

**Unbound and hydraulically bound mixtures - Part 3: Test method for the determination of the laboratory reference density and water content - Vibrocompression with controlled parameters**

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Test method for the determination of the laboratory  
reference density and water content -  
Vibrocompression with controlled parameters

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 13286-3:2003 sisaldab Euroopa standardi EN 13286-3:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 15.04.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 13286-3:2003 consists of the English text of the European standard EN 13286-3:2003.</p> <p>This document is endorsed on 15.04.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b> This European Standard describes a method for the determination of the laboratory dry density, the water content and the difficulty of compaction of a hydraulically bound or unbound mixture using vibrocompression with controlled parameters</p>	<p><b>Scope:</b> This European Standard describes a method for the determination of the laboratory dry density, the water content and the difficulty of compaction of a hydraulically bound or unbound mixture using vibrocompression with controlled parameters</p>
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**ICS** 93.080.20

**Võtmesõnad:** binders : materials, density (mass/volume), density (number/volume), pavements, roa, roads, rocks, size ranges, specification (approval), specifications, specimen preparation, testing, testing conditions, unbound, water, water content, vibrated density, vibration

ICS 93.080.20

English version

## Unbound and hydraulically bound mixtures - Part 3: Test methods for laboratory reference density and water content - Vibrocompression with controlled parameters

Mélanges traités et mélanges non traités aux liants hydraulique - Partie 3: Méthodes d'essai pour la masse volumique de référence et la teneur en eau en laboratoire - Compactage à paramètres contrôlés

Ungebundene und hydraulisch gebundene Gemische - Teil 3: Laborprüfverfahren für die Trockendichte und den Wassergehalt - Vibrationsverdichtung mit vertikalem Druck

This European Standard was approved by CEN on 12 December 2002.

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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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 13286-3:2003) 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 September 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

This European Standard is one of a series of standards as follows:

EN 13286-1, *Unbound and hydraulically bound mixtures – Part 1: Test methods for laboratory reference density and water content – Introduction, general requirements and sampling.*

prEN 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.*

prEN 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 methods 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.*

prEN 13286-44, *Unbound and hydraulically bound mixtures – Part 44: Test method for the determination of the alpha coefficient of vitrified blastfurnace slag.*

prEN 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.*

prEN 13286-47, *Unbound and hydraulically bound mixtures – Part 47: Test method for the determination of California bearing ratio, immediate bearing index and linear swelling.*

prEN 13286-48, *Unbound and hydraulically bound mixtures – Part 48: Test method for the determination of the degree of pulverisation.*

## EN 13286-3:2003 (E)

prEN 13286-49, *Unbound and hydraulically bound mixtures — Part 49: Test method for the determination of the accelerated swelling of soil treated by lime and/or hydraulic binder.*

prEN 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.*

prEN 13286-51, *Unbound and hydraulically bound mixtures — Part 51: Method for the manufacture of test specimens of hydraulically bound mixtures using vibrating hammer compaction.*

prEN 13286-52, *Unbound and hydraulically bound mixtures — Part 52: Method for the manufacture of test specimens of hydraulically bound mixtures using vibrocompression.*

prEN 13286-53, *Unbound and hydraulically bound mixtures — Part 53: Method for the manufacture of test specimens of hydraulically bound mixtures using axial compression.*

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard specifies a method for the determination of the laboratory dry density, the water content and the difficulty of compaction of a hydraulically bound or unbound mixture using vibrocompression with controlled parameters.

This European Standard applies to unbound mixtures as well as to mixtures bound with hydraulically binders before setting.

This method is applicable to mixture with a maximum size aggregate  $D$  equal to 31,5 mm.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13286-1:2003, *Unbound and hydraulically bound mixtures – Part 1: Test methods for laboratory reference density and water content – Introduction, general requirements and sampling.*

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13286-1:2003 and the following apply.

### 3.1

**difficulty of compaction**  $DC(w)$

difficulty of the mixture to be compacted

## 4 Principle

The material is compacted into a mould by means of circular horizontal vibration and an increasing vertical axial pressure  $P(t)$ . The dry density at frequencies of 50 Hz and 100 Hz are measured and the laboratory dry density  $\rho_{dR}$ , and the difficulty of compaction  $DC(w)$ , of the mixture are calculated.

## 5 Apparatus

**5.1 Cylindrical steel mould**, see Figure 1, with the following dimensions:

- a wall of minimum thickness 10 mm;
- an internal diameter of  $(152,0 \pm 0,2)$  mm;
- of sufficient height so that the mould can contain enough mixture which after compaction at 100 Hz has a height in the mould of  $(152 \pm 5)$  mm;
- a removable base plate fitted with a watertight seal.

**5.2 Vibrators**, which apply to the mould a horizontal circular vibration of amplitude  $(0,80 \pm 0,08)$  mm at frequencies of  $(50 \pm 3)$  Hz and  $(100 \pm 3)$  Hz;