2010, Clause 6				
	P4	P3	P2	P1	P_{sv}
10 mm	100	—	—	—	other specified value or no requirement
5 mm	≥ 95	100	100	—	
2 mm	—	≥ 95	≥ 95	100	
0,2 mm	—	—	≥ 70	≥ 95	
0,09 mm	—	≥ 30	≥ 50	≥ 85	
[a] Particle size ≥ 2 mm shall be determined by dry sieving in accordance with EN 459–2:2010, 6.1 and particle size < 2 mm by air-jet sieving in accordance with EN 459–2:2010, 6.2.					

4.4.4 Physical requirements and other physical properties for hydrated lime and lime putty

The physical properties of hydrated lime and lime putty of the type shown in Table 6 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 6 — Physical requirements of hydrated calcium lime and lime putty[a], given as characteristic values

Type of hydrated calcium lime	Particle size[b]		Free water content[c]	Soundness[d, e]			Mortar tests[b, f]	
				For hydrated limes		Lime putty	Penetration	Air content
	% residue by mass			Reference method	Alternative method			
	0,09 mm[g]	0,2 mm	%	mm	mm		mm	%
CL 90	≤ 7	≤ 2	≤ 2	≤ 2	≤ 20	Pass	> 10 and < 50	≤ 12
CL 80								
CL 70								

[a] Particle size and free water content apply to hydrated calcium lime for all applications. Soundness, penetration and air content apply only to hydrated calcium lime for masonry mortar, plastering and rendering.

[b] Not for lime putty.

[c] Not for lime putty. The free water content of lime putty is normally between 45 % and 70 %.

[d] Tested in accordance with EN 459–2:2010, 6.4.

[e] Hydrated calcium lime which includes particles larger than 0,2 mm shall satisfy the requirements of the soundness test for hydrated calcium limes with grains larger than 0,2 mm in EN 459–2.

[f] Tested in accordance with the test on standard mortar in EN 459–2.

[g] A residue on 0,09 mm sieve up to 15 % is permitted as long as the soundness test given in EN 459–2:2010, 6.4.2 is passed.

4.4.5 Additional properties

Other properties may be subject either to requirements in application standards dealing with the use of calcium lime or to requests from the user. These properties are given in informative Annex B.

4.4.6 Durability requirements

The choice of calcium lime, particularly as regards types for different applications and exposure conditions shall follow the appropriate European or national application standards and/or regulations valid in the place of use.

4.4.7 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 website on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

4.4.8 Assessment and verification of constancy of performance of calcium lime

4.4.8.1 General requirements

Conformity of calcium lime to this European Standard shall be continuously evaluated on the basis of testing of spot samples. The properties to be tested for the autocontrol testing by the manufacturer, test methods and the minimum testing frequencies for each type of calcium lime detailed in Table 1 are specified in Table 7.

The declaration of performance by the manufacturer, shall be based on the assessment and verification of constancy of performance of building lime with this European Standard according to the scheme specified in EN 459-3.

Requirements for the declaration of performance which the manufacturer should make available under the CE marking procedure are established in Annex ZA.

4.4.8.2 Conformity requirements

Sampling shall take place at the point of release of the building lime.

Conformity of calcium lime with the requirements concerning chemical and physical properties in this European Standard is assumed if the requirements in Tables 2 to 6 inclusive are met. The requirements in these tables shall be taken as absolute values.

The evaluation procedure depends on the frequency of testing during the control period of 12 months. If the number of samples is at least one per week, the evaluation may be statistical (characteristic values) (see Annex A).

Statistical evaluation is normally carried out by attributes (see Table 7 and A.1.3). If the data are normally distributed, the evaluation may be made by variables (see Table 7 and A.1.2).

NOTE This standard does not deal with acceptance inspection at delivery.

Table 7 — Properties, test methods and minimum testing frequencies [a] for the autocontrol testing by the manufacturer

Property	Form of calcium lime[b]	Test method to be used[c]	Minimum frequency of testing by manufacturer			
			Autocontrol testing			
			Regular[d] (see 4.4.8.2)	Product type determination[l]	Inspection by variables[h]	Inspection by attributes[j]
1	2	3	4	5	6	7
Particle size	Quicklime	EN 459–2	1/week	2/week	X	
	Hydrated lime[m]		1/day	2/day	X	
Soundness	Quicklime[e] Hydrated lime		1/day[g]	2/day		X
	Lime putty		1/week	2/week		X
Penetration/ Water demand	Hydrated lime		2/year	1/month		X
Air content	Hydrated lime[k]		2/year	1/month		X
CaO + MgO, MgO[f]	Quicklime Hydrated lime Lime putty		1/week	2/week		X

Property	Form of calcium lime[b]	Test method to be used[c]	Minimum frequency of testing by manufacturer			
			Autocontrol testing			
			Regular[d] (see 4.4.8.2)	Product type determination[l]	Inspection by variables[h]	Inspection by attributes[j]
1	2	3	4	5	6	7
CO_2[f, n]	Quicklime Hydrated lime Lime putty		1/week	2/week		X
SO_3	Quicklime Hydrated lime Lime putty		1/month	2/month		X
Available lime[f, o]	Quicklime Hydrated lime Lime putty		1/week	2/week		X
Free water	Hydrated lime Lime putty		1/month	2/month		X
Reactivity	Quicklime		1/week	2/week		X

a The methods used to take and prepare samples shall be in accordance with EN 459–2. Tests may be carried out at any time between production and dispatch. The producer shall ensure that the requirements are met at the time of dispatch.

b See 4.3 and Table 1.

c Any other methods may be used provided they are calibrated, either against the reference methods or against internationally accepted reference materials, in order to demonstrate their equivalence.

d The control period for conformity evaluation is 12 months.

e After slaking (see Table 3, Footnote [a]).

f If the test frequency of CaO + MgO and CO_2 is higher than the required frequency (e.g. CaO + MgO > 1/week and CO_2 > 1/week) then the test frequency of available lime may be reduced to twice per year.

If the test frequency of available lime and CO_2 is higher than the required frequency (e.g. available lime > 1/week and CO_2 > 1/week) then the test frequency of CaO + MgO may be reduced to twice per year.

g For hydrated lime: If 30 consecutive test results are less than 10 % of the required value then the test frequency may be reduced to once per month. If any single result is higher than 10 % of the required value then return to daily testing.

For quicklime: If 30 consecutive test results meet the requirement, then the test frequency may be reduced to once per month. If any single result fails the requirement, then return to daily testing.

h If the data are not normally distributed the evaluation shall be made by attributes.

j If the number of samples taken during the control period is at least one per week the evaluation may be made by variables.

k For lime without additives this test is required only for product type determination.

l See EN 459–3:2015, 4.4.

m See Table 6, Footnote [g].

n See Table 2, Footnote [b].

o See Table 2, Footnote [c].

4.4.9 Standard designation of calcium lime

Calcium lime shall be identified by its notation specified in Table 1, by the form of the product given in 4.3 and for quicklime by the physical requirements given in 4.4.3 (see examples below).

EXAMPLE 1 Calcium lime 90 in the form of quicklime, reactivity R5 and particle size distribution P1, is identified by:

EN 459–1 CL 90-Q (R5, P1)

EXAMPLE 2 Calcium lime 80 in the form of quicklime, reactivity R_{SV} (other specified value or no requirement) and particle size distribution P4, is identified by:

EN 459–1 CL 80-Q (R_{SV}, P4)

EXAMPLE 3 Calcium lime 80 in the form of hydrated lime is identified by:

EN 459–1 CL 80-S

EXAMPLE 4 Calcium lime 90 in the form of lime putty is identified by:

EN 459–1 CL 90-S PL

EXAMPLE 5 Calcium lime 90 in the form of milk of lime is identified by:

EN 459–1 CL 90-S ML

4.5 Dolomitic lime

4.5.1 Classification of dolomitic lime

Dolomitic lime shall be classified according to the notation given in Table 8 and its total (CaO + MgO) content in accordance with Table 9.

