



# SLOVENSKI STANDARD

## SIST EN 14023:2010

01-junij-2010

Nadomešča:  
SIST EN 14023:2005

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### Bitumen in bitumenska veziva - Okvirna specifikacija za bitumne, modificirane s polimeri

Bitumen and bituminous binders - Specification framework for polymer modified bitumens

Bitumen und bitumenhaltige Bindemittel - Rahmenwerk für die Spezifikation von polymermodifizierten Bitumen

(standards.iteh.ai)

Bitumes et liants bitumineux - Cadre de spécification des bitumes modifiés par des polymères

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Ta slovenski standard je istoveten z: **EN 14023:2010**

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#### **ICS:**

75.140	Voski, bitumni in drugi naftni proizvodi	Waxes, bituminous materials and other petroleum products
91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

**SIST EN 14023:2010**

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EUROPEAN STANDARD

**EN 14023**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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**Bitumen and bituminous binders - Specification framework for  
polymer modified bitumens**Bitumes et liants bitumineux - Cadre de spécifications des  
bitumes modifiés par des polymèresBitumen und bitumenhaltige Bindemittel - Rahmenwerk für  
die Spezifikation von polymermodifizierten Bitumen

This European Standard was approved by CEN on 6 March 2010.

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 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 Management Centre has the same status as the official versions.

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<b>Contents</b>		Page
Foreword.....		3
Introduction .....		4
1	Scope .....	5
2	Normative references .....	5
3	Terms and definitions.....	6
4	Sampling.....	6
5	Requirements and test methods .....	6
6	Evaluation of conformity.....	13
Annex A (informative) Example of selected classes for a PMB 45/80-60 .....		16
Annex B (informative) Other properties .....		17
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive.....		18
Bibliography .....		27

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[SIST EN 14023:2010](https://standards.iteh.ai/catalog/standards/sist/a3e2655e-b1cf-4fa7-beb6-b9ce15c61019/sist-en-14023-2010)

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## Foreword

This document (EN 14023:2010) has been prepared by Technical Committee CEN/TC 336 "Bituminous binders", the secretariat of which is held by AFNOR.

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 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

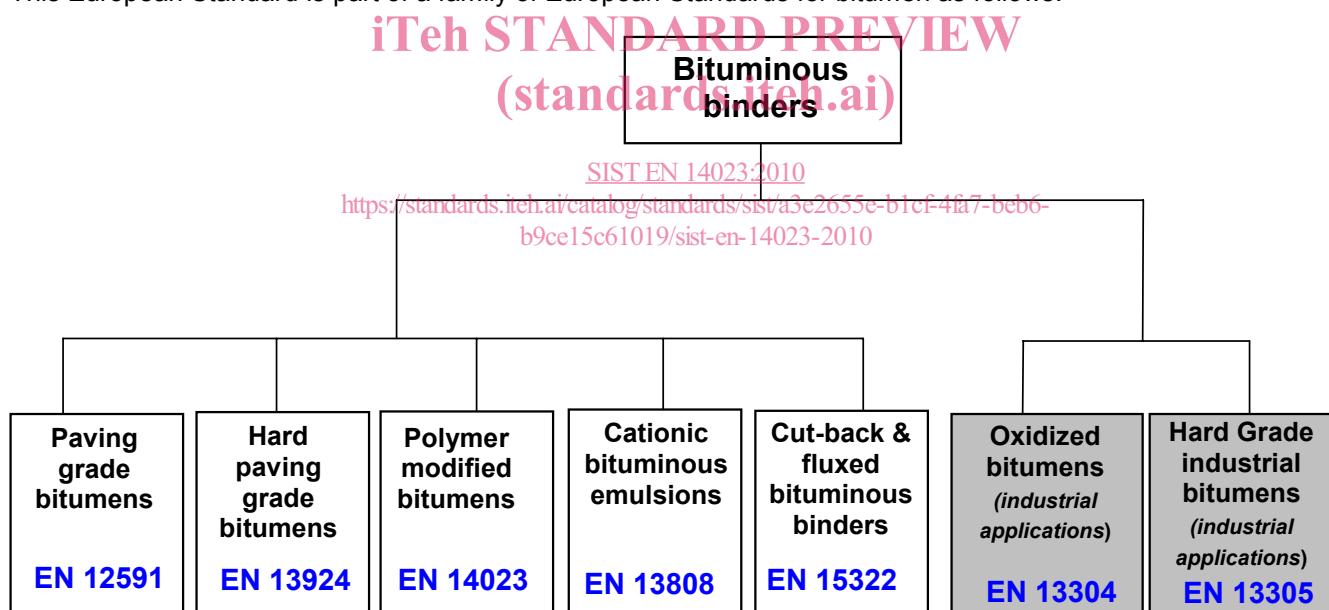
Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14023:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This European Standard is part of a family of European Standards for bitumen as follows:



NOTE Industrial applications are not covered by mandate M/124.

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 and the United Kingdom.

## Introduction

This European Standard is closely related to EN 12591, *Bitumen and bituminous binders – Specifications for paving grade bitumens* [1]. This introduction gives information on the basis for selection of the grades defined in this European Standard, the status of certain characteristics and test methods, and proposed development of this European Standard.

The general principle adopted in the development of EN 12591 [1] was to provide a range of grades suitable for the manufacture of the materials for road construction and maintenance used, and the climatic and traffic conditions encountered, in all the Member States. This European Standard extends the range of grades specified in EN 12591 [1], following the wider use of modified binders for road construction and maintenance having improved performances.

As with EN 12591 [1], it is compulsory for the full specification to be published in all EU and EFTA countries. However, it is permitted for each country to define the most suitable grades and classes.

Annex B lists informative characteristics which producers of polymer modified bitumens are invited to supply to the client on a voluntary basis. It is hoped that the data so gathered will be of assistance in developing performance-related specifications in the future.

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## 1 Scope

This European Standard provides a framework for specifying the characteristics and relevant test methods for polymer modified bitumens which are suitable for use in the construction and maintenance of roads, airfields and other paved areas.

This framework covers the following characteristics:

- "consistency at intermediate service temperature";
- "consistency at elevated service temperature";
- "cohesion";
- "durability" of consistency;
- "brittleness at low service temperature";
- "strain recovery".

The cohesion property has been included as a means of discriminating between polymer modified bitumens and other bituminous binders. The other essential requirements, "adhesion" and "setting ability" are indicated by tests carried out on the finished asphalt mixtures.

The introduction of classes of convenience in Table 1, Table 2 and Table 3 enables the selection of the most suitable specification for the bitumen taking account of local conditions of climate and use. The nomenclature of polymer modified bitumens comprises the penetration range and the minimum softening point (see example in Annex A).

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## 2 Normative references

The following referenced documents are indispensable for the application 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 58, *Bitumen and bituminous binders — Sampling bituminous binders*

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

EN 1427, *Bitumen and bituminous binders — Determination of the softening point — Ring and Ball method*

EN 12593, *Bitumen and bituminous binders — Determination of the Fraass breaking point*

EN 12594, *Bitumen and bituminous binders — Preparation of test samples*

EN 12595, *Bitumen and bituminous binders — Determination of kinematic viscosity*

EN 12596, *Bitumen and bituminous binders — Determination of dynamic viscosity by vacuum capillary*

EN 12597:2000, *Bitumen and bituminous binders — Terminology*

EN 12607-1, *Bitumen and bituminous binders — Determination of the resistance to hardening under the influence of heat and air — Part 1: RTFOT method*

EN 13302, *Bitumen and bituminous binders — Determination of dynamic viscosity of bituminous binder using a rotating spindle apparatus*

EN 13398, *Bitumen and bituminous binders — Determination of the elastic recovery of modified bitumen*

