BRITISH STANDARD

BS EN 934-2:2009
+A1:2012

Admixtures for concrete, mortar and grout

Part 2: Concrete admixtures — Definitions, requirements, conformity, marking and labelling

ICS 01.040.91; 91.100.30

National foreword

This British Standard is the UK implementation of EN 934-2:2009+A1:2012. It supersedes BS EN 934-2:2009 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by ⟩A1⟨.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/3, Admixtures.

A list of organizations represented on this subcommittee 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.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2009.

ISBN 978 0 580 72907 2

Amendments/corrigenda issued since publication

Date	Comments
31 October 2012	Implementation of CEN amendment A1:2012

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 934-2:2009+A1

June 2012

ICS 01.040.91; 91.100.30

Supersedes EN 934-2:2009

English Version

Admixtures for concrete, mortar and grout - Part 2: Concrete admixtures - Definitions, requirements, conformity, marking and labelling

Adjuvants pour bétons, mortier et coulis - Partie 2: Adjuvants pour béton - Définitions, exigences, conformité, marquage et étiquetage

Zusatzmittel für Beton, Mörtel und Einpressmörtel - Teil 2: Betonzusatzmittel - Definitionen, Anforderungen, Konformität, Kennzeichnung und Beschriftung

This European Standard was approved by CEN on 24 April 2009 and includes Amendment 1 approved by CEN on 10 May 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 934-2:2009+A1:2012: E

Contents

Page

Foreword

This document (EN 934-2:2009+A1:2012) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

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 December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

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 [A1] EN 934-2:2009 [A1].

This document includes Amendment 1 approved by CEN on 2012-05-10.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of [A1] EU Directive(s) [A1].

For relationship with [A1] EU Directive(s) [A1], see informative Annex ZA, which is an integral part of this document.

This standard is a part of the series EN 934 "Admixtures for concrete, mortar and grout“ which additionally comprises the following parts

Part 1: Common requirements

Part 3: Admixtures for masonry mortar — Definitions, requirements, conformity, marking and labelling

Part 4: Admixtures for grout for prestressing tendons — Definitions, requirements, conformity, marking and labelling

Part 5: Admixtures for sprayed concrete — Definitions, requirements, conformity, marking and labelling

Part 6: Sampling, conformity control and evaluation of conformity

This European Standard is used with the standards of the EN 480 series which comprises test methods for admixtures.

The annexes A 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, 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.

1 Scope

This European Standard specifies definitions and requirements for admixtures for use in concrete.

It covers admixtures for plain, reinforced and prestressed concrete which are used in site mixed, ready mixed concrete and precast concrete.

The performance requirements in this standard apply to admixtures used in concrete of normal consistence. They may not be applicable to admixtures intended for other types of concrete such as semi-dry and earth moist mixes.

Provisions governing the practical application of admixtures in the production of concrete, i.e. requirements concerning composition, mixing, placing, curing etc. of concrete containing admixtures are not part of this standard.

2 Normative references

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

EN 480-1, *Admixtures for concrete, mortar and grout — Test methods — Part 1: Reference concrete and reference mortar for testing*

EN 480-2, *Admixtures for concrete, mortar and grout — Test methods — Part 2: Determination of setting time*

EN 480-4, *Admixtures for concrete, mortar and grout — Test methods — Part 4: Determination of bleeding of concrete*

EN 480-5, *Admixtures for concrete, mortar and grout — Test methods — Part 5: Determination of capillary absorption*

EN 480-11, *Admixtures for concrete, mortar and grout — Test methods — Part 11: Determination of air void characteristics in hardened concrete*

〚A1〛 prEN 480-15, *Admixtures for concrete, mortar and grout — Test methods — Part 15: Reference concrete and method for testing viscosity modifying admixtures* 〚A1〛

EN 934-1:2008, *Admixtures for concrete, mortar and grout — Part 1: Common requirements*

EN 934-6:2001 *Admixtures for concrete, mortar and grout — Part 6: Sampling, conformity control and evaluation of conformity*

EN 12350-2, *Testing fresh concrete — Part 2: Slump test*

EN 12350-5, *Testing fresh concrete — Part 5: Flow table test*

EN 12350-7, *Testing fresh concrete — Part 7: Air content — Pressure methods*

〚A1〛 EN 12350-11, *Testing fresh concrete — Part 11: Self-compacting concrete — Sieve segregation test* 〚A1〛

EN 12390-3, *Testing hardened concrete — Part 3: Compressive strength of test specimens*

3 Terms and definitions

For the purposes of this document, the terms and definitions in EN 934-1:2008 and the following apply.