Table 8 — Types of dolomitic lime [a]

Designation	Notation
Dolomitic lime 90–30	DL 90–30
Dolomitic lime 90–5	DL 90–5
Dolomitic lime 85–30	DL 85–30
Dolomitic lime 80–5	DL 80–5

[a] In addition, dolomitic lime is classified according to the form of the product, quicklime (Q) or hydrated lime (S). Semi hydrated dolomitic lime is classified as (S1).

Conformity with this classification is assessed by means of statistical quality control as described in Annex A of this European Standard.

4.5.2 Chemical requirements for dolomitic lime

The properties of the type of dolomitic lime shown in Table 9 determined in accordance with EN 459-2 shall conform to the requirements in that table. All types of dolomitic lime listed in Table 9 may contain additives in small quantities to improve the manufacture or properties of dolomitic lime. When the total content exceeds 0,1 %, the actual types and amounts shall be declared.

Table 9 — Chemical requirements of dolomitic lime given as characteristic values

Type of dolomitic lime	Values given as mass fraction in percent			
	CaO + MgO	MgO	CO_2	SO_3
DL 90–30	≥ 90	≥ 30	≤ 6	≤ 2
DL 90–5	≥ 90	> 5	≤ 6	≤ 2
DL 85–30	≥ 85	≥ 30	≤ 9	≤ 2
DL 80–5	≥ 80	> 5	≤ 9	≤ 2
NOTE The values are applicable to all kinds of dolomitic lime. For dolomitic quicklime these values correspond to the finished product; for hydrated dolomitic lime the values are based on the product after subtraction of its free water and bound water content.				

4.5.3 Physical requirements and other physical properties for dolomitic quicklime

The physical properties of dolomitic quicklime of the type shown in Tables 10 and 11 determined in accordance with EN 459-2 shall conform to the requirements in those Tables.

Table 10 — Physical requirements of dolomitic quicklime

Type of dolomitic quicklime	Soundness after slaking in accordance with EN 459–2:2010, 6.4.4[a]
DL 90–30	Pass
DL 90–5	
DL 85–30	
DL 80–5	
[a] Slaking according to the instructions of the lime producer.	

Table 11 — Reactivity of dolomitic quicklime given as characteristic values

Type of dolomitic quicklime	**Reactivity** (time in minutes), **in accordance with** EN 459–2:2010, 6.6			
	R5	R2	R1	R_{sv}
DL 90–30	—	t_{40} < 25	—	other specified value or no requirement
DL 90–5	t_{60} < 10	t_{40} < 25	—	
DL 85–30	—	t_{40} < 25	—	
DL 80–5	—	—	t_{35} < 25	

The particle size distribution of all types of dolomitic quicklime shown in Table 8 shall conform to the requirements in Table 12 and shall be determined in accordance with EN 459-2.

Table 12 — Particle size distribution of dolomitic quicklime given as characteristic values

Sieves	Particle size distribution[a] (mass fraction passing the sieve in percent), in accordance with EN 459–2:2010, Clause 6				
	P4	P3	P2	P1	P_{sv}
10 mm	100	—	—	—	other specified value or no requirement
5 mm	≥ 95	100	100	—	
2 mm	—	≥ 95	≥ 95	100	
0,2 mm	—	—	≥ 70	≥ 95	
0,09 mm	—	≥ 30	≥ 50	≥ 85	

[a] Particle size ≥ 2 mm shall be determined by dry sieving in accordance with EN 459–2:2010, 6.1 and particle size < 2 mm by air-jet sieving in accordance with EN 459–2:2010, 6.2.

4.5.4 Physical requirements and other physical properties for dolomitic hydrated lime

The physical properties of dolomitic hydrated lime of the type shown in Table 13 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 13 — Physical requirements of dolomitic hydrated lime [a] given as characteristic values

Type of dolomitic hydrated lime	Particle size		Free water content	Soundness[b, c]	Mortar tests[d]	
	% residue by mass				Penetration	Air content
	0,09 mm	0,2 mm	%		mm	%
DL 90–30	≤ 7	≤ 2	≤ 2	Pass	> 10 and < 50	≤ 12
DL 90–5						
DL 85–30						
DL 80–5						

[a] Particle size and free water content apply to dolomitic hydrated lime for all applications. Soundness, penetration and air content apply only to dolomitic hydrated lime for masonry mortar, plastering and rendering.

[b] See EN 459–2:2010, 6.4.4.

[c] Dolomitic hydrated lime which includes particles larger than 0,2 mm shall satisfy the requirements of the soundness test for dolomitic hydrated limes with grains larger than 0,2 mm in EN 459–2.

[d] Tested in accordance with the test on standard mortar in EN 459–2.

4.5.5 Additional properties

Other properties may be subject either to requirements in application standards dealing with the use of dolomitic lime or to requests from the users. These properties are given in informative Annex B.

4.5.6 Durability requirements

The choice of dolomitic lime particularly as regards type for different applications and exposure conditions shall follow the appropriate European or national application standards and/or regulations valid in the place of use.

4.5.7 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 website on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

4.5.8 Assessment and verification of constancy of performance of dolomitic lime

4.5.8.1 General requirements

Conformity of dolomitic lime with this European Standard shall be continuously evaluated on the basis of testing of spot samples. The properties to be tested for the autocontrol testing by the manufacturer, test methods and the minimum testing frequencies for each type of dolomitic lime detailed in Table 8 are specified in Table 14.

The declaration of performance by the manufacturer shall be based on the assessment and verification of constancy of performance of building lime with this European Standard according to the scheme specified in EN 459-3.

Requirements for the declaration of performance which the manufacturer should make available under the CE marking procedure are established in Annex ZA.

4.5.8.2 Conformity requirements

Sampling shall take place at the point of release of the building lime.

Conformity of dolomitic lime with the requirements concerning chemical and physical properties in this European Standard is assumed if the requirements in Tables 9 to 13 inclusive are met. The requirements in these tables shall be taken as absolute values.

The evaluation procedure depends on the frequency of testing during the control period of 12 months. If the number of samples is at least one per week, the evaluation may be statistical (characteristic values) (see Annex A).

Statistical evaluation is normally carried out by attributes (see Table 14 and A.1.3). If the data are normally distributed, the evaluation may be made by variables (see Table 14 and A.1.2).

NOTE This standard does not deal with acceptance inspection at delivery.

Table 14 — Properties, test methods and minimum testing frequencies [a] for the autocontrol testing by the manufacturer

Property	Form of dolomitic lime[b]	Test method to be used[c]	Minimum frequency of testing by manufacturer			
			Autocontrol testing			
			Regular[d] (see 4.5.8.2)	Product type determination[l]	Inspection by variables[h]	Inspection by attributes[j]
1	2	3	4	5	6	7
Particle size	Quicklime and	EN 459–2	1/week	2/week		X
	Hydrated lime		1/day	2/day		X
Soundness	Quicklime[e] Hydrated lime		1/day[g]	2/day		X
Penetration/ Water demand	Hydrated lime		2/year	1/month		X
Air content	Hydrated lime[k]		2/year	1/month		X
CaO + MgO, MgO	Quicklime Hydrated lime		1/week	2/week		X
CO_2	Quicklime Hydrated lime		1/week	2/week		X
SO_3	Quicklime Hydrated lime		1/month	2/month		X
Free water	Hydrated lime		1/month	2/month		X
Reactivity	Quicklime		1/week	2/week		X

a The methods used to take and prepare samples shall be in accordance with EN 459–2. Tests may be carried out at any time between production and dispatch. The producer shall ensure that the requirements are met at the time of dispatch.

b See 4.3 and Table 8.

c Any other methods may be used provided they are calibrated, either against the reference methods or against internationally accepted reference materials, in order to demonstrate their equivalence.

d The control period for conformity evaluation is 12 months.

e After slaking (see Table 10, Footnote [a]).

g For hydrated lime: If 30 consecutive test results are less than 10 % of the required value then the test frequency may be reduced to once per month. If any single result is higher than 10 % of the required value, then return to daily testing.

