



# SLOVENSKI STANDARD

## SIST EN 14227-5:2013

01-julij-2013

Nadomešča:  
SIST EN 14227-5:2005

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**Hidravlično vezane zmesi - Specifikacije - 5. del: S hidravličnimi vezivi vezane zmesi**

Hydraulically bound mixtures - Specifications - Part 5: Hydraulic road binder bound mixtures

Hydraulisch gebundene Gemische - Anforderungen - Teil 5: Tragschichtbindergebundene Gemische  
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Mélanges traités aux liants hydrauliques - Spécifications - Partie 5: Mélanges granulaires traités aux liants hydrauliques routiers  
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**Ta slovenski standard je istoveten z: EN 14227-5:2013**

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**ICS:**

93.080.20      Materiali za gradnjo cest      Road construction materials

**SIST EN 14227-5:2013**      en,fr,de

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 14227-5**

May 2013

ICS 93.080.20

Supersedes EN 14227-5:2004

English Version

## Hydraulically bound mixtures - Specifications - Part 5: Hydraulic road binder bound granular mixtures

Mélanges traités aux liants hydrauliques - Spécifications -  
Partie 5: Mélanges granulaires traités aux liants  
hydrauliques routiers

Hydraulisch gebundene Gemische - Anforderungen - Teil 5:  
Tragschichtbindergebundene Gemische

This European Standard was approved by CEN on 1 March 2013.

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**EN 14227-5:2013 (E)****Foreword**

This document (EN 14227-5:2013) 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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.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 supersedes EN 14227-5:2004.

Compared with EN 14227-5:2004, the following changes have been made:

- Changing of the title;
- Revision of Clause 1 "Scope";
- Revision of Clause 2 "Terms and definitions";
- Revision of Clause 4 "Symbols and abbreviated terms";
- Revision of Clause 5 "Constituents";
- Revision of Clause 6 "Cement bound granular mixture";
- Revision of Clause 7 "Laboratory mechanical performance classification";
- Inclusion of Clause 8 "Other requirements for the mixtures";
- Revision of Clause 10 "Designation and description";
- Inclusion of Annex A (normative) "Compacity of a cement bound granular mixture 2".

This standard is one of a series of parts for EN 14227, *Hydraulically bound mixtures — Specifications*:

- *Part 1: Cement bound granular mixtures*
- *Part 2: Slag bound granular mixtures*
- *Part 3: Fly ash bound granular mixtures*
- *Part 4: Fly ash for hydraulically bound mixtures*
- *Part 5: Hydraulic road binder bound granular mixtures*
- *Part 10: Soil treated by cement*
- *Part 11: Soil treated by lime*
- *Part 12: Soil treated by slag*

— *Part 13: Soil treated by hydraulic road binder*

— *Part 14: Soil treated by fly ash*

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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.

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**EN 14227-5:2013 (E)****1 Scope**

This European Standard specifies hydraulic road binder bound granular mixtures for road construction, airfields and other trafficked areas and specifies the requirements for their constituents, composition and laboratory performance classification.

**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 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method*

EN 1097-6:2000, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

EN 1097-7, *Tests for mechanical and physical properties of aggregates — Part 7: Determination of the particle density of filler — Pyknometer method*

EN 13242, *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*

EN 13282-1, *Hydraulic road binders — Part 1: Rapid hardening hydraulic road binders — Composition, specifications and conformity criteria*

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 — Proctor compaction*

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 13286-40, *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 13286-45, *Unbound and hydraulically bound mixtures — Part 45: Test method for the determination of the workability period of hydraulically bound mixtures*



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 13286-50, *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*

### 3 Terms and definitions

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

#### 3.1

##### **hydraulically bound mixture**

mixture which sets and hardens by hydraulic reaction

#### 3.2

##### **hydraulic road binder bound granular mixture**

granular hydraulically bound mixture where hydraulic road binder is the binder

#### 3.3

##### **slenderness ratio**

height to diameter ratio of the specimen [SIST EN 14227-5:2013](https://standards.iteh.ai/catalog/standards/sist/af25f355-2909-4a5f-b399-87a53ba1e782/sist-en-14227-5-2013)

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#### 3.4

##### **compacity**

ratio of the absolute volume of the solid to the apparent volume of the mixture (see Annex A)

### 4 Symbols and abbreviated terms

For the purpose of this document, the following symbols and abbreviated terms apply.

