



SLOVENSKI STANDARD

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Admixture 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 béton - Définitions, exigences, conformité, marquage et étiquetage

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English version

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

Adjuvants pour béton, 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 2 May 2001.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 104 "Concrete", 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of an identical text or by endorsement, at the latest by January 2002, and conflicting national standards shall be withdrawn at the latest by April 2003.

This European Standard supersedes EN 934-2:1997.

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

For relationship with EU Directive(s) see informative annex ZA which is an integral part of this standard.

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

- 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

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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

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

EN 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.*

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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 480-6, *Admixtures for concrete, mortar and grout - Test methods - Part 6: Infrared analysis.*

EN 480-8, *Admixtures for concrete, mortar and grout - Test methods - Part 8: Determination of the conventional dry material content.*

EN 480-10, *Admixtures for concrete, mortar and grout - Test methods - Part 10: Determination of the water soluble chloride content.*

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

EN 480-12, *Admixtures for concrete, mortar and grout - Test methods - Part 12: Determination of the alkali content of admixtures.*

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

prEN 1015-13:1993, *Methods of test for mortar for masonry - Part 13: Determination of the dimensional stability of hardened mortars.*

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 method.*

prEN 12390-3:1999, *Testing hardened concrete - Part 3: Compressive strength of test specimens.*

ISO 758, *Liquid chemical products for industrial use - Determination of density at 20 °C.*

ISO 1158, *Plastics - Vinyl chloride homopolymers and copolymers - Determination of chlorine.*

ISO 4316, *Surface active agents - Determination of pH of aqueous solutions - Potentiometric method.*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions 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

the 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**

a single function of a multifunction admixture designated by the manufacturer

3.1.8**secondary function**

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

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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)

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 the admixtures defined in this standard shall conform to the general requirements in Table 1.

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 3.2.1 to 3.2.12 shall conform to the corresponding performance requirements as follows:

Water reducing/plasticizing admixtures	Table 2
High range water reducing/superplasticizing admixtures	Tables 3.1 and 3.2
Water retaining admixtures	Table 4
Air entraining admixtures	Table 5
Set accelerating admixtures	Table 6
Hardening accelerating admixtures	Table 7
Set retarding admixtures	Table 8
Water resisting admixtures	Table 9
Set retarding/water reducing/plasticizing admixtures	Table 10
Set retarding/high range water reducing/superplasticizing admixtures	Table 11.1 and Table 11.2
Set accelerating/water reducing/plasticizing admixtures	Table 12

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

NOTE Admixtures should not lead to a significant change in the shrinkage or expansion of hardened concrete. To measure this the procedure for determining dimensional stability in prEN 1015-13:1993 can be used with reference mortar according to EN 480-1.

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Table 1 – General Requirements

No	Property	Test method	Requirements
1	Homogeneity ^a	Visual	Homogeneous when used. Segregation shall not exceed the limit stated by the manufacturer
2	Colour ^a	Visual	Uniform and similar to the description provided by the manufacturer
3	Effective component ^a	EN 480-6 ^b	IR spectra to show no significant change with respect to the effective component when compared to reference spectrum provided by the manufacturer
4	Relative density ^a (for liquids only)	ISO 758	$D \pm 0,03$ if $D > 1,10$ $D \pm 0,02$ if $D \leq 1,10$ where D is manufacturer's stated value
5	Conventional dry material content ^a	EN 480-8 ^c	$0,95 T \leq X < 1,05 T$ for $T \geq 20 \%$ $0,90 T \leq X < 1,10 T$ for $T < 20 \%$ T is manufacturer's stated value % by mass; X is test result % by mass
6	pH value ^a	ISO 4316	Manufacturer's stated value ± 1 or within manufacturer's stated range
7	Effect on setting at maximum recommended dosage	EN 480-2 using maximum recommended dosage in reference mortar with 4 different cements as EN 480-1	Report results
8	Total chlorine ^{a d}	ISO 1158 ^e	Either $\leq 0,10 \%$ by mass or not above the manufacturer's stated value
9	Water soluble chloride (Cl) ^a	EN 480-10	Either $\leq 0,10 \%$ by mass ^h or not above the manufacturer's stated value
10	Alkali content (Na ₂ O equivalent) ^a	EN 480-12	Not above the manufacturer's stated maximum
11	Corrosion behaviour	^{f g}	No corrosion promoting effects on steel embedded in concrete ^g

^a Manufacturer's stated value shall be provided in writing, to the user.

^b If the method in EN 480-6 is not suitable the manufacturer shall recommend an alternative test method.

^c If the method in EN 480-8 is not suitable the manufacturer shall recommend an alternative test method.

^d If there is no significant difference between total chlorine and water soluble chloride content, only the water soluble chloride content should be determined in subsequent tests on the admixture involved.

^e The procedure in ISO 1158 shall be modified as follows:
- Increase of the sample size to 0,1 g of dry admixture;
- Use silver nitrate and ammonium thiocyanate solutions 0,01 N.

^f For testing, cement CEM I with C₃A content less than 5 % by mass shall be used.

^g Until there is an accepted European Standard the national regulations in the place of use shall apply when required.

^h Where the chloride content is $\leq 0,10 \%$ by mass the admixture may be described as "chloride free".

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	prEN 12390-3:1999	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	prEN 12390-3:1999	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)

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	prEN 12390-3:1999	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