For quicklime: If 30 consecutive test results meet the requirement, then the test frequency may be reduced to once per month. If any single result fails the requirement, then return to daily testing.

h If the data are not normally distributed the evaluation shall be made by attributes.

j If the number of samples taken during the control period is at least one per week the evaluation may be made by variables.

k For lime without additives this test is required only for product type determination.

l See EN 459–3:2015, 4.4.

4.5.9 Standard designation of dolomitic lime

Dolomitic lime shall be identified by its type and notation specified in Table 8, by the form of the product given in 4.3 and for quicklime by the physical requirements given in 4.5.3 (see examples below).

EXAMPLE 1 NOTE Dolomitic lime 90–30 in the form of quicklime, reactivity R2 and particle size distribution P2, is identified by:

EN 459–1 DL 90–30-Q (R2, P2)

EXAMPLE 2 Dolomitic lime 85–30 in the form of quicklime, reactivity R_{SV} (other specified value or no requirement) and particle size distribution P4, is identified by:

EN 459–1 DL 85–30-Q (R_{SV}, P4)

EXAMPLE 3 Dolomitic lime 85–30 in the form of hydrated lime is identified by:

EN 459–1 DL 85–30-S

EXAMPLE 4 Dolomitic lime 85–30 in the form of semi hydrated lime is identified by:

EN 459–1 DL 85–30-S1

5 Lime with hydraulic properties

5.1 General

Lime with hydraulic properties (see 3.4), when appropriately batched and mixed with aggregate and water, produces mortar or concrete which retains its workability for a sufficient time and after predetermined periods achieves a specified strength and also long-term volume stability.

Lime with hydraulic properties has an initial set, is classified according to its mechanical compressive strength and has a defined range of available lime content.

Lime with hydraulic properties has the property of setting and hardening when mixed with water and by reaction with carbon dioxide from the air (carbonation).

5.2 Sub-families of lime with hydraulic properties

5.2.1 Natural hydraulic lime (NHL)

Natural hydraulic lime is a lime with hydraulic properties produced by burning of more or less argillaceous or siliceous limestones (including chalk) with reduction to powder by slaking with or without grinding. It has the property of setting and hardening when mixed with water and by reaction with carbon dioxide from the air (carbonation).

The hydraulic properties exclusively result from the special chemical composition of the natural raw material. Grinding agents up to 0,1 % are allowed. Natural hydraulic lime does not contain any other additions.

5.2.2 Formulated lime (FL)

Formulated lime is a lime with hydraulic properties mainly consisting of air lime (CL) and/or natural hydraulic lime (NHL) with added hydraulic and/or pozzolanic material. It has the property of setting and hardening when mixed with water and by reaction with carbon dioxide from the air (carbonation).

5.2.3 Hydraulic lime (HL)

Hydraulic lime is a binder consisting of lime and other materials such as cement, blast furnace slag, fly ash, limestone filler and other suitable materials. It has the property of setting and hardening under water. Atmospheric carbon dioxide contributes to the hardening process.

5.3 Natural hydraulic lime

5.3.1 Classification of natural hydraulic lime

Natural hydraulic lime shall be classified according to the notation given in Table 15 and its compressive strength in accordance with Table 17.

Table 15 — Types of natural hydraulic limes

Designation	Notation
Natural hydraulic lime 2	NHL 2
Natural hydraulic lime 3,5	NHL 3,5
Natural hydraulic lime 5	NHL 5

Conformity with this classification is assessed by means of statistical quality control as described in Annex A of this European Standard.

5.3.2 Chemical requirements for natural hydraulic lime

The chemical properties of natural hydraulic lime of the type shown in Table 16 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 16 — Chemical requirements of natural hydraulic lime given as characteristic values

Type of natural hydraulic lime	SO_3	Available lime as $Ca(OH)_2$ in accordance with EN 459–2:2010, 5.8
	Values in mass fraction in percent	
NHL 2	≤ 2	≥ 35
NHL 3,5	≤ 2	≥ 25
NHL 5	≤ 2	≥ 15
NOTE The values for SO_3 are based on the product after subtraction of its free water and bound water content.		

5.3.3 Physical requirements and other physical properties for natural hydraulic lime

5.3.3.1 Standard strength requirements for natural hydraulic lime

The standard strengths of the types of natural hydraulic lime are the compressive strengths determined in accordance with EN 459-2 and shall conform to the requirements in Table 17.

Table 17 — Compressive strength of natural hydraulic lime given as characteristic values

Type of natural hydraulic lime	Compressive strength MPa	
	7 d	28 d
NHL 2	—	≥ 2 to ≤ 7
NHL 3,5	—	≥ 3,5 to ≤ 10
NHL 5	≥ 2	≥ 5 to ≤ 15

5.3.3.2 Other physical properties of natural hydraulic lime

The physical properties of natural hydraulic lime of the type shown in Table 18 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 18 — Physical requirements of natural hydraulic lime [a] given as characteristic values

Type of natural hydraulic lime	Particle size		Free water content	Soundness[b]		Mortar tests[c]		Setting times	
	% residue by mass			Reference method	Alternative method	Penetration	Air content	initial	final
	0,09 mm	0,2 mm	%	mm	mm	mm	%	h	
NHL 2	≤ 15	≤ 2	≤ 2	≤ 2	≤ 20	> 10 and < 50	≤ 5	> 1	≤ 40
NHL 3,5									≤ 30
NHL 5									≤ 15

a Particle size and free water content apply to natural hydraulic lime for all applications. Soundness, penetration, air content and setting time apply only to natural hydraulic lime for masonry mortar, plastering and rendering.

b Tested in accordance with EN 459–2:2010, 6.4.

c Tested in accordance with the test on standard mortar in EN 459–2.

5.3.4 Additional properties

Other properties may be subject either to requirements in application standards dealing with the use of natural hydraulic lime or to requests from the user. These properties are given in informative Annex B.

5.3.5 Durability requirements

The choice of natural hydraulic lime, particularly as regards types for different applications and exposure conditions shall follow the appropriate European or national application standards and/or regulations valid in the place of use.

5.4 Formulated lime

5.4.1 Classification of formulated lime

Formulated lime shall be classified according to the notation given in Table 19, its available lime content in accordance with Table 20, and its compressive strength in accordance with Table 21.

Table 19 — Types of formulated lime

Designation	Notation
Formulated lime A 2	FL A 2
Formulated lime A 3,5	FL A 3,5
Formulated lime A 5	FL A 5
Formulated lime B 2	FL B 2
Formulated lime B 3,5	FL B 3,5
Formulated lime B 5	FL B 5
Formulated lime C 2	FL C 2
Formulated lime C 3,5	FL C 3,5
Formulated lime C 5	FL C 5

Conformity with this classification is assessed by means of statistical quality control as described in Annex A of this European Standard.

5.4.2 Composition of formulated lime

5.4.2.1 General

The composition of the formulated lime shall be declared by the producer in accordance with Annex D.

