



**SLOVENSKI STANDARD**  
**SIST EN 12697-12:2004**  
**01-junij-2004**

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Bituminous mixtures - Test methods for hot mix asphalt - Part 12: Determination of the water sensitivity of bituminous specimens

Asphalt - Prüfverfahren für Heißasphalt - Teil 12: Bestimmung der Wasserempfindlichkeit von Asphalt-Probekörpern

Mélanges bitumineux - Méthodes d'essai pour mélange hydrocarboné a chaud - Partie 12 : Détermination de la sensibilité de l'eau des éprouvettes bitumineuses

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**ICS:**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12697-12**

December 2003

ICS 93.080.20

English version

**Bituminous mixtures - Test methods for hot mix asphalt - Part  
12: Determination of the water sensitivity of bituminous  
specimens**

Mélanges bitumineux - Méthodes d'essai pour mélange  
hydrocarboné à chaud - Partie 12 : Détermination de la  
sensibilité à l'eau des éprouvettes bitumineuses

Asphalt - Prüfverfahren für Heiasphalt - Teil 12:  
Bestimmung der Wasserempfindlichkeit von Asphalt-  
Probekrpern

This European Standard was approved by CEN on 3 November 2003.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

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## Foreword

This document (EN 12697-12:2003) has been prepared by Technical Committee CEN/TC 227 "Road materials", the secretariat of which is held by DIN.

The method described in this European Standard measures a property that is a surrogate for the water sensitivity of bituminous specimens because no satisfactory method has been developed for measuring the property directly. Alternative surrogate methods are currently being investigated by Technical Committee CEN/TC227 and may be used in a future revision of this European Standard.

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 June 2004, and conflicting national standards shall be withdrawn at the latest by August 2005.

This European Standard does not replace any existing European Standard.

This European Standard is one of a series for the testing of mechanical and physical properties of bituminous mixtures, as listed below:

EN 12697-1, *Bituminous mixtures — Test methods for hot mix asphalt — Part 1: Soluble binder content.*

EN 12697-2, *Bituminous mixtures - Test method for hot mix asphalt - Part 2: Determination of particle size distribution.*

EN 12697-3, *Bituminous mixtures — Test methods for hot mix asphalt — Part 3: Bitumen recovery: Rotary evaporator.*

EN 12697-4, *Bituminous mixtures — Test methods for hot mix asphalt — Part 4: Bitumen recovery: Fractionating column.*

EN 12697-5, *Bituminous mixtures — Test methods for hot mix asphalt — Part 5: Determination of the maximum density.*

EN 12697-6, *Bituminous mixtures — Test methods for hot mix asphalt — Part 6: Determination of bulk density of bituminous specimens.*

EN 12697-7, *Bituminous mixtures — Test methods for hot mix asphalt — Part 7: Determination of bulk density of bituminous specimens by gamma rays.*

EN 12697-8, *Bituminous mixtures - Test methods for hot mix asphalt - Part 8: Determination of void characteristics of bituminous specimens.*

EN 12697-9, *Bituminous mixtures — Test methods for hot mix asphalt — Part 9: Determination of the reference density.*

EN 12697-10, *Bituminous mixtures — Test methods for hot mix asphalt — Part 10: Compactibility.*

EN 12697-11, *Bituminous mixtures - Test methods for hot mix asphalt - Part 11: Determination of the affinity between aggregate and bitumen.*

EN 12697-12, *Bituminous mixtures - Test methods for hot mix asphalt - Part 12: Determination of the water sensitivity of bituminous specimens.*

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EN 12697-13, *Bituminous mixtures — Test methods for hot mix asphalt — Part 13: Temperature measurement.*

EN 12697-14, *Bituminous mixtures — Test methods for hot mix asphalt — Part 14: Water content.*

EN 12697-15, *Bituminous mixtures — Test methods for hot mix asphalt — Part 15: Determination of the segregation sensitivity.*

prEN 12697-16, *Bituminous mixtures — Test methods for hot mix asphalt — Part 16: Abrasion by studded tyres.*

prEN 12697-17, *Bituminous mixtures - Test methods for hot mix asphalt - Part 17: Partial loss of porous asphalt specimen.*

prEN 12697-18, *Bituminous mixtures — Test methods for hot mix asphalt — Part 18: Binder drainage from porous asphalt.*

prEN 12697-19, *Bituminous mixtures — Test methods for hot mix asphalt — Part 19: Permeability of specimen.*

EN 12697-20, *Bituminous mixtures — Test methods for hot mix asphalt — Part 20: Indentation using cube or Marshall specimens.*

prEN 12697-21, *Bituminous mixtures — Test methods for hot mix asphalt — Part 21: Indentation using plate specimens.*

prEN 12697-22, *Bituminous mixtures — Test methods for hot mix asphalt — Part 22: Wheel tracking.*

EN 12697-23, *Bituminous mixtures - Test methods for hot mix asphalt - Part 23: Determination of the indirect tensile strength of bituminous specimens.*

prEN 12697-24, *Bituminous mixtures — Test methods for hot mix asphalt — Part 24: Resistance to fatigue.*

prEN 12697-25, *Bituminous mixtures - Test methods for hot mix asphalt - Part 25: Cyclic compression test.*

prEN 12697-26, *Bituminous mixtures — Test methods for hot mix asphalt — Part 26: Stiffness.*

EN 12697-27, *Bituminous mixtures — Test methods for hot mix asphalt — Part 27: Sampling.*

EN 12697-28, *Bituminous mixtures — Test methods for hot mix asphalt — Part 28: Preparation of samples for determining binder content, water content and grading.*

EN 12697-29, *Bituminous mixtures — Test method for hot mix asphalt — Part 29: Determination of the dimensions of a bituminous specimen.*

prEN 12697-30, *Bituminous mixtures - Test methods for hot mix asphalt - Part 30: Specimen preparation, impact compactor.*

prEN 12697-31, *Bituminous mixtures — Test methods for hot mix asphalt — Part 31: Specimen preparation gyratory compactor.*

EN 12697-32, *Bituminous mixtures — Test methods for hot mix asphalt — Part 32: Laboratory compaction of bituminous mixtures by vibratory compactor.*

EN 12697-33, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen prepared by roller compactor.*

prEN 12697-34, *Bituminous mixtures — Test methods for hot mix asphalt — Part 34: Marshall test.*

prEN 12697-35, *Bituminous mixtures — Test methods for hot mix asphalt — Part 35: Laboratory mixing.*

EN 12697-36, *Bituminous mixtures - Test methods for hot mix asphalt - Part 36: Determination of the thickness of a bituminous pavement.*

EN 12697-37, *Bituminous mixtures — Test methods for hot mix asphalt — Part 37: Hot sand test for the adhesivity of binder on precoated chippings for HRA.*

prEN 12697-38, *Bituminous mixtures — Test methods for hot mix asphalt — Part 38: Test equipment and calibration.*

prEN 12697-39, *Bituminous mixtures - Test methods for hot mix asphalt - Part 39: Binder content by ignition.*

prEN 12697-41, *Bituminous mixtures — Test methods for hot mix asphalt — Part 41: Resistance to de-icing fluids.*

prEN 12697-42, *Bituminous mixtures - Test methods for hot mix asphalt - Part 42: Amount of foreign matters in reclaimed asphalt.*

prEN 12697-43, *Bituminous mixtures — Test methods for hot mix asphalt — Part 43: Resistance to fuel.*

prEN 12697-45, *Bituminous mixtures — Test methods for hot mix asphalt — Part 45: Binder drainage — Schellenberg method.*

The applicability of this European Standard is described in the product standards for bituminous mixtures (series prEN 13108).

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, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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## 1 Scope

This European Standard describes a test method for determining the effect of saturation and accelerated water conditioning on the indirect tensile strength of cylindrical specimens of bituminous mixtures.

This method can be used to evaluate the effect of moisture with or without antistripping additives including liquids, such as amines, and fillers, such as hydrated lime or cement.

