

SLOVENSKI STANDARD SIST EN 13286-47:2012

01-september-2012

Nadomešča: SIST EN 13286-47:2004

Nevezane in hidravlično vezane zmesi - 47. del: Preskusna metoda za ugotavljanje kalifornijskega indeksa nosilnosti (CBR), neposrednega indeksa nosilnosti (IBI) in linearnega nabrekanja

Unbound and hydraulically bound mixtures - Part 47: Test method for the determination of California bearing ratio, immediate bearing index and linear swelling

iTeh STANDARD PREVIEW

Ungebundene und hydraulisch gebundene Gemische - Teil 47: Prüfverfahren zur Bestimmung des CBR-Wertes (California bearing ratio), des direkten Tragindex (IBI) und des linearen Schwellwertes

SIST EN 13286-47:2012

https://standards.iteh.ai/catalog/standards/sist/1bbf2222-e1b3-4a03-b2fa-

Mélanges non traités et mélanges à base de liant hydraulique - Partie 47 : Méthodes d'essai de la capacité portante au moyen de l'indice portant CBR, de l'indice portant immédiat et du gonflement

Ta slovenski standard je istoveten z: EN 13286-47:2012

ICS: 93.080.20 Materiali za gradnjo cest F

Road construction materials

SIST EN 13286-47:2012

en,fr,de



iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 13286-47:2012 https://standards.iteh.ai/catalog/standards/sist/1bbf2222-e1b3-4a03-b2fac26eacb76c18/sist-en-13286-47-2012

SIST EN 13286-47:2012

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 13286-47

April 2012

ICS 93.080.20

Supersedes EN 13286-47:2004

English Version

Unbound and hydraulically bound mixtures - Part 47: Test method for the determination of California bearing ratio, immediate bearing index and linear swelling

Mélanges traités et mélanges non traités aux liants hydrauliques - Partie 47: Méthode d'essai pour la détermination de l'indice portant Californien (CBR), de l'indice de portance immédiate (IPI) et du gonflement linéaire Ungebundene und hydraulisch gebundene Gemische - Teil 47: Prüfverfahren zur Bestimmung des CBR-Wertes (California bearing ratio), des direkten Tragindex (IBI) und des linearen Schwellwertes

This European Standard was approved by CEN on 9 March 2012.

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.

ST EN 13286-47:2012

CEN members are the national standards bodies of 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 United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

SIST EN 13286-47:2012

EN 13286-47:2012 (E)

Contents

Forewo	ord	.3
1	Scope	.5
2	Normative references	.5
3	Terms and definitions	.5
4	Principle	.5
5 5.1 5.2 5.3	Apparatus Apparatus for specimen manufacture Additional apparatus for soaking procedure and measurement of swelling Additional apparatus for determination of the California bearing ratio and immediate bearing index	.6 .6 .6
6	Test sample for the California bearing ratio and immediate bearing index tests	.6
7	Specimen manufacture for the California bearing ratio and immediate bearing index tests	.7
8 8.1 8.2 8.3 8.4	Curing for California bearing ratio test General Curing by prevention of evaporation ANDARD PREVIEW Curing that permits full soaking Curing consisting of 'prevention of evaporation' followed by soaking	.7 .7 .7 .8 .8
9	Procedure for California bearing ratio and immediate bearing index determination	.9
10 10.1 10.2 10.3	Calculation and expression of results Force/penetration curve	.9 .9 10 10
44	To advance of	

Foreword

This document (EN 13286-47:2012) has been prepared by Technical Committee CEN/TC 227 "Road materials", 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 October 2012, and conflicting national standards shall be withdrawn at the latest by October 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 EN 13286-47:2004.

The following changes have been made in comparison with EN 13286-47:2004:

- Editorial changes;
- Addition of the 2nd paragraph in Clause 6.

This European standard is one of a series of standards as listed below: R.W.