5.4.2.2 Constituents for formulated lime

5.4.2.2.1 General

The presence of clinker and/or cement in formulated lime shall be declared by the producer (see examples in Annex D).

5.4.2.2.2 Main constituents of formulated lime

The main constituents to be used in formulated lime shall be those identified in Annex D.

5.4.2.2.3 Minor additional constituents of formulated lime and additives

The minor additional constituents and additives to be used in formulated lime shall be those identified in Annex D.

5.4.3 Chemical requirements for formulated lime

The chemical properties of formulated lime of the type shown in Table 20 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 20 — Chemical requirements of formulated lime given as characteristic values

Type of formulated lime	SO_3	Available lime as $Ca(OH)_2$ in accordance with EN 459–2:2010, 5.8
	Values in mass fraction in percent	
FL A	≤ 2	≥ 40 to < 80
FL B	≤ 2	≥ 25 to < 50
FL C	≤ 2	≥ 15 to < 40
NOTE The values for SO_3 are based on the product after subtraction of its free water and bound water content.		

5.4.4 Physical requirements and other physical properties for formulated lime

5.4.4.1 Standard strength requirements for formulated lime

The standard strengths of the types of formulated lime are the compressive strengths determined in accordance with EN 459-2 and shall conform to the requirements in Table 21.

Table 21 — Compressive strength of formulated lime given as characteristic values

Type of formulated lime	Compressive strength MPa	
	7 d	28 d
All types of FL 2	—	≥ 2 to ≤ 7
All types of FL 3,5	—	≥ 3,5 to ≤ 10
All types of FL 5	≥ 2	≥ 5 to ≤ 15

5.4.4.2 Other physical properties of formulated lime

The physical properties of formulated lime of the type shown in Table 22 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 22 — Physical requirements of formulated lime [a] given as characteristic values

Type of formulated lime	Particle size		Free water content	Soundness[b]		Mortar tests[c]		Setting times	
	% residue by mass			Reference method	Alternative method	Penetration	Air content	initial	final
	0,09 mm	0,2 mm	%	mm	mm	mm	%	h	
FL 2	≤ 15	≤ 5	≤ 2	≤ 2	≤ 20	> 10 and < 50	≤ 25	> 1	≤ 40
FL 3,5									≤ 30
FL 5									≤ 15

a Particle size and free water content apply to formulated lime for all applications. Soundness, penetration, air content and setting time apply only to formulated lime for masonry mortar, plastering and rendering.

b Tested in accordance with EN 459–2:2010, 6.4.

c Tested in accordance with the test on standard mortar in EN 459–2.

5.4.5 Additional properties

Other properties may be subject either to requirements in application standards dealing with the use of formulated lime or to requests from the user. These properties are given in informative Annex B.

5.4.6 Durability requirements

The choice of formulated lime, particularly as regards type and strength class for different applications and exposure classes shall follow the appropriate European or national standards and/or regulations for mortar and other construction products valid in the place of use.

5.5 Hydraulic lime

5.5.1 Classification of hydraulic lime

Hydraulic lime shall be classified according to the notation given in Table 23 and its compressive strength in accordance with Table 25.

Table 23 — Types of hydraulic lime

Designation	Notation
Hydraulic lime 2	HL 2
Hydraulic lime 3,5	HL 3,5
Hydraulic lime 5	HL 5

Conformity with this classification is assessed by means of statistical quality control as described in Annex A of this European Standard.

5.5.2 Chemical requirements for hydraulic lime

The chemical properties of hydraulic lime of the type shown in Table 24 determined in accordance with EN 459-2 shall conform to the requirements in that table. All types of hydraulic lime listed in Table 24 may

contain additives in small quantities to improve the manufacture or properties of hydraulic lime. When the total content exceeds 0,1 %, the actual types and amounts shall be declared.

Table 24 — Chemical requirements of hydraulic lime given as characteristic values

Type of hydraulic lime	**SO_3**	**Available lime as $Ca(OH)_2$ in accordance with** EN 459–2:2010**,** 5.8
	Values in mass fraction in percent	
HL 2	≤ 3[a]	≥ 10
HL 3,5	≤ 3[a]	≥ 8
HL 5	≤ 3[a]	≥ 4
NOTE The values for SO_3 are based on the product after subtraction of its free water and bound water content.		
[a] SO_3 content of more than 3 % and up to 7 % is permissible, if soundness is demonstrated at 28 days of water curing using the test given in EN 459–2:2010, 6.4.2.3.		

5.5.3 Physical requirements and other physical properties for hydraulic lime

5.5.3.1 Standard strength requirements for hydraulic lime

The standard strengths of the types of hydraulic lime are the compressive strengths determined in accordance with EN 459-2 and shall conform to the requirements in Table 25.

Table 25 — Compressive strength of hydraulic lime given as characteristic values

Type of hydraulic lime	**Compressive strength** MPa	
	7 d	28 d
HL 2	—	≥ 2 to ≤ 7
HL 3,5	—	≥ 3,5 to ≤ 10
HL 5	≥ 2	≥ 5 to ≤ 15 [a]
[a] HL 5 with a bulk density less than 0,90 kg/dm^3 is permitted to have a strength up to 20 MPa.		

5.5.3.2 Other physical properties of hydraulic lime

The physical properties of hydraulic lime of the type shown in Table 26 determined in accordance with EN 459-2 shall conform to the requirements in that table.

Table 26 — Physical requirements of hydraulic lime [a] given as characteristic values

Type of hydraulic lime	Particle size		Free water content	Soundness[b]		Mortar tests[c]		Setting times	
	% residue by mass			Reference method	Alternative method	Penetration	Air content	initial	final
	0,09 mm	0,2 mm	%	mm	mm	mm	%	h	
HL 2	≤ 15	≤ 5	≤ 2	≤ 2	≤ 20	> 10 and < 50	≤ 25	> 1	≤ 15
HL 3,5									
HL 5									

[a] Particle size and free water content apply to hydraulic lime for all applications. Soundness, penetration, air content and setting time apply only to hydraulic lime for masonry mortar, plastering and rendering.

[b] Tested in accordance with EN 459–2:2010, 6.4.

[c] Tested in accordance with the test on standard mortar in EN 459–2.

5.5.4 Additional properties

Other properties may be subject either to requirements in application standards dealing with the use of hydraulic lime or to requests from the users. These properties are given in informative Annex B.

5.5.5 Durability requirements

The choice of hydraulic lime, particularly as regards types for different applications and exposure conditions shall follow the appropriate European or national application standards and/or regulations valid in the place of use.

5.5.6 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 website on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

5.6 Assessment and verification of constancy of performance of natural hydraulic lime, formulated lime and hydraulic lime

5.6.1 General requirements

Conformity of lime with hydraulic properties to this European Standard shall be continuously evaluated on the basis of testing of spot samples. The properties to be tested for the autocontrol testing by the manufacturer, test methods and the minimum testing frequencies for each type and classification of lime with hydraulic properties as detailed in Tables 15, 19 and 23, are specified in Table 27.

The declaration of performance by the manufacturer shall be based on the assessment and verification of constancy of performance of lime with hydraulic properties with this European Standard according to the scheme specified in EN 459-3.

Requirements for the declaration of performance which the manufacturer should make available under the CE marking procedure are established in Annex ZA.

5.6.2 Conformity requirements

Sampling shall take place at the point of release of the building lime.

Conformity of lime with hydraulic properties to the requirements concerning strength, physical and chemical properties in this European Standard is assumed if the requirements in Tables 16, 17 and 18, Tables 20, 21 and 22 and Tables 24, 25 and 26 are met. The requirements in these tables shall be taken as absolute values.

The evaluation procedure depends on the frequency of testing during the control period of 12 months. If the number of samples is at least one per week, the evaluation may be statistical (characteristic values) (see Annex A).