3.1 General definitions

3.1.1
performance
ability of an admixture to be effective in its intended use without detrimental effects

3.1.2
compliance dosage
dosage of an admixture, expressed in % by mass of cement, stated by the manufacturer which will meet the requirements of this standard. The compliance dosage is within the recommended range of dosage

3.1.3
recommended range of dosage
dosages between limits expressed in % by mass of cement which the manufacturer recommends for the product based on experience on site

NOTE The use of the recommended dosage does not imply that compliance with this standard will be met over the whole range. Trial tests should be carried out with the materials to be used on site to find the dosage necessary to achieve the required result.

3.1.4
maximum recommended dosage
upper limit of the recommended range of dosage

3.1.5
reference concrete and mortar
concrete and mortar as specified in EN 480-1 for testing admixtures for conformity with this standard

3.1.6
multifunction admixture
admixture which affects several properties of fresh and/or hardened concrete by performing more than one of the main functions defined in 3.2.2 to 3.2.9

3.1.7
primary function
single function of a multifunction admixture designated by the manufacturer

3.1.8
secondary function
function of a multifunction admixture which is additional to the primary function

3.2 Specific definitions

3.2.1
admixtures for concrete
material added during the mixing process of concrete in a quantity not more than 5 % by mass of the cement content of the concrete, to modify the properties of the mix in the fresh and /or hardened state

3.2.2
water reducing/plasticizing admixture
admixture which without affecting the consistence, permits a reduction in the water content of a given concrete mix, or which, without affecting the water content increases the slump/flow or produces both effects simultaneously

3.2.3
high range water reducing/superplasticizing admixture
admixture which, without affecting the consistence, permits a high reduction in the water content of a given concrete mix, or which, without affecting the water content increases the slump/flow considerably, or produces both effects simultaneously

3.2.4
water retaining admixture
admixture which reduces the loss of water by a reduction of bleeding

3.2.5
air entraining admixture
admixture which allows a controlled quantity of small, uniformly distributed air bubbles to be incorporated during mixing which remain after hardening

3.2.6
set accelerating admixture
admixture which decreases the time to commencement of transition of the mix from the plastic to the rigid state

3.2.7
hardening accelerating admixture
admixture which increases the rate of development of early strength in the concrete, with or without affecting the setting time

3.2.8
set retarding admixture
admixture which extends the time to commencement of transition of the mix from the plastic to the rigid state

3.2.9
water resisting admixture
admixture which reduces the capillary absorption of hardened concrete

3.2.10
set retarding/water reducing/plasticizing admixture
admixture which produces the combined effects of a water reducing/plasticizing admixture (primary function) and a set retarding admixture (secondary function)

3.2.11
set retarding/high range water reducing/superplasticizing admixture
admixture which produces the combined effects of a high range water reducing/superplasticizing admixture (primary function) and a set retarding admixture (secondary function)

3.2.12
set accelerating/water reducing/plasticizing admixture
admixture which produces the combined effects of a water reducing/plasticizing admixture (primary function) and a set accelerating admixture (secondary function)

A1 **3.2.13**
viscosity modifying admixture
admixture incorporated in concrete to limit segregation by improving cohesion A1

4 Requirements

4.1 General requirements

The requirements in this standard assume that admixtures are uniformly dispersed in concrete; special attention shall be given to the dispersion of powder admixtures with retarding effects.

All admixtures defined in [A1] 3.2.2 to 3.2.13 [A1] shall conform the general requirements in EN 934-1:2008 Table 1, Clause 5 and Clause 6.

NOTE For requirements which lead to the CE-marking, see Table ZA.1 of Annex ZA.

