



SLOVENSKI STANDARD
oSIST prEN 480-1:2022

01-februar-2022

**Kemijski dodatki za beton, malto in injekcijsko maso - Preskusne metode - 1. del:
Referenčni beton in referenčna malta za preskušanje**

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

Zusatzmittel für Beton, Mörtel und Einpressmörtel - Prüfverfahren - Teil 1: Referenzbeton und Referenzmörtel für Prüfungen

Adjuvants pour béton, mortier et coulis - Méthodes d'essai - Partie 1 : Béton et mortier de référence pour essais

Ta slovenski standard je istoveten z: prEN 480-1

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ICS:

91.100.10	Cement. Mavec. Apno. Malta	Cement. Gypsum. Lime. Mortar
91.100.30	Beton in betonski izdelki	Concrete and concrete products

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
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December 2021

ICS 91.100.10; 91.100.30

Will supersede EN 480-1:2014

English Version

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

Adjuvants pour béton, mortier et coulis - Méthodes
d'essai - Partie 1 : Béton et mortier de référence pour
essais

Zusatzmittel für Beton, Mörtel und Einpressmörtel -
Prüfverfahren - Teil 1: Referenzbeton und
Referenzmörtel für Prüfungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 480-1:2021) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by SN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 480-1:2014.

This document is part of the series EN 480 *Admixtures for concrete, mortar and grout — Test methods*, which comprises the following:

- *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*

This standard is applicable together with the standards of the series EN 934 *Admixtures for concrete, mortar and grout*.

The main changes compared to the previous edition are as follows:

- a) the determination of the consistence of the reference mortar by workability in accordance with EN 413-2 is deleted as this option is no longer covered by EN 413-2;
- b) editorial changes.

prEN 480-1:2021 (E)**1 Scope**

This document specifies the constituent materials, the composition and the mixing method to produce reference concrete and reference mortar for testing the efficacy and the compatibility of admixtures in accordance with the series EN 934.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 196-1, *Methods of testing cement — Part 1: Determination of strength*

EN 196-2, *Method 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 413-2, *Masonry cement — Part 2: Test methods*

EN 934 (all parts), *Admixtures for concrete, mortar and grout*

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

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

EN 12350-6, *Testing fresh concrete — Part 6: Density*

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

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 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Constituent materials

4.1 Cement

The reference concrete and mortar 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 to 4 600) cm²/g determined according to EN 196-6.

4.2 Aggregate

4.2.1 Aggregate for reference concrete

A natural normal weight aggregate conforming to EN 12620 with low water absorption (less than 2 % by mass) shall be used. The size fractions of the aggregate used in the production of reference concretes shall lie within the limits given in Table 1.

Table 1 — Aggregate for reference concrete

Aperture size (mm)	Percentage by mass passing the test sieve ^{a b}
31,5	100
16,0	75 to 95
8,0	45 to 70
4,0	35 to 50
2,0	25 to 40
1,0	20 to 35
0,5	10 to 25
0,25	4 to 12
0,125	1 to 8

^a The range is selected to accommodate both crushed and uncrushed aggregate.

^b The variation in the quantity passing each sieve of the chosen grading for both mixes (control and test mix) shall not exceed ± 2,0 % by mass.

4.2.2 Aggregate for reference mortar

Standard sand according to EN 196-1 shall be used as the aggregate for the reference mortar.

4.3 Mixing water

Water according to EN 1008 shall be used as mixing water.

Distilled or de-ionized water may be used in special cases.

It is not allowed to use wash water from concrete production.

5 Reference concrete

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

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

Table 2 — Requirements for reference concrete ^a

Reference concrete	Cement content ^c kg/m ³	Consistence at required test temperature ^{b d}	
		Slump (mm)	Flow (mm)
I	350 ± 5	70 ± 10	400 ± 20
II	300 ± 5	120 ± 20	450 ± 20
III	350 ± 5	50 ± 10	350 ± 10
IV	350 ± 5	30 ± 10	350 ± 20

^a When testing at equal w/c ratio the requirements for consistence shall only apply to the control mix.

^b These consistence tests are alternatives and have to be chosen before starting the test. Slump shall be determined in accordance with EN 12350-2 or flow in accordance with EN 12350-5 respectively.

^c Control mix only: The resulting cement content of the test mix may change as a result of volume change to concrete caused by water reducing or air entraining effects of the admixture under test.

^d For high range water reducing/superplasticising admixture the consistence of the test mix shall be not less than the consistence of the control mix with no upper limit on consistence of the test mix.