Statistical evaluation is normally carried out by attributes (see Table 27 and A.1.3). If the data are normally distributed, the evaluation may be made by variables (see Table 27 and A.1.2).

NOTE This standard does not deal with acceptance inspection at delivery.

Table 27 — Properties, test methods and minimum testing frequencies [a] for the autocontrol testing by the manufacturer

Property	Type of lime with hydraulic properties[b]	Test method to be used[c]	Minimum frequency of testing by manufacturer			
			Autocontrol testing			
			Regular[d] (see 5.6.2)	Product type determination j	Inspection by variables[e]	Inspection by attributes[f]
1	2	3	4	5	6	7
7 day strength	NHL 5, FL 5 and HL 5	EN 459–2	2/month	2/week		X
28 day strength	all NHL, FL and HL		2/month	2/week	X	
Particle size	all NHL, FL and HL		1/day	2/day	X	
Soundness	NHL 2, NHL 3,5; FL 2, FL 3,5; HL 2, HL 3,5		1/day[g]	2/day		X
	NHL 5, FL 5 and HL 5		1/week	2/week		X
Setting time	all NHL, FL and HL		1/month	2/month		X
Penetration/ Water demand	all NHL, FL and HL		1/month	2/month		X
Air content	all NHL[h], FL[i] and HL		1/week	2/week		X[i]
SO_3	all NHL, FL and HL		1/month	2/month		X
Available lime	all NHL, FL and HL		1/month	2/month		X
Free water	all NHL, FL and HL		1/month	2/month		X

[a] The methods used to take and prepare samples shall be in accordance with EN 459–2. Tests may be carried out at any time between production and dispatch. The producer shall ensure that the requirements are met at the time of dispatch.

[b] See 5.3.1 and Table 15, 5.4.1 and Table 19, 5.5.1 and Table 23.

[c] Any other methods may be used provided they are calibrated, either against the reference methods or against internationally accepted reference materials, in order to demonstrate their equivalence.

[d] The control period for conformity evaluation is 12 months.

[e] If the data are not normally distributed the evaluation shall be made by attributes.

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

[g] If 30 consecutive test results show less than 10 % of the required value, the test frequency may be reduced to once every two weeks. If one single test result is > 10 % of the required value, then return to daily testing.

[h] For NHL this test is required only for product type determination.

[i] For lime which does not contain air entraining additive, it is permitted to stop the tests once 12 consecutive results not exceeding 5 % are obtained.

[j] See EN 459–3:2015, 4.4.

5.7 Standard designation of lime with hydraulic properties

5.7.1 Standard designation of natural hydraulic lime

Natural hydraulic lime is designated as NHL and is classified in accordance with its compressive strength class (2; 3,5 and 5) given in Table 17 (see example below).

EXAMPLE Natural hydraulic lime 3,5 is identified by:

EN 459–1 NHL 3,5

5.7.2 Standard designation of formulated lime

Formulated lime is designated as FL. It is classified in accordance with its available lime content (A, B, C) given in Table 20, the strength class (2; 3,5 and 5) given in Table 21 and the composition in accordance with Annex D.

EXAMPLE EN 459–1 FL B 5
contains cement
CL55, K30, L10
iron sulfate: 2 %
water retainer: 0,5 %.

For further examples, see Annex D.

5.7.3 Standard designation of hydraulic lime

Hydraulic lime is designated as HL and is classified in accordance with its compressive strength class (2; 3,5 and 5) given in Table 25 (see example below).

EXAMPLE Hydraulic lime 5 is identified by:
EN 459–1 HL 5

Annex A
(normative)

Statistical evaluation methods for strength, physical and chemical properties

A.1 Statistical conformity criteria

A.1.1 General

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

— the specified characteristic value for strength, physical and chemical properties, as given in 4.4.2 to 4.4.4, 4.5.2 to 4.5.4, 5.3.2, 5.3.3, 5.4.2, 5.4.3, 5.4.4, 5.5.2 and 5.5.3 of this standard;

— the percentile P_k on which the specified characteristic value is based, as given in Table A.1;

the allowable probability of acceptance CR, as given in Table A.1.

Table A.1 — Required values P_k and CR

	Strength requirements		**Physical and chemical requirements**
	7 d and 28 d strength (Lower limit)	28 d 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 standard shall be verified either by variables or by attributes, as described in A.1.2 and A.1.3 as specified in Tables 7, 14 and 27.

The control period shall be 12 months.

A.1.2 Inspection by variables

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

Conformity is verified when Formulae (A.1) and (A.2) as relevant, are satisfied:

$$\overline{x} - k_A \, s \geq L \tag{A.1}$$

and

$$\bar{x} + k_A \; s \leq U \tag{A.2}$$

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 Tables 2, 4 to 6, 9, 11 to 13, 16 to 18, 20 to 22 and 24 to 26 referred to in Clauses 4 and 5;

U is the specified upper limit given in Tables 2, 4 to 6, 9, 11 to 13, 16 to 18, 20 to 22 and 24 to 26 referred to in Clauses 4 and 5.

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 A.2.

Table A.2 — Acceptability constant k_A

Number of test results n	k_A[a]	
	for P_k = 5 %	for P_k = 10 %
	(lower strength property)	(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] The value of k_A valid for intermediate values of n may be used.

A.1.3 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 A.1.

Conformity is verified when Formula (A.3) is satisfied:

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

The values 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 A.3.

Table A.3 — Value 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
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.	

A.2 Single result conformity criteria

In addition to the statistical conformity criteria, conformity of test results to the requirements of this standard requires that it shall be verified that each test result remains within the single result limit values specified in Table A.4.

Table A.4 — Limit values for single results

Property	Building lime	Single result limit values
(CaO + MgO) (% by mass)		
	CL 90	85
	DL 90–30, DL 90–5	85
Lower limit	CL 80, DL 80–5	75
	CL 70	65
	DL 85–30	80
(MgO) (% by mass)		
Upper limit	CL 90, CL 80, CL 70	7
	DL 90–30	27
	DL 85–30	27
Lower limit	DL 90–5	5
	DL 80–5	5
(CO_2) (% by mass)		
	CL 90	6
	DL 90–30, DL 90–5	6
Upper limit	CL 80	9
	DL 85–30, DL 80–5	11
	CL 70	14
(SO_3) (% by mass)		
Upper limit	CL 90, CL 80, CL 70, DL 90–30, DL 90–5, DL 85–30, DL 80–5, NHL 2, NHL 3,5, NHL 5, FL A, FL B, FL C	2,5
	HL 2, HL 3,5, HL 5	3,5
Available lime (CaO or $Ca(OH)_2$ % by mass)		
	CL 90	77
Lower limit	CL 80	62
	CL 70	52

Property		Building lime	Single result limit values
Available lime ($Ca(OH)_2$ % by mass)			
		NHL 2	37
		NHL 3,5	22
		NHL 5	12
		FL A	37
Lower limit		FL B	22
		FL C	12
		HL 2	8
		HL 3,5	6
		HL 5	2,5
Free water (% by mass)			
Upper limit		CL 90, CL 80, CL 70, DL 90–30, DL 90–5, DL 85–30, DL 80–5, NHL 2, NHL 3,5, NHL 5, FL 2, FL 3,5, FL 5, HL 2, HL 3,5, HL 5	2,5
7 day strength (MPa)			
Lower limit		NHL 5, FL 5, HL 5	1,5
28 day strength (MPa)			
		NHL 2, FL 2, HL 2	1,5
Lower limit		NHL 3,5, FL 3,5, HL 3,5	2,7
		NHL 5, FL 5, HL 5	4,0
28 day strength (MPa)			
		NHL 2, FL 2, HL 2	10
Upper limit		NHL 3,5, FL 3,5, HL 3,5	14
		NHL 5, FL 5, HL 5	20
Reactivity (time in minutes)			
	R5	CL 90, CL 80, DL 90–5	12
	R4	CL 90, CL 80	30
Upper limit	R3	CL 80	30
	R2	CL 70, DL 90–30, DL 90–5, DL 85–30	30
	R1	DL 80–5	30

Property			Building lime	Single result limit values
Particle size distribution				
Mass passing the sieve (% by mass)				
Lower limit	10 mm	P4	CL, DL	99
	5 mm	P4	CL, DL	94
		P3, P2	CL, DL	99
	2 mm	P3, P2	CL, DL	94
		P1	CL, DL	99
	0,2 mm	P2	CL, DL	65
		P1	CL, DL	94
	0,09 mm	P3	CL, DL	25
		P2	CL, DL	45
		P1	CL, DL	80
Particle size for hydrated lime				
Residue (% by mass)				
Upper limit	0,09 mm		CL[a], DL	9
			NHL, FL, HL	17
	0,2 mm		CL, DL	4
			NHL, FL, HL	7
Air content (% by mass)				
Upper limit			CL 90, CL 80, CL 70, DL 90–30, DL 90–5, DL 85–30, DL 80–5	15
			NHL 2, NHL 3,5, NHL 5	8
			FL 2, FL 3,5, FL 5, HL 2, HL 3,5, HL 5	28
Value of penetration (mm)				
Upper limit			for all types of building lime	55
Lower limit			for all types of building lime	8
Soundness (mm)				
Upper limit			for all types of building lime other than quicklime, lime putty and all types of dolomitic lime:	
			— reference method (EN 459–2:2010, 6.4.2.1);	2
			— alternative method (EN 459–2:2010, 6.4.2.2)	20

Property	Building lime	Single result limit values
Setting time — initial (min) Lower limit	NHL 2, NHL 3,5, NHL 5, FL 2, FL 3,5, FL 5, HL 2, HL 3,5, HL 5	50
— final (h) Upper limit	NHL 2, FL 2	45
	NHL 3,5, FL 3,5	33
	NHL 5, FL 5, HL 2, HL 3,5, HL 5	16
[a] See Footnote [g] in Table 6.		

Annex B
(informative)

Additional properties for building lime

Additional requirements to 4.4.3, 4.4.4, 4.5.3, 4.5.4, 5.3.3, 5.4.4 and 5.5.3 of this European Standard may be subject either to requirements in execution standards dealing with the use of limes or to information required by the users. Examples are:

a) water demand (mortar test);

b) water retention (mortar test);

c) bulk density in kilograms per cubic decimetre:

   1) CL 70/CL 80/CL 90: 0,3 to 0,6 (these values refer to hydrated limes only);

   2) DL 80-5/DL 85-30/DL 90-5/DL 90-30: 0,4 to 0,6 (these values refer to hydrated limes only);

   3) NHL 2: 0,4 to 0,7;

   4) NHL 3,5: 0,45 to 0,75;

   5) NHL 5: 0,5 to 0,8;

   6) FL 2: 0,4 to 0,7;

   7) FL 3,5: 0,4 to 0,8;

   8) FL 5: 0,5 to 0,9;

   9) HL 2: 0,4 to 0,8;

   10) HL 3,5: 0,4 to 0,9;

   11) HL 5: 0,4 to 1,0;

d) yield, in accordance with EN 459-2:2010, 6.7: ≥ 26 dm^3/10 kg (these requirements apply to calcium lime for masonry mortar, plastering and rendering);

e) whiteness (test to be defined between supplier and purchaser);

f) flowability (test to be defined between supplier and purchaser).

If conformity of building lime with these additional requirements is continuously evaluated on the basis of spot samples, the properties to be tested for the autocontrol testing by the manufacturer, test methods and minimum testing frequencies of building limes as specified in Table B.1 shall be taken.

Table B.1 — Properties, test methods and minimum testing frequencies[a] for the autocontrol testing by the manufacturer

Property	Type of building lime[b]	Test method to be used[c]	Minimum frequency of testing by manufacturer			
			Autocontrol testing			
			Regular[d] (see 4.4.7.2, 4.5.7.2 and 5.6.2)	product type determination g	Inspection by variables[e]	Inspection by attributes[f]
1	2	3	4	5	6	7
Bulk density	Hydrated lime	EN 459–2	1/month	2/month		X
	All NHL, FL and HL		1/week	2/week		X
Water retention/Water demand	All NHL, FL and HL		2/year	1/month		X
Yield	quicklime		2/year	1/month		X

a The methods used to take and prepare samples shall be in accordance with EN 459–2. Tests can be carried out at any time between production and dispatch. The producer shall ensure the fulfilment of the requirements at the time of dispatch.

b See Clause 3, 4.2 and 4.3 and Tables 1 and 8 and 5.2 and Tables 15, 19 and 23.

c Where allowed in the relevant part of EN 459–2 other methods may be used provided that they give results which are equivalent to those obtained using the reference methods.

d The control period for conformity evaluation is 12 months.

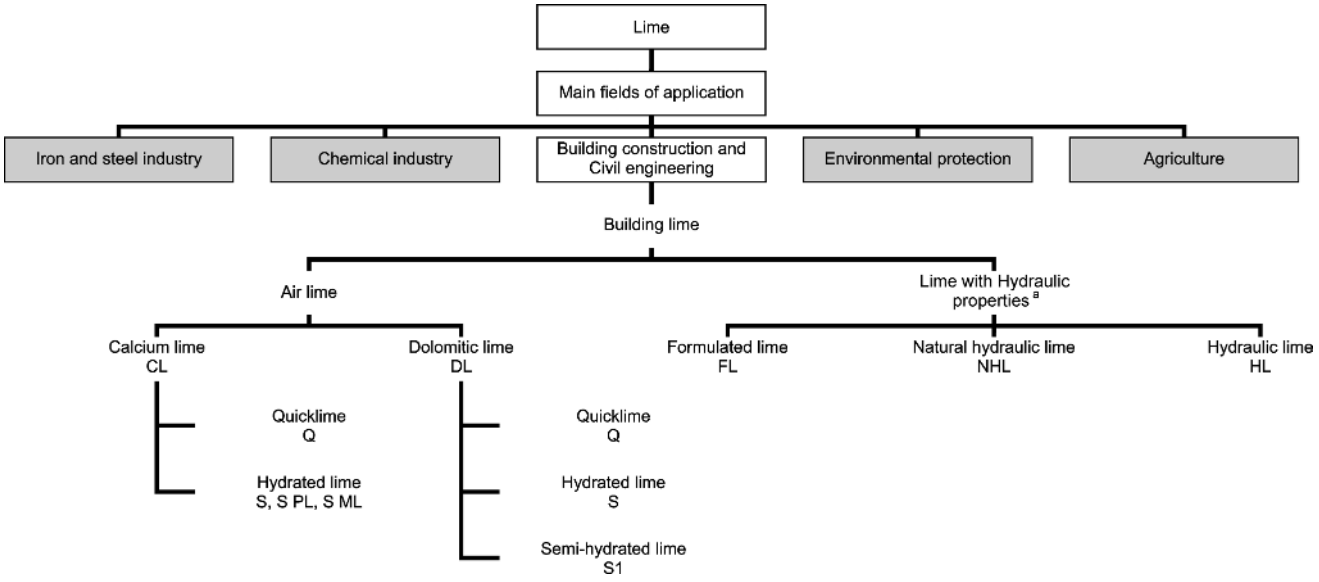
e If the data are not normally distributed the evaluation shall be made by attributes.