- EN 13286-1, Unbound and hydraulically bound mixtures Part 1: Test methods for laboratory reference density and water content — Introduction, general requirements and sampling;
- EN 13286-2, Unbound and hydraulically bound mixtures Part 2: Test methods for laboratory reference density and water content — Proceed compaction; 13286-47-2012
- EN 13286-3, Unbound and hydraulically bound mixtures Part 3: Test methods for laboratory reference density and water content — Vibrocompression with controlled parameters;
- EN 13286-4, Unbound and hydraulically bound mixtures Part 4: Test methods for laboratory reference density and water content — Vibrating hammer;
- EN 13286-5, Unbound and hydraulically bound mixtures Part 5: Test methods for laboratory reference density and water content Vibrating table;
- EN 13286-7, Unbound and hydraulically bound mixtures Part 7: Cyclic load triaxial test for unbound mixtures;
- EN 13286-40, Unbound and hydraulically bound mixtures Part 40: Test method for the determination of the direct tensile strength of hydraulically bound mixtures;
- EN 13286-41, Unbound and hydraulically bound mixtures Part 41: Test method for the determination of the compressive strength of hydraulically bound mixtures;
- EN 13286-42, Unbound and hydraulically bound mixtures Part 42: Test method for the determination of the indirect tensile strength of hydraulically bound mixtures;
- EN 13286-43, Unbound and hydraulically bound mixtures Part 43: Test method for the determination of the modulus of elasticity of hydraulically bound mixtures;

EN 13286-47:2012 (E)

- EN 13286-44, Unbound and hydraulically bound mixtures Part 44: Test method for the determination of the alpha coefficient of vitrified blast furnace slag;
- EN 13286-45, Unbound and hydraulically bound mixtures Part 45: Test method for the determination of the workability period of hydraulically bound mixtures;
- EN 13286-46, Unbound and hydraulically bound mixtures Part 46: Test method for the determination of the moisture condition value;
- EN 13286-47, Unbound and hydraulically bound mixtures Part 47: Test method for the determination of California bearing ratio, immediate bearing index and linear swelling;
- EN 13286-48, Unbound and hydraulically bound mixtures Part 48: Test method for the determination of degree of pulverisation;
- EN 13286-49, Unbound and hydraulically bound mixtures Part 49: Accelerated swelling test for soil treated by lime and/or hydraulic binder;
- EN 13286-50, Unbound and hydraulically bound mixtures Part 50: Method for the manufacture of test specimens of hydraulically bound mixtures using Proctor equipment or vibrating table compaction;
- EN 13286-51, Unbound and hydraulically bound mixtures Part 51: Method for the manufacture of test specimens of hydraulically bound mixtures using vibrating hammer compaction;
- EN 13286-52, Unbound and hydraulically bound mixtures Part 52: Method for the manufacture of test specimens of hydraulically bound mixtures using vibrocompression;
- EN 13286-53, Unbound and hydraulically bound mixtures Part 53. Methods for the manufacture of test specimens of hydraulically bound mixtures using axial compression; SIST EN 13286-47:2012
- prEN 13286-54, Unbound and hydraulically bound mixtures UPart 54: Test method for the determination of frost susceptibility Resistance to freezing and thawing of hydraulically bound mixtures.

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.

1 Scope

This European Standard specifies the test methods for the laboratory determination of the California bearing ratio and immediate bearing index.

The tests are appropriate to that part of the mixture up to a maximum particle size of 22,4 mm.

When immersion in water is specified as part of the curing of the specimen, this European Standard also includes the determination of vertical swelling of the specimen before the determination of the California bearing ratio.

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 1097-5:2008, Tests for mechanical and physical properties of aggregates — Part 5: Determination of the water content by drying in a ventilated oven

EN 13286-2, Unbound and hydraulically bound mixtures — Part 2: Test methods for laboratory reference density and water content — Proctor compaction

iTeh STANDARD PREVIEW

3 Terms and definitions (standards.iteh.ai)

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

https://standards.iteh.ai/catalog/standards/sist/1bbf2222-e1b3-4a03-b2fa-

3.1

c26eacb76c18/sist-en-13286-47-2012

California bearing ratio

ratio used to characterise the bearing capacity of a mixture, determined immediately after compaction, or after a period of curing

3.2

immediate bearing index

immediate California bearing ratio test without surcharge

3.3

Proctor compactive effort

compactive effort used in the Proctor test described in EN 13286-2

3.4

modified Proctor compactive effort

compactive effort used in the modified Proctor test described in EN 13286-2

3.5

curing

period of time and storage condition between manufacture and testing of the specimen for the California bearing ratio

4 Principle

The relationship between force and penetration is determined when a cylindrical piston of a standard crosssectional area is made to penetrate a specimen of a mixture, contained within a mould, at a given rate.

EN 13286-47:2012 (E)

The California bearing ratio or immediate bearing index is calculated by expressing the force on the piston for a given penetration as a percentage of a reference force.

5 Apparatus

5.1 Apparatus for specimen manufacture

- 5.1.1 Proctor mould B with appropriate spacer disc, if required conforming to EN 13286-2.
- 5.1.2 Rammer A or B, conforming to EN 13286-2.
- **5.1.3** Balance accurate to $\pm 0,1$ % of mass weighed and capable of weighing up to 30 kg.
- 5.1.4 Apparatus conforming to EN 1097-5:2008 for water content determination.
- **5.1.5** Miscellaneous apparatus including coarse filter papers, a steel straightedge, scrapers, etc.

5.2 Additional apparatus for soaking procedure and measurement of swelling

5.2.1 Base plate uniformly perforated for minimum 1 % of its surface.

5.2.2 Perforated top plate in aluminium alloy with adjustable stem to provide the seating for the stem of a dial gauge. iTeh STANDARD PREVIEW

5.2.3 Unperforated top plate in aluminium alloy with a thickness (10 ± 1) mm with adjustable stem to provide the seating for the stem of a dial gauge inclares. Iten.al)

5.2.4 Device for measuring the vertical expansion 206 the orbit of the California bearing ratio accurate to 0,05 mm. https://standards.iteh.ai/catalog/standards/sist/1bbf2222-e1b3-4a03-b2fa-

5.2.5 Soaking tank, large enough to allow the Proctor mould B to be submerged, preferably supported on an open mesh platform.

5.2.6 Annular surcharge rings, each having a mass known to \pm 100 g, an internal diameter of (53 \pm 1) mm and an external diameter equal to the diameter of the mould minus 5 mm.

NOTE Alternatively half-annular segments may be used.

5.3 Additional apparatus for determination of the California bearing ratio and immediate bearing index

5.3.1 Cylindrical penetration piston with a diameter of (50 ± 0.5) mm, the lower end of which shall be of hardened steel.

5.3.2 Loading machine with a capacity of at least 50 kN capable of applying the test force through the piston at a penetration rate of $(1,27 \pm 0,20)$ mm/min.

The machine shall be equipped with a load-indicating device that can be read to 5 N or less.

6 Test sample for the California bearing ratio and immediate bearing index tests

After sieving on a 22,4 mm sieve, approximately 7,5 kg of mixture shall be used for one test and water content determination. The quantity shall be weighed accurately so that the actual quantity used for the test sample can be determined after compaction by difference for checking purposes.

NOTE Preliminary trials may be necessary to ascertain the required quantity more closely.

The determination of the immediate bearing index shall be carried out no later than 90 min after mixing for all hydraulically bound mixtures but no sooner than 60 min where lime is used.

7 Specimen manufacture for the California bearing ratio and immediate bearing index tests

7.1 Clamp the mould, with extension collar attached, to the base plate. Insert the spacer disc over the base plate and place an anti-sticking medium such as coarse filter paper on top of the spacer disc. The California bearing ratio assembly shall be placed on a solid substrate e.g. concrete or plinth, prior to specimen manufacture. Compact the mixture into the mould using either Proctor or modified Proctor compactive effort in accordance with EN 13286-2.

NOTE It is normal but not universal practice to use a mould that requires the use of a spacer disc.

7.2 After compaction, remove the extension collar and carefully trim the mixture flush with the top of the mould with the scraper, checking with the steel straightedge. Patch with smaller size material any holes that may have developed in the surface during trimming.

7.3 Remove the baseplate and spacer disc (where used), weigh, and record the mass of the mould and mixture to the nearest 5 g.

NOTE In the case of mixtures lacking cohesion, it would be better to weigh the mould and mixture with the baseplate and spacer disc attached to avoid loss of mixture. DARD PREVER

7.4 For immediate California bearing ratio and immediate bearing index tests, proceed to Clause 9, if not, the specimen shall be cured using one of the procedures described in Clause 8.

7.5 The material surplus to that required for the test specimen shall be used to determine, in accordance with EN 1097-5, the water content of the test portion.

8 Curing for California bearing ratio test

8.1 General

A curing period, which may be required between specimen manufacture and testing, shall consist of the storage of the specimens for a specified period of time in one of the following states:

- a) a condition that prevents evaporation resulting in a loss of mass of more than 2 %;
- b) a condition that permits full soaking of the specimens (immersion);
- c) 'prevention of evaporation' [as in a)] followed by full soaking.

In each case, the type of curing, the average temperature and duration of storage shall be recorded and stated.

8.2 Curing by prevention of evaporation

Curing by prevention of water loss by evaporation shall be carried out by one of the following methods:

- a) storage in a climatic cabinet or room with a relative humidity of at least 98 %;
- b) coating the ends of the specimen with wax;