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Kemijski dodatki za beton, malto in injekcijsko maso - 2. del: Kemijski dodatki za beton - Definicije, zahteve, skladnost, označevanje in etiketiranje

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

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

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

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EUROPEAN STANDARD
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**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.

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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of an identical text or by endorsement, at the latest by December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.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.

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

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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.

EN 934-2:2009+A1:2012 (E)**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*

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

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*

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

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

EN 934-2:2009+A1:2012 (E)**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

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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 \square_{A1} 3.2.2 to 3.2.13 \square_{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 \square_{A1} 3.2.2 to 3.2.13 \square_{A1} shall comply with the requirements listed in Table 1:

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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 $\geq 2,5$ % 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 $\leq 0,200$ 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.