## 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 1426, *Bitumen and bituminous binders — Determination of needle penetration.*

EN 12697-6, *Bituminous mixtures — Test methods for hot mix asphalt — Part 6: Determination of bulk density of bituminous specimens.*

EN 12697-23, *Bituminous mixtures - Test methods for hot mix asphalt - Part 23: Determination of the indirect tensile strength of bituminous specimens.*

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EN 12697-27, *Bituminous mixtures — Test methods for hot mix asphalt — Part 27: Sampling.*

EN 12697-29, *Bituminous mixtures — Test method for hot mix asphalt— Part 29: Determination of the dimensions of a bituminous specimen.*

prEN 12697-30, *Bituminous mixtures - Test methods for hot mix asphalt - Part 30: Specimen preparation, impact compactor.*

prEN 12697-31, *Bituminous mixtures — Test methods for hot mix asphalt — Part 31: Specimen preparation gyratory compactor.*

EN 12697-32, *Bituminous mixtures — Test methods for hot mix asphalt — Part 32: Laboratory compaction of bituminous mixtures by vibratory compactor.*

EN 12697-33, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen preparation roller compactor.*

**3 Terms and definitions**

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

- 3.1**  
**water sensitivity**  
is expressed as the *ITSR* value obtained on compacted specimens of a bituminous mixture
- 3.2**  
*ITSR*  
indirect tensile strength ratio, calculated as the ratio of the indirect tensile strength of wet (water conditioned) specimens to that of dry specimens, expressed in percent
- 3.3**  
**indirect tensile strength (*IST*)**  
maximum tensile stress applied to a cylindrical specimen loaded at the specified test temperature and speed of displacement of the compression testing machine, determined in accordance with EN 12697-23
- 3.4**  
**cylindrical specimen**  
laboratory-made (e.g. gyratory- or impact-compacted) cylindrical moulded specimen or core taken from a bituminous layer or slab
- 3.5**  
**precision**  
the closeness of agreement between independent test results obtained under stipulated conditions
- NOTE 1 Precision depends only on the distribution of random errors and does not relate to the true value or the specified value.
- NOTE 2 The measure of precision is usually expressed in terms of imprecision and computed as a standard deviation of the test results. Less precision is reflected by a larger standard deviation.
- NOTE 3 “Independent test results” means results obtained in a manner not influenced by any previous result on the same or similar test object. Quantitative measures of precision depend critically on the stipulated conditions. Repeatability and reproducibility conditions are particular sets of extreme conditions.
- 3.6**  
**repeatability**  
precision under repeatability conditions



### 3.7

#### **repeatability conditions**

conditions in which independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time

### 3.8

#### **repeatability limit**

value less than or equal to which the absolute difference between two test results obtained under repeatability conditions may be expected to be within probability of 95 %

NOTE The symbol used for repeatability limit is  $r$ .

### 3.9

#### **reproducibility**

precision under reproducibility conditions

### 3.10

#### **reproducibility conditions**

conditions in which test results are obtained with the same method on identical test items in different laboratories with different operators using different equipment

### 3.11

#### **reproducibility limit**

the value less than or equal to which the absolute difference between two test results obtained under reproducibility conditions may be expected to be with a probability of 95 %

NOTE The symbol used for reproducibility limit is  $R$ .

### 3.12

#### **single test result**

value obtained by applying the standard test method fully, once to a single specimen may be the mean of two or more observations or the result of a calculation from a set of observations as specified by the standardized test method

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## 4 Principle

A set of cylindrical test specimens is divided into two equally sized subsets and conditioned. One subset is maintained dry at room temperature while the other subset is saturated and stored in water at elevated conditioning temperature.

After conditioning, the indirect tensile strength of each of the two subsets is determined in accordance with EN 12697-23 at the specified test temperature. The ratio of the indirect tensile strength of the water conditioned subset compared to that of the dry subset is determined and expressed in percent.

## 5 Apparatus

**5.1** Compression testing machine, testing head with loading strips, thermostatically controlled water bath or air chamber for conditioning to test temperature, soft plastic bags or other suitable watertight protection (optional, for water bath test temperature conditioning only) and all other equipment required to perform the indirect tensile strength test in accordance with EN 12697-23.

**5.2** Vacuum system (pump, gauge etc.). The vacuum system shall be capable of obtaining a residual pressure in the vacuum container of  $(6,7 \pm 0,3)$  kPa within  $(10 \pm 1)$  min and able to maintain the vacuum for  $(30 \pm 5)$  min.

**5.3** Vacuum container with a perforated shelf, placed above the bottom.