$R_c$  is the compressive strength, expressed in megapascals (MPa);

$R_i$  is the compressive strength after immersion, expressed in megapascals (MPa);

$R_t$  is the direct tensile strength, expressed in megapascals (MPa);

$R_{it}$  is the indirect tensile strength, expressed in megapascals (MPa);

$E$  is the modulus of elasticity, expressed in megapascals (MPa);

$E_c$  is the  $E$  determined by compression, expressed in megapascals (MPa);

$E_t$  is the  $E$  determined in direct tension, expressed in megapascals (MPa);

$E_{it}$  is the  $E$  determined in indirect tension, expressed in megapascals (MPa).

**EN 14227-5:2013 (E)****5 Constituents****5.1 Aggregates**

Aggregates shall be selected from EN 13242.

The properties and the appropriate categories of the aggregates shall be specified depending on the position of the hydraulic road binder bound granular mixture in the pavement structure and the traffic to be carried.

Aggregates shall be volumetrically stable. When this is not the case, the use of the mixture shall be permitted provided there is a satisfactory performance record or a thorough laboratory evaluation of the mixture has been carried out in accordance with provisions valid at the place of use.

**5.2 Hydraulic road binder**

Hydraulic road binder shall comply with EN 13282-1 or with a European Technical Approval.

**5.3 Water**

Water shall not contain components which adversely affect the hardening and performance of the hydraulic road binder bound granular mixtures.

**5.4 Retarders**

Retarders shall comply with provisions valid in the place of use.

NOTE Generally, retarders are not necessary.

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**6 Hydraulic road binder bound granular mixture**

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**6.1 Types**

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Hydraulic road binder bound granular mixture shall be made from the constituents specified in Clause 5.

The mixture shall be selected from the 4 types described in 6.1.1 to 6.1.4 and shall conform to the specified requirements for the selected mixture.

**6.1.1 Hydraulic road binder bound granular mixture 1**

Hydraulic road binder bound granular mixture 1 shall be a 0/31,5 mm mixture with a grading, determined in accordance with EN 933-1, complying with the requirements in Figure 1.

**6.1.2 Hydraulic road binder bound granular mixture 2****6.1.2.1 Description**

Hydraulic road binder bound granular mixture 2 shall be a granular mixture with compacity requirement. There are 3 sub-types depending on the aggregate size.

**6.1.2.2 Grading of the mixture**

The grading of the selected sub-type, determined in accordance with EN 933-1, shall comply with Table 1. According to the use of the mixture, either category G1 or category G2 of the grading envelopes in Figures 2 to 4 shall be specified.

**Table 1 — Grading of hydraulic road binder bound granular mixture 2**

Column	1	2	3
Line	<b>Hydraulic road binder bound granular mixture</b>	<b>Grading category</b>	<b>Grading envelopes</b>
1	2-0/20	G1 or G2	Figure 2
2	2-0/14	G1 or G2	Figure 3
3	2-0/10	G1 or G2	Figure 4

### 6.1.3 Hydraulic road binder bound granular mixture 3

#### 6.1.3.1 Description

Hydraulic road binder bound granular mixture 3 shall be a granular mixture with a maximum nominal size of D equal or less than 6,3 mm with an immediate bearing index requirement.

#### 6.1.3.2 Grading of the mixture

The grading of the mixture, determined in accordance with EN 933-1, shall comply with Table 2.

**Table 2 — Grading of hydraulic road binder bound granular mixture 3**

Column	1	2	3	4
Line	Sieve mm	2D	D	0,063
1	Percentage passing by mass	100	≥ 85	≤ 35

#### 6.1.3.3 Immediate bearing index

The immediate bearing index category shall be selected from Table 3.

### 6.1.4 Hydraulic road binder bound granular mixture 4

Hydraulic road binder bound granular mixture 4 shall be a mixture where the grading including upper and lower limits, determined in accordance with EN 933-1, is declared by the supplier.

When required, an immediate bearing index category selected from Table 3 shall be declared.

## 6.2 Water content of mixtures

The water content shall be selected to permit compaction on site by rolling and to optimise the mechanical performance of the mixture. The water content shall be determined by the Proctor test or other method in accordance with EN 13286-1, EN 13286-2, EN 13286-3, EN 13286-4 and EN 13286-5, and limits set to give a workable range of water content on site compatible with the compaction and the desired mechanical performance of the mixture.

## 6.3 Proportioning of the constituents, grading and dry density

The proportioning of the constituents, expressed as a percentage by dry mass of the total dry mass of the mixture, the grading, and the dry density of the mixture shall be declared. The declared proportions shall be based on the laboratory mixture design and/or practical experiences with mixtures produced with the same constituents and under the same conditions in a way that the mixture complies with the requirements of this European Standard.