**EN 14023:2010 (E)**

EN 13399, *Bitumen and bituminous binders — Determination of storage stability of modified bitumen*

EN 13587, *Bitumen and bituminous binders — Determination of the tensile properties of bituminous binders by the tensile test method*

EN 13588, *Bitumen and bituminous binders — Determination of cohesion of bituminous binders with pendulum test*

EN 13589, *Bitumen and bituminous binders — Determination of the tensile properties of modified bitumen by the force ductility method*

EN 13702-1, *Bitumen and bituminous binders — Determination of dynamic viscosity of modified bitumen — Part 1: Cone and plate method*

EN 13703, *Bitumen and bituminous binders — Determination of deformation energy*

EN 15326, *Bitumen and bituminous binders — Measurement of density and specific gravity — Capillary-stoppered pycnometer method* (including EN 15326:2007/A1:2009)

EN ISO 2592, *Determination of flash and fire points — Cleveland open cup method* (ISO 2592:2000)

EN ISO 4259, *Petroleum products — Determination and application of precision data in relation to methods of test* (ISO 4259:2006)

EN ISO 9001:2008, *Quality management systems — Requirements* (ISO 9001:2008)

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### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12597:2000 apply.

[SIST EN 14023:2010](#)

The following abbreviation term is used in the specification tables of this document (see Table 1, Table 2 and Table 3):

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TBR for "To Be Reported": this class shall mean that the manufacturer is invited, but not required, to provide information, regarding performance characteristics, with the product.

NOTE The reported values (TBR) are intended to be used for future development of specifications.

NR for "No Requirement" may be used when there are no regulations or other regional requirements for the property in the territory of intended use.

### 4 Sampling

Samples of bulk products shall be taken as described in EN 58.

Test samples shall be taken from the laboratory samples, and prepared for testing, as described in EN 12594.

### 5 Requirements and test methods

#### 5.1 General

European product standards cover a large variety of road materials for different applications, to accommodate local traffic loads and climatic conditions. This European Standard therefore also covers a large range of bitumens to facilitate the production and application of the designed paving.

This European Standard is a framework of specifications and classes for properties of polymer modified bitumens which are chosen from Table 1, Table 2 and Table 3.



There is a subdivision of properties into three groups in the tables. The properties in Table 1 shall be specified for all polymer modified bitumens. They are associated with regulatory or HSE requirements. The properties in Table 2 are required to meet specific regional conditions. They are associated with regulatory or other regional requirements. The properties in Table 3 are additional properties, which are non-mandated, but have been found useful in some countries to describe polymer modified bitumens.

## 5.2 Properties and related test methods

### 5.2.1 General

The properties of, and the related test methods for polymer modified bitumens shall be selected from the classes given in Table 1 and Table 2. When tested by the methods given in a table, the various grades shall conform to the limits specified in that table.

In Table 3 further properties that have been considered useful for specifications are described.

NOTE 1 Each country will then have a particular selection of specifications, which, if regulated, are covered in Tables 1 and 2 and which, if commonly used by industry, are covered in Table 3. It is useful for each country to publish in a national guidance document for each application, their requirements for polymer modified bitumens from Table 1, Table 2 and Table 3. The appropriate class for each technical requirement or application is selected in turn and the selection of classes should be made from past experience of successful use, on a regional basis, in order to avoid unworkable combinations.

NOTE 2 In order to assist in using the tables, an example has been provided in Annex A.

### 5.2.2 Consistency at intermediate service temperatures

Consistency at intermediate service temperature for polymer modified bitumens shall comply with the requirements for penetration at 25 °C in Table 1. The grades are designated by the nominal penetration range at 25 °C.

### 5.2.3 Consistency at elevated service temperatures

Consistency at elevated service temperature for polymer modified bitumens shall comply with the requirements for softening point as indicated in Table 1.

Polymer modified bitumens are supplied for a variety of end uses in various climatic conditions; consequently the specifications include a wide range of softening point values.

NOTE The various softening point limits are included so as not to prevent some traditional methods used to evaluate the suitability of modified bitumens in the different European climatic conditions (for more information refer to national guidance documents).

As the grading system is based on the consistency at intermediate and elevated service temperatures, values shall be given for these characteristics.

### 5.2.4 Brittleness at low service temperature

Brittleness at low service temperature may be required to meet specific regional conditions. Where required, polymer modified bitumens shall conform to the requirements for Fraass breaking point in Table 2.

For some highly modified polymer modified bitumens, Fraass breaking point is not a suitable low temperature method and, in that case, low temperature elastic recovery at 10 °C shall be used.

### 5.2.5 Cohesion

The property of cohesion is included as a means of differentiating polymer modified bitumens from paving grade bitumens. Three different test methods are included in Table 1: force ductility, tensile test and Vialit pendulum. These reflect the different characteristics that can occur with polymer modified bitumens and are not considered to be equivalent. It is intended that the most appropriate cohesion test method shall be used in each case, at the discretion of the supplier. The manufacturer shall state the test method used.

**EN 14023:2010 (E)**

One cohesion method shall be chosen based on end application. Vialit cohesion (EN 13588) shall only be used for surface dressing binders.

**5.2.6 Durability – Resistance to hardening**

Resistance to hardening shall be tested after conditioning in accordance with the Rolling Thin Film Oven Test (RTFOT) (see EN 12607-1).

The main test is the RTFOT at 163 °C. For some highly viscous polymer modified bitumens where the viscosity is too high to provide a moving film it is not possible to carry out the RTFOT at the reference temperature of 163 °C. In such cases the procedure shall be carried out at 180 °C in accordance with EN 12607-1.

NOTE In order to assist in controlling rutting deformation and cracking of asphalt mixes, optional tests and classes, for measurements on material after the hardening procedure, are given in Table 3. The choice will depend upon climatic conditions, traffic and local use.

Resistance to hardening is not appropriate for surface dressing bitumens.

**5.2.7 Strain recovery**

Strain recovery may be required to meet specific regional conditions. Where required, polymer modified bitumens shall conform to the requirements for elastic recovery at 25 °C or 10 °C in Table 2.

**5.2.8 Other properties****5.2.8.1 Informative characteristics**

The framework specifications include a table of informative characteristics (see Annex B) based on new test methods that are under validation. Producers of polymer modified bitumens are invited to supply data from these measurements to the client on a voluntary basis. It is hoped that the data so gathered will be of assistance in developing performance-related specifications in the future.

**5.2.8.2 Flash point**

The flash point shall be determined by the Cleveland open cup method in EN ISO 2592 for normal specification purposes.

NOTE The Pensky-Martens closed cup method (see EN ISO 2719 [6]) can be used to investigate possible contamination but is likely to give lower values.

**5.2.8.3 Density**

Where required, density shall be determined in accordance with EN 15326.

**5.2.8.4 Plasticity range**

The plasticity range is the numerical difference between the softening point and Fraass breaking point.

EXAMPLE Polymer modified bitumen with a softening point of 75 °C and a Fraass breaking point of - 18 °C would have a plasticity range of 93 °C.

**5.2.8.5 Storage conditions**

Storage conditions of the polymer modified bitumen shall be given by the supplier.

**5.2.8.6 Homogeneity and storage stability**

Homogeneity is necessary for polymer modified bitumens. The tendency of polymer modified bitumens to separate during storage may be assessed by the storage stability test (see EN 13399). If the product does not fulfil the

properties in Table 3 Class 2 to Class 5, information shall be given by the supplier regarding storage conditions for the polymer modified bitumen to avoid separation of the components and to ensure the homogeneity of the product.

### 5.3 Release of regulated dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the Member State of destination.

### 5.4 Precision and dispute

The test methods referred to in this document include precision statements where available. In cases of dispute, the procedures described in EN ISO 4259 for resolving the dispute, and interpretation of the results based on test method precision shall be used.

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