4.2 Requirements for specific types of admixtures

The admixtures defined in [A1] 3.2.2 to 3.2.13 [A1] shall comply with the requirements listed in Table 1:

Table 1 — Performance requirements for specific types of admixture

Definition	Name of admixture	Performance requirements
3.2.2	Water reducing/plasticizing admixtures	Table 2
3.2.3	High range water reducing/superplasticizing admixtures	Tables 3.1 and 3.2
3.2.4	Water retaining admixtures	Table 4
3.2.5	Air entraining admixture	Table 5
3.2.6	Set accelerating admixtures	Table 6
3.2.7	Hardening accelerating admixtures	Table 7
3.2.8	Set retarding admixtures	Table 8
3.2.9	Water resisting admixtures	Table 9
3.2.10	Set retarding/water reducing/plasticizing admixtures	Table 10
3.2.11	Set retarding/high range water reducing/superplasticizing admixtures	Tables 11.1 and 11.2
3.2.12	Set accelerating/water reducing/plasticizing admixtures	Table 12
[A1] 3.2.13	Viscosity modifying admixture	Table 13 [A1]

Where manufacturer's stated values are required these shall be provided in writing on request.

Table 2 — Specific requirements for water reducing/plasticizing admixtures (at equal consistence)

No	Property	Reference concrete	Test method	Requirements
1	Water reduction	EN 480-1 reference concrete I	slump EN 12350-2 or flow EN 12350-5	In test mix ≥ 5 % compared with control mix
2	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 7 and 28 days: Test mix ≥ 110 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless stated otherwise by the manufacturer

Table 3.1 — Specific requirements for high range water reducing/super plasticizing admixtures (at equal consistence)

No	Property	Reference concrete	Test method	Requirements
1	Water reduction	EN 480-1 reference concrete I	slump EN 12350-2 or flow EN 12350-5	In test mix ≥ 12 % compared with control mix
2	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 1 day: Test mix ≥ 140 % of control mix At 28 days: Test mix ≥ 115 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless otherwise stated by the manufacturer

Table 3.2 — Specific requirements for high range water reducing/super plasticizing admixtures (at equal w/c ratio)[a]

No	Property	Reference concrete	Test method	Requirements
1	Increase in consistence	EN 480-1 reference concrete IV	slump EN 12350-2 or flow EN 12350-5	Increase in slump ≥ 120 mm from initial (30 ± 10) mm Increase in flow ≥ 160 mm from initial (350 ± 20) mm
2	Retention of consistence	EN 480-1 reference concrete IV	slump EN 12350-2 or flow EN 12350-5	30 min after the addition the consistence of the test mix shall not fall below the value of the initial consistence of the control mix
3	Compressive strength	EN 480-1 reference concrete IV	EN 12390-3	At 28 days: test mix ≥ 90 % of control mix
4	Air content in fresh concrete	EN 480-1 reference concrete IV	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless otherwise stated by the manufacturer

[a] The compliance dosage for admixtures used to meet the requirements of Table 3.2 does not have to be the same as that used to meet the requirements of Table 3.1.

Table 4 — Specific requirements for water retaining admixtures (at equal consistence)

No	Property	Reference concrete	Test method	Requirements
1	Bleeding	EN 480-1 reference concrete II	EN 480-4	Test mix ≤ 50 % of control mix
2	Compressive strength	EN 480-1 reference concrete II	EN 12390-3	At 28 days: Test mix ≥ 80 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete II	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless stated otherwise by the manufacturer

Table 5 — Specific requirements for air entraining admixtures (at equal consistence)

No	Property	Reference concrete	Test method	Requirements[a]
1	Air content in fresh concrete (entrained air)	EN 480-1 reference concrete III	EN 12350-7	Test mix ≥ 2,5 % by volume above control mix Total air content 4 % to 6 % by volume
2	Air void characteristics in hardened concrete	EN 480-1 reference concrete III	EN 480-11[b]	Spacing factor in test mix ≤ 0,200 mm
3	Compressive strength	EN 480-1 reference concrete III	EN 12390-3	At 28 days : test mix ≥ 75 % of control mix

[a] All the requirements apply to the same test mix.

[b] EN 480-11 is the reference method. Other methods of determining the spacing factor (e. g. modified point count method) may be used provided that they can be shown to give essentially the same results as the method in EN 480-11.

