



SLOVENSKI STANDARD

SIST EN 480-15:2013

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**Kemijski dodatki za beton, malto in injekcijsko maso - Metode preskušanja - 15.
del: Referenčni beton in metode za preskušanje spreminjanja viskoznosti
dodatkov**

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

Zusatzmittel für Beton, Mörtel und Einpressmörtel - Prüfverfahren - Teil 15:
Referenzbeton und Prüfverfahren zur Prüfung von viskositätsmodifizierenden
Zusatzmitteln
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Adjuvant pour béton, mortier et coulis - Méthodes d'essai - Partie 15 : Béton de
référence et méthode d'essai des adjuvants modificateurs de viscosité
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ICS:

91.100.30 Beton in betonski izdelki Concrete and concrete
products

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EUROPEAN STANDARD

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

Adjuvant pour béton, mortier et coulis - Méthodes d'essai -
Partie 15: Béton de référence et méthode d'essai des
adjuvants modificateurs de viscosité

Zusatzmittel für Beton, Mörtel und Einpressmörtel -
Prüfverfahren - Teil 15: Referenzbeton und Prüfverfahren
zur Prüfung von viskositätsmodifizierenden Zusatzmitteln

This European Standard was approved by CEN on 19 January 2013.

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.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 480-15:2013) 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 September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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 has been drafted by Subcommittee 3 (SC 3) of CEN/TC 104 “Admixtures for concrete, mortar and grout”.

This draft European Standard is part of the series EN 480, *Admixtures for concrete, mortar and grout — Test methods* which is comprised of the following parts:

- *Part 1: Reference concrete and reference mortar for testing*
- *Part 2: Determination of setting time*
- *Part 4: Determination of bleeding of concrete*
- *Part 5: Determination of capillary absorption*
- *Part 6: Infrared analysis*
- *Part 8: Determination of the conventional dry material content*
- *Part 10: Determination of water soluble chloride content*
- *Part 11: Determination of air void characteristics in hardened concrete*
- *Part 12: Determination of the alkali content of admixtures*
- *Part 13: Reference masonry mortar for testing mortar admixtures*
- *Part 14: Determination of the effect on corrosion susceptibility of reinforcing steel by potentiostatic electro-chemical test*
- *Part 15: Reference concrete and method for testing viscosity modifying admixtures (the present document)*

This European Standard is applicable together with the other standards of the EN 480 series and for testing admixtures in accordance with the EN 934 series of standards.

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

EN 480-15:2013 (E)**1 Scope**

This European Standard specifies the constituent materials, the composition and the mix procedure to produce a reference concrete with a prescribed consistency and segregated portion for testing viscosity modifying admixtures as defined in EN 934-2. It also describes how to determine the requirements for the test mix in comparison with the control mix.

2 Normative references

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

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

EN 196-6, *Methods of testing cement — Part 6: Determination of fineness*

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

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

EN 1008, *Mixing water for concrete — Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*

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

EN 12350-8, *Testing fresh concrete — Part 8: Self-compacting concrete — Slump-flow test*

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

EN 12390-1, *Testing hardened concrete — Part 1: Shape, dimensions and other requirements for specimens and moulds*

EN 12390-2, *Testing hardened concrete — Part 2: Making and curing specimens for strength tests*

EN 12620, *Aggregates for concrete*

3 Constituent materials**3.1 Cement**

The reference concrete shall be made with a CEM I cement of strength class 42,5 or 52,5 conforming to EN 197-1.

The cement used shall have a C₃A content of 7 % to 11 % by mass calculated from chemical analysis according to EN 196-2 and a specific surface of 3 200 cm²/g to 4 600 cm²/g determined according to EN 196-6.

3.2 Aggregate

A natural normal weight aggregate conforming to EN 12620 with low water absorption (≤ 2 % by mass) shall be used. The grading shall conform to Table 1.

Table 1 — Aggregate for reference concrete

Aperture size - mm	Percentage by mass passing the test sieve
16	95 to 100
12	85 to 100
8	62 to 74
4	42 to 52
2	28 to 38
1	19 to 29
0,500	11 to 21
0,250	4 to 14
0,125	2 to 6
0,063	0 to 2

3.3 Mixing water

Water according to EN 1008, or distilled or de-ionised water shall be used as mixing water.

Wash water from concrete production shall not be used.

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4 Reference concrete

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Unless otherwise specified, tests on the reference concrete are performed as comparative tests. That is, the performance of the admixtures is determined by comparing the reference concrete containing the viscosity modifying admixture (test mix) with the reference concrete made without the viscosity modifying admixture (control mix) but otherwise with the same aggregate/cement ratio and constituents from the same delivery.

The requirements for the reference concrete are given in Table 2. The fresh concrete shall be fully compacted. The air content of the control mix shall not exceed 2 % by volume.

Table 2 — Requirements for reference concrete

Constituent / test	Requirement
Reference Cement	$(400 \pm 10) \text{ kg/m}^3$
Aggregate	According to 3.2. The aggregate: cement ratio shall be recorded
Superplasticizer to EN 934-2	Within manufacturers normal range
Water	$\leq 230 \text{ kg/m}^3$
Slump flow (SF) to EN 12350-8	Control mix 660 mm to 750 mm Test mix \geq control mix
Sieve segregation (SR) to EN 12350-11	Control mix $15 \% \leq \text{SR} \leq 30 \%$
Air content to EN 12350-7	Control mix $\leq 2 \%$

5 Preparation of reference concrete

5.1 Mix proportions

The mix proportions shall be in accordance with Table 2.

The aggregate shall be used in an oven dry condition ($\geq 105 \text{ }^\circ\text{C}$) to remove doubts on moisture content variation. If the aggregate is not oven dry, its moisture content shall be determined and the aggregate and water content shall be corrected accordingly. In the case of dispute, oven dry aggregates shall be used.

The dosage of the superplasticizer and the quantity of water in the control mix shall be such as to obtain an initial slump flow (SF) and sieve segregation (SR) in accordance with Table 2.

The test mix containing the viscosity modifying admixture shall have the same water content, cement content and the same aggregate: cement ratio as the control mix but the dosage of superplasticizer shall be adjusted if necessary to give a consistence not less than that of the control mix.

5.2 Mixing and testing

Prior to mixing, each of the constituents shall be conditioned to a temperature of $(20 \pm 2) \text{ }^\circ\text{C}$.

The following mixing technique shall be adopted to ensure repeatability of results and eliminate initial moisture absorption effects on consistence.

- Use a forced action pan mixer to a minimum of 50 % and a maximum 90 % of capacity.
- Wipe the inside with a damp cloth if dry.
- Add all the aggregates to the pan mixer with half the mixing water. Mix for 2 min then stand for 2 min. Cover the pan mixer during the standing period to minimise evaporation effects.
- Restart the mixer for 30 s after or while adding the cement. Over the next 30 s, add the remaining water and admixtures as appropriate to the mix (noting any manufacturer's recommendations with respect to the order and timing). Mix for a further 2 min.
- Determine the slump flow (SF) and start the sieve segregation test (SR) within 10 min of completion of mixing.