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

g See EN 459–3:2015, 4.4.

Annex C
(informative)

Schematic diagram for the types of lime and fields of application



Key

Q Quicklime in dry powder or lump

S Hydrated lime in dry powder

S1 Semi-hydrated lime in dry powder

S PL Lime putty

S ML Milk of lime

a Lime with hydraulic properties are produced in the form of powder Not covered by this standard.

Figure C.1 — Schematic diagram for the types of lime and fields of application

Annex D
(normative)

Declaration of composition for formulated lime

D.1 Main constituents content to be declared by the producer

D.1.1 **Building lime** according to EN 459-1: CL and NHL.

D.1.2 **Cements** according to EN 197-1 (CEM I, CEM II; CEM III) exclusively on the basis of the constituents in D.1.3. Cement contents are identified according to their standard designation for the type of cement.

D.1.3 **Other constituents:**

D.1.3.1 **Portland cement clinker** (see EN 197-1) written (K).

D.1.3.2 **Natural pozzolana** (see EN 197-1) written (P).

D.1.3.3 **Natural calcined pozzolan**a (see EN 197-1) written (Q).

D.1.3.4 **Limestone** (see EN 197-1) written (L, LL).

D.1.3.5 **Granulated blastfurnace slag** (see EN 197-1) written (S).

D.2 Minor constituents

D.2.1 **Individual minor constituents,** shall be permitted, up to 5 % by mass, without declaration by the producer, if total minor constituents exceed 10 %, all minor constituents shall be declared.

D.2.2 **Components** listed in D.1.3.

D.2.3 **Calcium sulfate** (see EN 197-1) written (G), see Table 20 — Chemical requirement for formulated lime.

D.2.4 **Silica fume** (see EN 197-1) written (D).

D.3 Additives

D.3.1 Organic additives shall be declared under the formulated lime name on the CE mark when the content exceeds 0,2 % in mass. The actual amount and types shall be declared.

D.3.2 Mineral additives, such as compounds of iron or tin for treatment of chromium shall be declared if they exceed 1 % by mass.

D.4 Declaration of composition

The constituents of formulated lime are limited to the constituents listed in D.1, D.2 and D.3.

In the declaration of the composition of formulated lime, all constituents above 5 % by mass shall be declared.

Irrespective of the amount, the presence of cement and/or Portland cement clinker in formulated lime shall be declared by the producer by using the statement “contains cement”.

The composition of formulated lime shall be specified for each component within the following absolute deviation.

Amount of the specified component	Absolute deviation
≥ 20 %	± 5,0 %
2,5 % to 20 %	± 2,5 %

For example, for a specified composition of CL 55, K 30, L 10 the effective composition of a formulated lime should be within the following limits:

— CL: 50 % to 60 % by mass;

— K: 25 % to 35 % by mass;

— L: 7,5 % to 12,5 % by mass.

D.5 Standard designation

Designation of a formulated lime is given in accordance with its mechanical strength values 2, 3,5 or 5.

EXAMPLE 1 For a formulated lime with available lime between 25 % and 50 % and with a compressive strength of more than 5 MPa consisting of 55 % of calcium lime (CL 55), 30 % of clinker (K 30), 10 % of limestone filler (L 10), with 2 % of iron sulfate and 0,5 % of water retainer.

The normative designation is:

EN 459–1 FL B 5

Contains cement

CL55, K30, L10

iron sulfate: 2 %

water retainer: 0,5 %.

EXAMPLE 2 For a formulated Lime with available lime between 25 % and 50 % and with a compressive strength of more than 3,5 MPa consisting of 55 % of natural hydraulic lime (NHL 55), 40 % of cement CEM II/B-L and 0,5 % water proof agent.

The normative designation is:

EN 459–1 FL B 3,5

Contains cement

NHL 55, CEM II/B-L 40

water proof agent: 0,5 %.

EXAMPLE 3 For a formulated lime with available lime between 40 % and 80 % and with a compressive strength of more than 2 MPa consisting of 40 % of calcium lime (CL 40), 40 % of natural hydraulic lime (NHL 40), 15 % of limestone filler (L 15) and 0,5 % of water retainer.

The normative designation is:

EN 459–1 FL A 2

CL40, NHL 40, L15

water retainer: 0,5 %.

Annex ZA
(informative)

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

ZA.1 Scope and relevant characteristics

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

If this European standard is cited in 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 Building limes 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 for Building lime and for construction and manufacture of construction products

Product:	22 different building lime products (see Tables 1, 8, 15, 19 and 23)
Intended use:	Preparation of binder for mortar (for masonry, rendering and plastering) and production of other construction products (e.g. calcium silicate bricks, aerated autoclaved concrete, concrete, etc.), and for civil engineering applications (soil treatment, asphalt mixtures, etc.).

Essential Characteristics *[2]*	**Clauses** [a] **in this and other European Standard(s)**	**Regulatory classes** *[4]*	**Notes** *[5]*
Compressive strength	5.3.3.1, Table 17 5.4.4.1, Table 21 5.5.3.1, Table 25	—	for NHL, FL and HL Compressive strength requirements expressed in terms of strength classes and limits [b]
Setting time	5.3.3.2, Table 18 5.4.4.2, Table 22 5.5.3.2, Table 26	—	for NHL, FL and HL Requirements expressed in terms of limits [b]
Air content	5.3.3.2, Table 18 5.4.4.2, Table 22 5.5.3.2, Table 26	—	for NHL, FL and HL Requirements expressed in terms of upper limits [b]
Content of constituents for: - $CaO + MgO$ - MgO - CO_2 - SO_3	4.4.2, Table 2 4.5.2, Table 9	—	only for air lime (CL and DL) Requirements expressed in terms of classes and limits [b]
- SO_3	5.3.2, Table 16 5.4.3, Table 20 5.5.2, Table 24	—	for NHL, FL and HL Requirements expressed in terms of classes and limits [b]

Product:	22 different building lime products (see Tables 1, 8, 15, 19 and 23)		
Intended use:	Preparation of binder for mortar (for masonry, rendering and plastering) and production of other construction products (e.g. calcium silicate bricks, aerated autoclaved concrete, concrete, etc.), and for civil engineering applications (soil treatment, asphalt mixtures, etc.).		
Essential Characteristics *[2]*	**Clauses** [a] **in this and other European Standard(s)**	**Regulatory classes** *[4]*	**Notes** *[5]*
Product:	22 different building lime products (see Tables 1, 8, 15, 19 and 23)		
Intended use:	Preparation of binder for mortar (for masonry, rendering and plastering) and production of other construction products (e.g. calcium silicate bricks, aerated autoclaved concrete, concrete, etc.), and for civil engineering applications (soil treatment, asphalt mixtures, etc.).		
Available lime	4.4.2, Table 2 5.3.2, Table 16 5.4.3, Table 20 5.5.2, Table 24	—	for CL, NHL, FL and HL Requirements expressed in terms of lower limits [b]
Reactivity	4.4.3, Table 4 4.5.3, Table 11	—	only for quicklime Requirements expressed in terms of upper limits [b]
Soundness	4.4.3, Table 3 4.4.4, Table 6 4.5.3, Table 10 4.5.4, Table 13 5.3.3.2, Table 18 5.4.4.2, Table 22 5.5.3.2, Table 26	—	all types of building lime Requirements expressed in terms of limits [b]
Particle size	4.4.4, Table 6 4.5.4, Table 13 5.3.3.2, Table 18 5.4.4.2, Table 22 5.5.3.2, Table 26	—	all types of hydrated lime and NHL, FL and HL Requirements expressed in terms of upper limits [b]
Particle size distribution	4.4.3, Table°5 4.5.3, Table°12	—	only for quicklime Requirements expressed in terms of limits [b]
Penetration	5.3.3.2, Table 18 5.4.4.2, Table 22 5.5.3.2, Table 26	—	all types of hydrated lime and NHL, FL and HL Requirements expressed in terms of limits [b]
Durability	4.4.6, 4.5.6, 5.5.5	—	—

[a] These requirements are an integral part of this harmonized European Standard for building lime.