Table 6 — Specific requirements for set accelerating admixtures (at equal consistence)

No	Property	Reference mortar/concrete	Test method	Requirements
1	Initial setting time	EN 480-1 mortar	EN 480-2	At 20° C: test mix ≥ 30 min At 5° C : test mix ≤ 60 % of control mix
2	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 28 days: Test mix ≥ 80 % control mix At 90 days: Test mix ≥ test mix at 28 days
3	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless stated otherwise by the manufacturer

Table 7 — Specific requirements for hardening accelerating admixtures (at equal consistence)

No	Property	Reference concrete	Test method	Requirements
1	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 20° C and 24 h: test mix ≥ 120 % of control mix At 20° C and 28 days: test mix ≥ 90 % of control mix At 5° C and 48 h: test mix ≥ 130 % of control mix
2	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless otherwise stated by the manufacturer

Table 8 — Specific requirements for set retarding admixtures (at equal consistence)

No	Property	Reference mortar/concrete	Test method	Requirements
1	Setting time	EN 480-1 mortar	EN 480-2	Initial: test mix ≥ control mix + 90 min Final: test mix ≤ control mix + 360 min
2	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 7 days: Test mix ≥ 80 % control mix At 28 days: Test mix ≥ 90 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless otherwise stated by the manufacturer

Table 9 — Specific requirements for water resisting admixtures (at equal consistence or equal w/c ratio [a])

No	Property	Reference mortar/concrete	Test method	Requirements
1	Capillary absorption	EN 480-1 mortar	EN 480-5	Tested for 7 days after 7 days curing : test mix ≤ 50 % by mass of control mix Tested for 28 days after 90 days curing : test mix ≤ 60 % by mass of control mix
2	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 28 days : test mix ≥ 85 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % by volume above control mix unless otherwise stated by the manufacturer

[a] All tests shall be performed either at equal consistence or equal w/c ratio.

Table 10 — Specific requirements for set retarding/water reducing/plasticizing admixtures (at equal consistence)

No	Property	Reference concrete/mortar	Test method	Requirements
1	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 28 days: test mix ≥ 100 % of control mix
2	Setting time	EN 480-1 mortar	EN 480-2	Initial: test mix ≥ control mix + 90 min Final: test mix ≤ control mix + 360 min
3	Water reduction	EN 480-1 reference concrete I	slump EN 12350-2 or flow EN 12350-5	In test mix ≥ 5 % compared with control mix
4	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % (by volume) above control mix unless stated otherwise by the manufacturer

Table 11.1 — Specific requirements for set retarding/high range water reducing/super plasticizing admixtures (at equal consistence)

No	Property	Reference concrete/mortar	Test method	Requirements
1	Compressive strength	EN 480-1 reference concrete I	EN 12390-3	At 7 days: test mix ≥ 100 % of control mix At 28 days: test mix ≥ 115 % of control mix
2	Setting time	EN 480-1 mortar	EN 480-2	Initial: test mix ≥ control mix + 90 min Final: test mix ≤ control mix + 360 min
3	Water reduction	EN 480-1 reference concrete I	slump EN 12350-2 or flow EN 12350-5	In test mix ≥ 12 % compared with control mix
4	Air content in fresh concrete	EN 480-1 reference concrete I	EN 12350-7	Test mix ≤ 2 % (by volume) above control mix unless stated otherwise by the manufacturer

Table 11.2 — Specific requirements for set retarding/high range water reducing/ super plasticizing admixtures (at equal w/c ratio [a])

No	Property	Reference concrete/mortar	Test method	Requirements
1	Retention of consistence	EN 480-1 reference concrete IV	slump EN 12350-2 or flow EN 12350-5	60 min after the addition the consistence of the test mix shall not fall below the value of the consistence of the control mix
2	Compressive strength	EN 480-1 reference concrete IV	EN 12390-3	At 28 days: test mix ≥ 90 % of control mix
3	Air content in fresh concrete	EN 480-1 reference concrete IV	EN 12350-7	Test mix ≤ 2 % (by volume) above control mix unless stated otherwise by the manufacturer

[a] The compliance dosage for admixtures used to meet the requirements of Table 11.2 does not have to be the same as that used to meet the requirements of Table 11.1.