6 Reference mortar

Unless otherwise specified, tests on reference mortar are performed as comparative tests. That is, comparing the performance of the reference mortar containing an admixture (test mix) with the performance of the reference mortar without an admixture (control mix).

Standard mortar conforming to EN 196-1 shall be used as the reference mortar.

7 Production of reference concrete

7.1 Mix proportion

The cement content shall be in accordance with Table 2.

Aggregate shall be used in an oven dry condition (≥ 105 °C) to remove doubts on moisture content variation. If the aggregate is not oven dry, its moisture content shall be determined and the specific gravity shall be corrected accordingly. In case of dispute, oven dry aggregate shall be used.

The test mix shall have the same aggregate:cement ratio as the control mix but the water content shall be adjusted to give a consistence within the limits given in Table 2 for the control mix. The water content of the mix shall be calculated from the moisture content of the aggregate, the mixing water and

the water content of the admixture. In the case of the plasticised or superplasticised flowing concrete mix and when testing water resisting admixtures at equal w/c ratio no water reduction shall be made.

7.2 Mixing and testing

Prior to mixing, each of the constituents shall be conditioned to a temperature of (20 ± 2) °C or when required by the test method, to (5 ± 1) °C.

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

Use a forced action pan mixer to its minimum of 50 % capacity (maximum 90 % of capacity).

Wipe the inside with a damp cloth if dry.

Add all of the aggregate to the pan mixer with half the mixing water. Mix for two minutes, then stand for two minutes. Cover the pan mixer during the standing period to minimize evaporation effects.

Re-start the mixer for thirty seconds after or whilst adding the cement. Add the remaining water (plus admixture in the test mix) over the next thirty seconds. Mix for two minutes.

In the case of powder admixture, the admixture shall be added to the dry constituents of the concrete unless otherwise specified by the manufacturer.

Determine the consistence within five minutes from completion of mixing.

Immediately after mixing and initial testing, store the specimens at the required test temperature, (20 ± 2) °C or (5 ± 1) °C.

If the consistence is outside the limit in Table 2, (except test mixes at equal w/c ratio and in accordance with Table 2 footnote d) discard the mix and repeat at a revised water content.

Determine the density according to EN 12350-6 and check whether the cement content conforms to the values given in Table 2. If the cement content is outside the limits discard the mix and repeat with a revised content of cement, aggregate and water.

Measure air content according to EN 12350-7 and make specimens within 30 min from completion of mixing. Unless otherwise specified in the standards of the series EN 934, three cubes or cylinders shall be taken for compressive strength testing at each test age and results averaged for the assessment of compliance. Prepare and cure the specimens in accordance with EN 12390-2 using moulds conforming to EN 12390-1. If one of the specimens varies from the average for the set by more than 10 %, it shall be discarded and the average recalculated on the remaining two specimens.

8 Production of reference mortar

8.1 Mix proportions

The proportion of cement and sand shall be in accordance with EN 196-1.

The amount of water added to the control mix shall be in accordance with EN 196-1. For test mixes the water added shall be sufficient to give equal consistence to that of the control mix, except when testing water resisting admixtures at equal w/c ratio.

8.2 Mixing and testing

The requirements of conditioning and temperature after mixing shall be as specified in 7.2.

Mix the dry sand and cement for 30 s at low speed in a mixer in accordance with EN 196-1.

Add all the water (plus admixture in the test mix) over the next 30 s at low speed.

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In the case of a powder admixture, which is not soluble or dispersible, the admixture shall be added to the dry constituents of the mortar unless otherwise specified by the manufacturer.

Continue mixing for 60 s at low speed.

Stop mixing and remove any unmixed material from the edge and bottom of the bowl using the mixing paddle over a period of 30 s.

Re-start mixing and continue for a further 60 s at high speed. Total mixing time shall be 3 min 30 s.

Determine consistence in accordance with EN 413-2 by plunger apparatus or flow table within 5 min from completion of mixing. If the plunger value of the test mix (except for mixes of equal w/c ratio) differs from the control mix by more than 3 mm, discard the mix and repeat at a revised water content.

If the flow value of the test mix (except for mixes of equal w/c ratio) differs from that of the control mix by more than 5 %, discard the mix and repeat at a revised water content.

9 Test report

The test report shall include the following information about the reference concrete and/or the reference mortar:

For control and test concrete:

aggregate:

- source;
- crushed or uncrushed;
- type;
- grading;

— moisture content if not oven dry;

cement:

- source;
- cement notation and class in accordance with EN 197-1;
- C3A content;
- specific surface area;

control concrete and/or mortar:

- consistence;
- fresh bulk density;
- air content;
- details of other tests carried out on the mix;

test concrete and/or mortar:

- admixture dosage;

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