BRITISH STANDARD

BS EN
934-1:2008

Admixtures for concrete, mortar and grout —

Part 1: Common requirements

ICS 91.100.30

National foreword

This British Standard is the UK implementation of EN 934-1:2008.

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 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.

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 31 March 2008

ISBN 978 0 580 56625 7

Amendments/corrigenda issued since publication

Date	Comments

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 934-1

January 2008

ICS 91.100.30

English Version

Admixtures for concrete, mortar and grout - Part 1: Common requirements

Adjuvants pour béton, mortier et coulis - Partie 1 : Exigences communes

Zusatzmittel für Beton, Mörtel und Einpressmörtel - Teil 1: Gemeinsame Anforderungen

This European Standard was approved by CEN on 24 October 2007.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 934-1:2008: E

Contents

Page

Foreword

This document (EN 934-1:2008) 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 July 2008, and conflicting national standards shall be withdrawn at the latest by July 2008.

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 standard is part of the series EN 934 “Admixtures for concrete, mortar and grout”, which is comprised of the following additional parts:

- Part 2 *Concrete admixtures – Definitions, requirements, conformity, marking and l*abelling
- 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 draft European Standard is used with the standards of the EN 480 series which comprises the test methods for admixtures.

This standard has been prepared under a mandate issued to CEN by the European Commission and the European Free Trade Association and supports essential requirements of the Construction Products Directive.

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, 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 and the United Kingdom.

Introduction

This European Standard covers the requirements that are common to all admixtures. The general requirements replace those which were previously included in EN 934 parts 2 to 5. They include the requirements for the effect on corrosion behaviour when admixtures are used in concrete, mortar or grout containing embedded metal.

The requirements for corrosion behaviour in this standard include an approved list and a declared list of active substances used in some admixtures. These lists are based on experience, which shows that the use of admixtures only containing substances on the approved list do not promote the corrosion of embedded steel. Materials on the declared list are subject, in some countries, to national restrictions on their use for certain applications and should be declared on the CE mark.

The specific requirements that characterise the performance of an admixture in a cementitous mix are detailed in EN 934 parts 2 to 5.

The special requirements are new and relate to specific uses of admixtures and/or their effect on the environment. It is anticipated that, in the future, special requirements will result from European legislation and, for example, will be applicable to admixtures used in concrete or mortar in contact with drinking water and to the release of dangerous regulated substances.

1 Scope

This European Standard specifies the common requirements for all admixtures covered by EN 934-2, EN 934-3, EN 934-4 and EN 934-5, which contain the specific requirements for each type of admixture.

The requirements for corrosion behaviour are not applicable to chloride based admixtures.

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 196-2, *Methods of testing cement - Part 2: Chemical analysis of cement*

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

EN 206-1:2000, *Concrete - Part 1: Specification, performance, production and conformity*

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

EN 480-14, *Admixtures for concrete, mortar and grout – Test methods – Part 14: Determination of the effect on corrosion susceptibility of reinforcing steel by potentiostatic electro-chemical test*

EN 934-2, *Admixtures for concrete, mortar and grout - Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling*

EN 934-3, *Admixtures for concrete, mortar and grout – Part 3: Admixtures for masonry mortar – Definitions, requirements, conformity, marking and labelling*

EN 934-4, *Admixtures for concrete, mortar and grout – Part 4: Admixtures for grout for prestressing tendons - Definitions, requirements, conformity, marking and labelling*

EN 934-5, *Admixtures for concrete, mortar and grout – Part 5: Admixtures for sprayed concrete - Definitions, requirements, conformity, marking and labelling*

EN ISO 1158, *Plastics - Vinyl chloride homopolymers and copolymers - Determination of chlorine content (ISO 1158:1998)*

ISO 758, *Liquid chemical products for industrial use – Determination of density at 20 degrees C*

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

3 Terms and Definitions

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

3.1
common requirements
requirements that apply to all admixtures within the scope of EN 934-2, EN 934-3, EN 934-4 and EN 934-5

3.2
general requirements
requirements that characterise the admixture by physical and chemical measurements and that apply to all admixtures within the scope of EN 934-2, EN 934-3, EN 934-4 and EN 934-5

3.3
specific requirements
requirements detailed in EN 934-2, EN 934-3, EN 934-4 or EN 934-5, which characterise the performance of the admixture in a cementitious mix

3.4
special requirements
requirements which apply to admixtures within the scope of EN 934-2, EN 934-3, EN 934-4 and EN 934-5 in relation to their effect on the environment or when used for specific applications

3.5
approved list
list of substances used as ingredients in admixtures that are accepted for use without the need for further testing in relation to the property stated in the list

NOTE Approved lists are specific to a requirement detailed in this standard.

3.6
declared list
list of substances used as ingredients in admixtures that do not have to be tested in relation to the property stated in the list but have to be declared because, in some countries, they are subject to national restrictions on their use for certain applications

4 General requirements

All admixtures within the scope of EN 934-2, EN 934-3, EN 934-4 and EN 934-5 shall conform to the requirements of Table 1.