Table 12 — Specific requirements for set accelerating/water reducing/plasticizing admixtures (at equal consistence)

No	Property	Reference concrete/mortar	Test method	Requirements
1	Compressive strength	EN 480-1 reference concrete 1	EN 12390-3	At 28 days: test mix ≥ 100 % of control mix
2	Initial setting time	EN 480-1 mortar	EN 480-2	At 20 °C test mix ≥ 30 min At 5 °C test mix ≤ 60 % of control mix
3	Water reduction	EN 480-1 reference concrete 1	slump EN 12350-2 or flow EN 12350-5	In test mix ≥ 5 % compared with control mix
4	Air content in fresh concrete	EN 480-1 reference concrete 1	EN 12350-7	Test mix ≤ 2 % (by volume) above control mix unless stated otherwise by the manufacturer

4.3 Release of dangerous substances

For content and release from hardened concrete of substances dangerous to health, hygiene and environment, see Annex A (informative).

5 Sampling

Requirements for sampling are given in EN 934-6:2001.

6 Conformity control

Requirements for conformity control are given in EN 934-6:2001. The frequency of testing in connection with factory production control is given in [A1] Annex B [/A1].

For Factory Production Control, the reference cement required by EN 480-1 may be replaced by alternative cement provided that:

— The alternative cement has been tested in the EN 480-1 reference concrete in parallel with the reference cement to EN 480-1 for Initial Type Testing with the same admixture type.

— The admixture type so tested showed compliance with the appropriate Table of Requirements in EN 934-2 with both the EN 480-1 reference cement and the alternative cement.

7 Evaluation of conformity

Requirements for evaluation of conformity are given in EN 934-6:2001.

[A1]

Table 13 — Specific requirements for viscosity modifying admixture

No	Property	Reference Concrete	Test Method	Requirements
1	Segregated portion SR	prEN 480-15	EN 12350-11	Control mix ≥ 15 % and SR ≤ 30 % Test mix SR ≤ 70 % of the value obtained with the control mix
2	Compressive strength	prEN 480-15	EN 12390-3	At 28 days: test mix ≥ 80 % of control mix
3	Air content in fresh concrete	prEN 480-15	EN 12350-7	Test mix ≤ 2 % (by volume) above control mix unless stated otherwise by the manufacturer

[/A1]

8 Marking and labelling

8.1 General

When admixtures for concrete are supplied in containers they shall be clearly marked with the relevant information.

When the material is supplied into a bulk container at the point of delivery, the same information shall be provided in writing at the time of delivery.

NOTE For CE-marking and labelling see ZA.3.

8.2 Designation of admixtures

Admixtures for concrete shall be designated by:

a) Name of type of admixture in the language of one member country,

b) Number of standard: EN 934-2,

c) Code, to identify the type of the admixture, consisting of the number of this standard and the number of the table which gives the additional performance requirements for the particular type of admixture. Where the performance requirements are included in two tables both table numbers shall be included.

EXAMPLE High range water reducing/super plasticizing admixture for concrete; EN 934-2: T3.1/3.2

8.3 Additional Information

a) batch number and production plant;

b) summary of storage requirements including any special requirements on storage life which shall be clearly marked, e. g.: This admixture shall not be taken to comply with EN 934-2 after "date“;

c) instructions for homogenisation before use, when necessary;

d) instructions for use and any necessary safety precautions, e. g. if caustic, toxic or corrosive;

e) manufacturer's recommended range of dosage.

Annex A
(informative)

Release of dangerous substances

In the absence of specific requirements for substances dangerous to health, hygiene and environment in this standard, the requirements of ZA.1 (paragraph "Warning“) and ZA.3 apply.

Annex B
(normative)

A1 Factory production control

Table B.1 lists the frequency of testing required for factory production control.

Table B.1 — Minimum frequency of test for the factory production control of concrete admixtures according to EN 934-2:2009+A1:2012

Tests	Water reducing/ Plasticizing admixtures	High range water reducing/ Super-plasticizing admixtures[a]	Water retaining admixtures	Air entraining admixtures	Set accelerating admixtures[b]	Hardening accelerating admixtures	Set retarding admixtures	Water resisting admixtures[b]	Set retarding/ Water reducing/ Plasticizing admixtures	Set retarding/ Highrange water reducing/ Superplasticizing admixtures[a]	Set acceleratin g/ Water reducing/ Plasticizing admixtures	Viscosity modifying admixtures
Homogeneity, colour	B	B	B	B	B	B	B	B	B	B	B	B
Relative density (for liquids only)[c]	B	B	B	B	B	B	B	B	B	B	B	B
Conventional dry material content[c]	B	B	B	B	B	B	B	B	B	B	B	B
pH value (for liquids only)	B	B	B	B	B	B	B	B	B	B	B	B
Chloride content (Cl^-) [d]	4	4	4	4	4	4	4	4	4	4	4	4
Alkali content	2	2	2	2	2	2	2	2	2	2	2	2
Water reduction	A	A							A	A	A	
Increase in consistence		A								A		
Retention of consistence		A								A		
Setting time					A		A		A	A	A	
Air content in fresh concrete	1	1	1	A	1	1	1	1	1	1	1	1
Bleeding			A									
Air content in hardened concrete (air void spacing)				1								
Compressive strength	1	1	1	1	1	A	1	1	1	1	1	1
Capillary absorption								A				
Segregated portion												1

Numbers in this table denote minimum frequency of test per year, spread according to production; if the production is less frequent every batch has to be tested

A: means test for every 1000 t with a maximum of 3 times a year

B: means test for each batch

a For factory production control, high range water reducing/superlasticising admixtures may be tested for water reduction or for increase in consistence.

b For factory production control, water resisting and set accelerating admixtures, the 90 day test may be omitted.

c For factory production control of density and dry material content, different test methods from those specified in EN 934-1:2008, Table 1 may be used, provided a correlation between the method used and the specified method has been established.

d Total chlorine content also has to be tested at this frequency if it is significantly different from the chloride content.

NOTE Effective component (infra red analysis) need not be included in the programme of factory production control. It will be included in initial type testing.

A1

Annex ZA
(informative)

Provisions for the CE marking of admixtures for concrete under the EU Construction Products Directive

ZA.1 Clauses of this European Standard addressing the provisions of the EU Construction Products Directive

This European Standard has been prepared under Mandate M/128 “Products related to concrete, mortar and grout” given to CEN by the European Commission and European Free Trade Association.

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

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

WARNING Other requirements and other EU Directives, not affecting the fitness for intended use(s), may be applicable to the construction products falling within the scope of this standard.

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

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA [A1] (accessed through http://ec.europa.eu/enterprise/construction/cpd-ds) [A1].
This annex establishes the conditions for the CE marking of the admixtures for concrete intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as Clause 1 of this standard and is defined by Table ZA.1

Table ZA.1 — Scope and relevant clauses of this standard

Product: Admixtures for concrete as covered under the scope of this standard

Intended use(s): To be used in concrete for: water reducing/plasticising; high range water reducing/super plasticising; water retaining; air entraining; set accelerating; hardening accelerating; set retarding; water resisting; set retarding/water reducing/plasticising; set retarding/high range water reducing/super plasticising; set accelerating/water reducing/plasticising;

Essential characteristics	Requirement clauses in this standard	Mandated level(s) or class(es):	Notes
Chloride ion content	4.1 and EN 934-1:2008, Table 1 (8)	None	Applies to all admixtures within the scope of this standard. Requirements are for upper limit or declared maximum value.
Alkali content	4.1 and EN 934-1:2008, Table 1 (9)	None	Applies to all admixtures within the scope of this standard. Requirements are for declared maximum value.
Corrosion behaviour	4.1 and EN 934-1:2008, Table 1 (10)	None	Applies to all admixtures Requirements are by information about — approved substances — declared substances or ,when tested, an upper limit and comparison with a control
Compressive strength	4.2 and Tables 2(2), 3.1 (2), 3.2 (3), 4(2), 5(3), 6(2), 7(1), 8(2), 9(2), 10(1), 11.1(1), 11.2(2)〉A1〈 , 12(1) and 13(2) 〉A1〈	None	Applies to all admixtures within the scope of this standard. Requirements are for lower limits in test mix (with admixture).
Air content	4.2 and Tables 2 (3), 3.1 (3), 3.2 (4), 4(3), 6(3), 7(2), 8(3), 9(3), 10(4), 11.1(4), 11.2(3)〉A1〈 , 12(4) and 13(3) 〉A1〈	None	Applies to all admixtures within the scope of this standard except air entraining admixtures. Requirements are for upper limits in test mix (with admixture).
Air content (entrained air)	4.2 and Table 5(1)	None	Applies to air entraining admixtures only. Requirements are for an upper and lower limit in test mix (with admixture).
Air void characteristic	4.2 and Table 5 (2)	None	Applies to air entraining admixtures only. Requirements are for an upper limit in test mix (with admixture).
Water reduction	4.2 and Tables 2(1), 3.1(1), 10(3) 11.1(3) and 12(3)	None	Applies to water reducing/plasticizing, high range water reducing/super–plasticizing, set retarding/ water reducing/plasticizing, set retarding/high range water reducing/super-plasticizing and set accelerating/ water reducing/ plasticizing admixtures only. Requirements are for a lower limit in test mix (with admixture).
Bleeding	4.2 and Table 4(1)	None	Applies to water retaining admixtures only. Requirement is for an upper limit in test mix (with admixture).

Table ZA.1 (*continued*)

Essential characteristics	Requirement clauses in this standard	Mandated level(s) or class(es):	Notes
Setting time	4.2 and Tables 6(1), 8(1), 10(2), 11.1(2) and 12(2)	None	Applies to set accelerating, set retarding admixtures, set retarding/water reducing/ plasticizing admixtures, set retarding/ high range water reducing/super-plasticizing and set accelerating/water reducing/ plasticizing admixtures only. Requirement are for upper and lower limit in test mix (with admixtures).l
Hardening time/strength development	4.2 and Tables 6(2), 7(1), 8(2), 10(1) and 11.1(1)	None	Applies to set accelerating, hardening accelerating, set retarding admixtures, set retarding/water reducing/plasticizing and set retarding/high range water reducing/ super-plasticizing admixtures only. Requirements are for lower limit in test mix (with admixture).
Capillary absorption	4.2 and Table 9 (1)	None	Applies to water resisting admixtures only. Requirement is for an upper limit in test mix (with admixture).
Consistency	4.2 and Table 3.2 (1)(2) and 11.2 (1)	None	Applies to high range water reducing/ super–plasticizing and set retarding/ high range water reducing/super-plasticizing admixtures only. Requirement are for lower limit in test mix (with admixture).
Dangerous substances	4.3 and Annex ZA	None	Applies to all admixtures for concrete. Requirements are dependant on regulations in the place of use.
Durability	---	---	Durability relates to the concrete incorporating admixtures.
[A1] Segregated portion	4.2 and Table 13(1)	None	Applies to Cohesion improving admixtures only. Requirement is for a minimum level of improvement in the test mix (with admixture) relative to a control mix. [A1]

The requirements on a certain characteristic do not apply in those Member States where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, producers placing their products on the market of these Member states are not obliged to determine nor to declare the performance of their products with regard to this characteristic and the option "no performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used.

The NPD option may not be used however where the characteristic is subject to a threshold level.

ZA.2 Procedure for attestation of conformity of admixtures for concrete

ZA.2.1 System of attestation of conformity

The system(s) of attestation of conformity for admixtures for concrete indicated in Table ZA.1 in accordance with the Decision of the Commission 1999/469/EC of 25 June 1999 (OJEU doc.L184 of 17 January 1999 page 27) as amended by the Decision 01/596/EC of 8 January 2001 (OJEU doc.L209 of 2nd August 2001 page 33) and as given in the Annex III of the mandate M/128 "Products related to concrete, mortar and grouts", is shown in Table ZA.2 for the indicated intended uses and relevant level(s) or class(es).

Table ZA.2 — System of attestation of conformity

Product(s)	Intended use	Level(s) or class(es)	Attestation of conformity system(s)
Admixtures	For concrete	--	2+
System 2+: See Directive 89/106/EEC (CPD) Annex III.2 (ii), first possibility, including certification of the factory production control by an approved body on the basis of initial inspection of factory and of factory production control as well as of continuous surveillance, assessment and approval of factory production control.			

The attestation of conformity of the construction products in Table ZA.1shall be according to the evaluation of conformity procedures indicated in Table(s) ZA.3 resulting from application of the clauses of this or other European Standard indicated therein.

Table ZA.3 — Assignation of evaluation of conformity tasks

Tasks			Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)		Parameters related to all relevant characteristics of Table ZA.1	EN 934-2:2009, Clause 6 (relevant tests of [A1] Table B.1 [A1]) EN 934-6:2001, 5.4
	Initial type testing		All relevant characteristics of Table ZA.1	EN 934-6: 2001, 5.3
	Testing of samples taken at the factory		All relevant characteristics of Table ZA.1	EN 934–6: 2001, Clause 4
Tasks for the notified body	Certification of F.P.C on the basis of	Initial inspection of factory and of F.P.C	Parameters related to all relevant characteristics of Table ZA.1	EN 934-6: 2001, 5.5
		Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all relevant characteristics of Table ZA.1	EN 934-2:2009, Clause 6 (relevant tests of [A1] Table B.1 [A1]) EN 934-6: 2001, 5.4 and 5.5

ZA.2.2 EC certificate and declaration of conformity

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

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

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

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

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

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

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

— the number of the accompanying factory production control certificate, and FPC records, where applicable,

— name and address of the notified laboratory(ies) if some characteristics are tested by such a laboratory,

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

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

— name and address of the notified body,

— the number of the factory production control certificate,

— conditions of validity of the certificate, where applicable,

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

The above mentioned declaration and certificate shall be presented, on demand, in the official language or languages of the Member State in which the product is to be used.

ZA.3 CE marking and labelling

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the construction product (or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note). The following information shall accompany the CE marking symbol:

— identification number of the certification body,

— name or identifying mark and registered address of the manufacturer (see Note 1 in ZA.2.2),

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

— number of the EC Certificate of conformity of factory production control certificate (if relevant),

— reference to this European Standard;

— description of the product : generic name, material, dimensions,…and intended use;

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

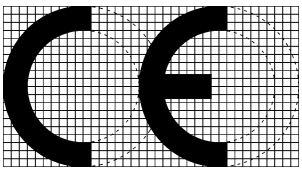
  — declared values and, where relevant, level or class (including "pass" for pass/fail requirements where necessary) to declare for each essential characteristic as indicated in "Notes" in Table ZA.1,

  — "No performance determined" for characteristics where this is relevant;

  — as an alternative, a standard designation which shows some or all of the relevant characteristics (where the designation covers only some characteristics, it will need to be supplemented with declared values for other characteristics as above).

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

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

	Explanation
	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.*
01234	*Identification number of the certification body*
AnyCo Ltd, PO Box 21, B-1050	*Name or identifying mark and registered address of the producer*
09	*The last two digits of the year in which the marking was affixed*
01234-CPD-00234	*Certificate number*
EN 934-2:2009+A1:2012	*No. and date of this European Standard and version date*
High range water reducing super plasticizing admixture for concrete EN 934-2:T3.1/3.2	*Designation of the admixture. In accordance with Clause 8*
maximum chloride ion content:……..by mass maximum alkali content:…….by mass Corrosion behaviour:[a] Dangerous substances: NL decree ZZ/pp (yy-mm-dd)	*and information on regulated characteristics*

[a] For corrosion behaviour the CE-marking should include one or more of the following statements according to the requirements in EN 934-1:2008 Clause 5:
- Contains components only from EN 934-1:2008,Annex A.1.
- Contains the following components from EN 934-1:2008 Annex A.2:…
- Maximum corrosion current density ….μ A/cm² and in conformity to EN 934-1:2008, 5.2.

Figure ZA.1 — Example of CE marking information

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

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

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

blank

British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards and other standards-related publications, information and services. It presents the UK view on standards in Europe and at the international level.

BSI is incorporated by Royal Charter . British Standards and other standardization products are published by BSI Standards Limited.

Revisions

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

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using British Standards would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Similary for PASs, please notify BSI Customer Services.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001

BSI offers BSI Subscribing Members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of British Standards and PASs.

Tel: +44 (0)20 8996 7669 Fax: +44 (0)20 8996 7001
Email: plus@bsigroup.com

Buying standards

You may buy PDF and hard copy versions of standards directly using a credit card from the BSI Shop on the website **www.bsigroup.com/shop.** In addition all orders for BSI, international and foreign standards publications can be addressed to BSI Customer Services.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001
Email: orders@bsigroup.com

In response to orders for international standards, BSI will supply the British Standard implementation of the relevant international standard, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Knowledge Centre.

Tel: +44 (0)20 8996 7004 Fax: +44 (0)20 8996 7005
Email: knowledgecentre@bsigroup.com

BSI Subscribing Members are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001
Email: membership@bsigroup.com

Information regarding online access to British Standards and PASs via British Standards Online can be found at **www.bsigroup.com/BSOL**

Further information about British Standards is available on the BSI website at **www.bsigroup.com/standards**

Copyright

BSI

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/standards

raising standards worldwide™