[b] These limits are included in the definition of the products covered by this building lime standard.

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 Building limes

ZA.2.1 System of AVCP

The AVCP system(s) of Building limes indicated in Table ZA.1, established by EC Decision 97/555/EC (OJ L229,20.8.1997,p.9) amended by EC Decision 2010/683/EU (L293/60) of 9 November 2010 is shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or class(es) of performance.

Table ZA.2 — System of AVCP

Product(s)	Intended use(s)	Level(s) or class(es) of performance	AVCP system
Building lime, including: — Calcium lime — Dolomitic lime — lime with hydraulic properties	Preparation of concrete, mortar, grout and other mixes for construction and for the manufacture of construction products	—	2+
System 2+: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.3 including certification of the factory production control by a notified production control certification body on the basis of initial inspection of the manufacturing plant and of factory production control as well as of continuous surveillance, assessment and evaluation of factory production control.			

The AVCP of the building limes 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 Standard 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 Building limes under system 2+

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 which are declared	EN 459–3:2015, 4.1 to 4.3, and EN 459–1:2015, 4.4.7 (calcium lime), 4.5.7 (dolomitic lime), 5.6 (natural hydraulic lime, formulated lime and hydraulic lime)
	determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN 459–3:2015, 4.4, and EN 459–1:2015, 4.4.7 (calcium lime), 4.5.7 (dolomitic lime), 5.6 (natural hydraulic lime, formulated lime and hydraulic lime)
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN 459–3:2015, 4.3
Tasks for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which are declared, namely Compressive strength *(for lime with hydraulic properties only)* Initial and final setting time *(for lime with hydraulic properties only)* Air content *(for lime with hydraulic properties only)* Content of active constituents *(for air lime only)* Soundness-maximum expansion Particle size, Particle size distribution, Penetration, Reactivity Available lime. Documentation of the FPC.	EN 459–3:2015, 4.1 to 4.3, and Clause 5, and EN 459–1:2015, 4.4.7 (calcium lime), 4.5.7 (dolomitic lime), 5.6 (natural hydraulic lime, formulated lime and hydraulic lime
	Continuous surveillance, assessment and evaluation of FPC		

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:

In case of products under system 2+

a) the determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; the factory production control and the testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

b) the certificate of conformity of the factory production control, issued by the notified production control certification body on the basis of:

1) initial inspection of the manufacturing plant and of factory production control and

2) continuous surveillance, assessment and evaluation of factory production control.

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 calcium lime EN 459-1 CL 90-Q (R5, P1).

DECLARATION OF PERFORMANCE

Nr. 123-DoP-2013

1. Unique identification code of the product-type

Calcium lime EN 459-1 **CL 90-Q (R5, P1)**

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):

see 1

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:

Intended to be used in applications or materials for construction, building and civil engineering

Provided the product is used in accordance with the relevant application standard and/or manufacturer's advice and/or following the current best practice

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

AnyCo SA,

PO Box 21

B-1050 Brussels, Belgium

Tel. +32987654321

Fax: +32123456789

e-mail: anyco.sa@provider.be

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

no authorized representative

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:

System 2+

7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:

EN 459-1:2015-MM

Notified factory production control certification body No. 1234 performed the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment

and evaluation of factory production control under system 2+ and issued the certificate of conformity (Reg.-No.:…….) of the factory production control.

8. Declared performance

Essential characteristics	Performance	Harmonized technical specification
CaO+MgO	≥ 90 %	EN 459–1:2015–MM
MgO	≤ 5 % (see EN 459–1:2015, 4.4.2)	
CO_2	≤ 4 % (see EN 459–1:2015, 4.4.2)	
SO3	≤ 2 %	
available lime	≥ 80 %	
soundness	pass	
reactivity	R5	
particle size distribution	P1	

9. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 8. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

……

(name and function)

……..…… ……..……

(place and 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 [see example of DoP];

— the level or class of the performance declared;

— the dated 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.

Figures ZA.1 to ZA.4 give examples of the information related to products subject to AVCP under each of the different systems to be given on the label or with the accompanying documents.

CE 1234	*CE-symbol given in directive 93/68/EEC* *identification number of the notified body*
Name of producer **Address of producer** **Plant** **03** 123-DoP-2013	*name and registered address of the producer* *manufacturing plant* *last 2 digits of the year in which the CE-marking was first affixed* *number of the DoP*
EN 459–1 **Calcium lime** EN 459–1 CL90-**Q (R5, P1)** applications or materials for construction, building and civil engineering The declared performance by levels or classes is defined by the building lime designation	*number of the harmonized European standard* *unique identification code of the product* *intended use of the product as laid down in the standard* *declared performance*

Figure ZA.1 — Example CE marking information of products under AVCP system 2+ for Calcium lime 90 in the form of quicklime

CE 1234	*CE-symbol given in directive 93/68/EEC* *identification number of the notified body*
Name of producer **Address of producer** **Plant** **03** 123-CPR-xyz-ab	*name and registered address of the producer* *manufacturing plant* *last 2 digits of the year in which the CE-marking was first affixed* *number of the DoP*
EN 459–1 **Calcium lime** EN 459–1 CL90**-S** applications or materials for construction, building and civil engineering The declared performance by levels or classes is defined by the building lime designation	*number of the harmonized European standard* *unique identification code of the product* *intended use of the product as laid down in the standard* *declared performance*

Figure ZA.2 — Example CE marking information of products under AVCP system 2+ for Calcium lime 90 in the form of hydrated lime

CE 1234	*CE-symbol given in directive 93/68/EEC* *identification number of the notified body*
Name of producer **Address of producer** **Plant** **03** 123-CPR-xyz-ab	*name and registered address of the producer* *manufacturing plant* *last 2 digits of the year in which the CE-marking was first affixed* *number of the DoP*
EN 459–1 **Dolomitic lime** EN 459–1 DL85**-Q (R2, P4)** applications or materials for construction, building and civil engineering The declared performance by levels or classes is defined by the building lime designation	*number of the harmonized European standard* *unique identification code of the product* *intended use of the product as laid down in the standard* *declared performance*

Figure ZA.3 — Example CE marking information of products under AVCP system 2+ for dolomitic lime in the form of quicklime

Example for the CE-marking of formulated lime:

CE 1234	*CE-symbol given in directive 93/68/EEC* *identification number of the notified body*
Name of producer **Address of producer** **Plant** **03** 123-CPR-xyz-ab	*name and registered address of the producer* *manufacturing plant* *last 2 digits of the year in which the CE-marking was first affixed* *number of the DoP*
EN 459–1 **Formulated lime** EN 459–1 **FL B 5** **contains cement** **CL 55, K 30, L 10** **iron sulfate: 2 %** **water retainer: 0,5 %** applications or materials for construction, building and civil engineering The declared performance by levels or classes is defined by the building lime designation	*number of the harmonized European standard* *unique identification code of the product* *intended use of the product as laid down in the standard* *declared performance*

Figure ZA.4 — Example CE marking information of products under AVCP system 2+ for formulated lime FL B 5

Bibliography

[1] ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

[2] ISO 3534 (all parts), *Statistics — Vocabulary and symbols*

[3] ISO 3951 (all parts), *Sampling procedures and charts for inspection by variables for percent nonconforming*

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