Table 1 — General requirements

	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 declared by the manufacturer.
3	Effective component[a]	EN 480-6[b]	Infra red spectra to show no significant change with respect to the effective component when compared to the reference spectrum provided by the manufacturer.
4	Absolute density[a] (for liquid admixtures only)	ISO 758[c]	$D \pm 0,03$ if $D > 1,10$ kg/l $D \pm 0,02$ if $D \leq 1,10$ kg/l where D is manufacturer's stated value of density.
5	Conventional dry material content[a]	EN 480-8[d]	$0,95T \leq X \leq 1,05T$ if $T \geq 20$ % $0,90T \leq X \leq 1,10T$ if $T < 20$ % T is manufacturer's stated value % by mass; X is test result % by mass.
6	pH value[a] (for liquid admixtures only)	ISO 4316	Manufacturer's stated value $\pm$ 1 or within manufacturer's stated range.
7	Total chlorine[a f]	EN ISO 1158[g]	Either $\leq$ 0,10 % by mass[e] or not above manufacturer's stated value.
8	Water soluble chloride[a]	EN 480-10	Either $\leq$ 0,10 % by mass[e] or not above manufacturer's stated value.
9	Alkali content (Na_2O equivalent)[a]	EN 480-12	Not above manufacturer's stated maximum value in % by mass.
10	Corrosion behaviour	EN 480-14	See clause 5.
11	Silicon dioxide SiO_2 content[a h l]	EN 196-2 (procedure 13)	Not above manufacturer's stated maximum value in % by mass. 0

[a] Manufacturer's stated values and characteristics shall be provided in writing to the user upon request.

[b] If the method in EN 480-6 is not suitable, the manufacturer shall specify a documented alternative test method.

[c] ISO 758 is the reference method. Another method may be used provided that it can show essentially the same results as the method in ISO 758.

[d] If the method in EN 480-8 is not suitable, the manufacturer shall specify a documented alternative test method.

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

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

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

[h] The silicon dioxide content is only required when silica (see A.1) is a constituent intended to exceed 5 % by mass of the admixture.

[l] This requirement does not apply to natural sand.

5 Corrosion behaviour

5.1 Testing and labelling

No testing for corrosion behaviour is required for admixtures containing only substances on the approved list A.1 and declared list A.2.

Admixtures containing any substances not on the approved list A.1 or declared list A.2 shall be tested in accordance with EN 480-14 and meet the test requirement in 5.2.

Admixtures containing substances on the declared list A.2 shall have the names of the substances declared on the label.

NOTE For admixtures containing chloride and chlorine the requirements of Table 1, rows 7 and 8 apply.

5.2 Test requirement

When tested in accordance with EN 480-14 the calculated current density of each of three test mix specimens shall not exceed 10 $\mu A/cm^2$ at any time between 1 h and 24 h. In addition there shall be a similar trend in the progression of the current density vs. time curves for the control mix and the test mix.

6 Special requirements

NOTE Special requirements are currently being drafted by an Expert Group of the European Commission responsible for Construction Products in contact with Drinking Water. The requirements for admixtures, which are sold into concrete for drinking water applications, will be added to this European standard by amendment when they become available.

Annex A
(normative)

Approved and declared lists for corrosion behaviour

A.1 Approved list

Acetates	Melamine formaldehyde sulfonate
Alkanolamine	Natural resins and salts thereof
Anionic and cationic lattices	Naphthalene formaldehyde sulfonate
Aluminates	Phosphonic acid and salts thereof
Aluminium powder	Phosphates
Benzoates	Poly acrylate (acrylic ester polymers)
Borates	Poly carboxylate polymers
Carbonates	Poly carboxylate ethers
Citrates	Polysaccharides
Cellulose and cellulose ethers	Poly ethers
Ethoxylated amines	Polyvinyls and their derivatives
Fatty acids and fatty acid salts/esters	Saccharose
Fillers (cement and its main constituents in accordance with EN 197-1 and additions in accordance with EN 206-1:2000, clause 5.1.6)	Silica • Synthetic silica (Colloidal silica, nanometric silica) • Silica fume
Formaldehyde	Silicates
Gluconates	Starch and starch ether
Glycols and derivatives	Sugar
Hydroxides	Sulfates
Hydroxycarboxilic acids and hydroxycarboxilic acid salts	Surfactants
Lactates	Tartrates
Lignosulfonate	Waterglass
Malic acid	
Maltodextrins	
NOTE Minor organic constituents, e.g. preservatives or defoamers may be added in individual amounts ≤ 0,50 % by mass of constituent in the final admixture	

A.2 Declared list

Formates

Nitrates

Nitrites

Sulfides

Thiocyanates

NOTE 1 See Table 1, row 7 regarding the declaration of water soluble chloride.

NOTE 2 Limits on chloride content of concrete and mortar in the presence of embedded metals are contained in standards covering the use of admixtures.

NOTE 3 Where the use of substances on the declared list is regulated this normally relates to use in post-tensioned concrete.

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards 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 this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI 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@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL