



SLOVENSKI STANDARD
SIST EN 14023:2005

01-december-2005

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

Bitumen and bituminous binders - Framework specification for polymer modified bitumens

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

Bitumes et liants bitumineux - Cadre de spécifications des bitumes modifiés par des polymeres

ITEH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019666c678d5/sist-en-14023-2005>

Ta slovenski standard je istoveten z: EN 14023:2005

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 14023:2005

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 14023:2005

<https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019666c678d5/sist-en-14023-2005>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14023

October 2005

ICS 93.080.20

English Version

**Bitumen and bituminous binders - Framework specification for
polymer modified bitumens**

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

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

This European Standard was approved by CEN on 24 February 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

[SIST EN 14023:2005](https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019666c678d5/sist-en-14023-2005)

<https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019666c678d5/sist-en-14023-2005>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Symbols and abbreviations.....	6
4 Sampling.....	6
5 Requirements and test methods.....	6
5.1 Characteristics and related test methods	6
5.2 Precision and dispute.....	8
6 Evaluation of conformity	13
6.1 General	13
6.2 Type testing.....	13
6.3 Factory Production control (FPC).....	13
Annex A (informative) Example of selected classes for a PMB 45/80-60	16
Annex B (informative) Other characteristics	17
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.....	18
ZA.1 Scope and relevant characteristics	18
ZA.2 Procedure for attestation of conformity of polymer modified bitumens	19
ZA.3 CE marking and labelling	21
Bibliography.....	24

Foreword

This European Standard (EN 14023:2005) has been prepared by Technical Committee CEN/TC 336 "Bituminous binders", the secretariat of which is held by AFNOR.

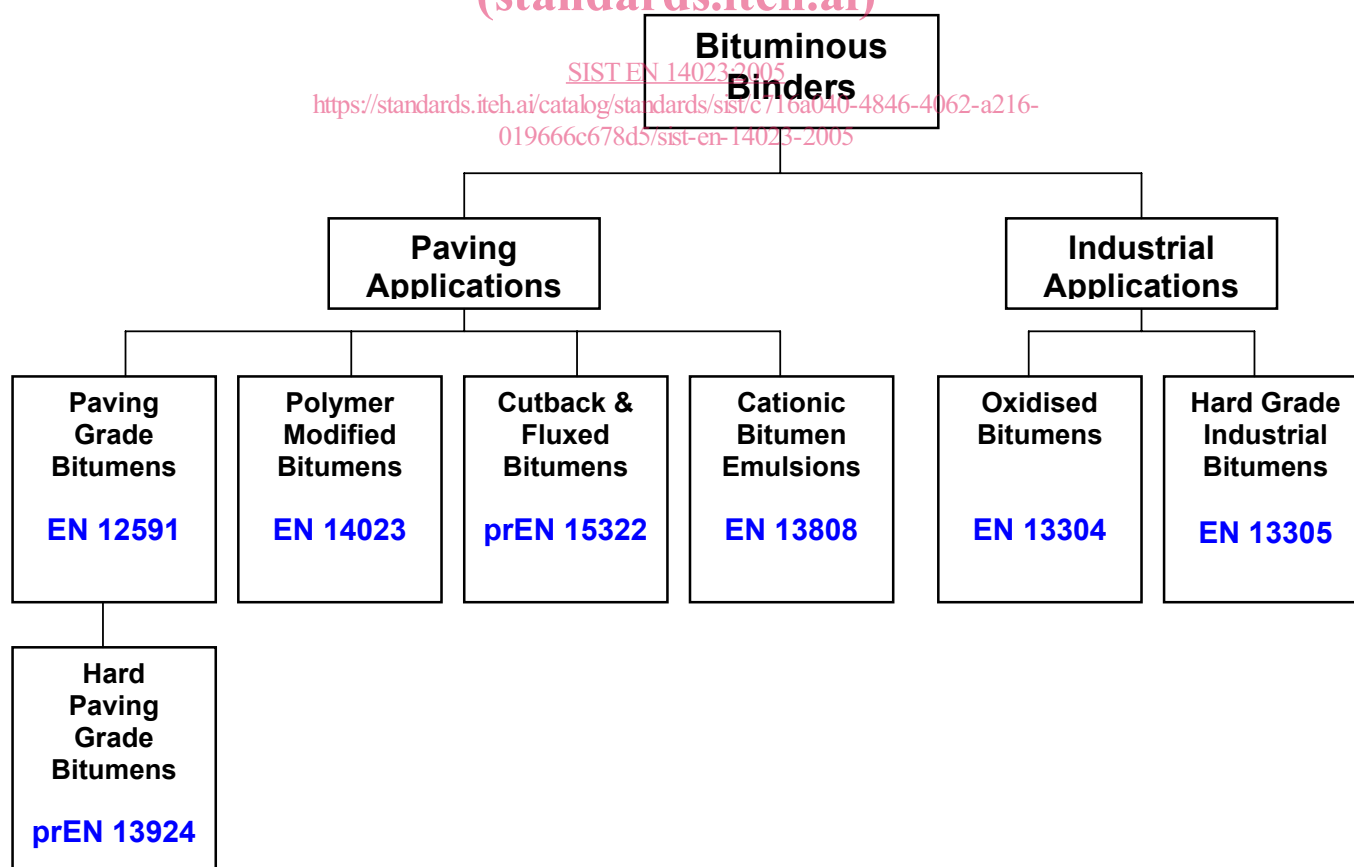
This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

This European Standard 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 Construction Products Directive (89/106/EEC).

For relationship with EU Construction Products Directive, see informative Annex ZA, which is an integral part of this document.

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

This document is part of a family of documents for bitumens as follows:



Introduction

This European Standard is closely related to EN 12591 [1], *Bitumen and bituminous binders – Specifications for paving grade bitumens*. 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 EATA countries. However, it is permitted for each country to define the most suitable grades and classes.

This document has been based on the various national documents that were in existence when the process started. It is a first step in harmonising the so-called "empirical" specifications and it is intended to evaluate alternative characteristics and test methods to develop new specifications that are more directly performance-related. To this end, work programmes are being undertaken and the results will be considered for a future revision of this document.

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.

SIST EN 14023:2005

<https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019666c678d5/sist-en-14023-2005>

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" (surrogate characteristic: penetration);
- "Consistency at elevated service temperature" (surrogate characteristic: softening point);
- "Cohesion";
- "Durability" of consistency.

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 Tables 1 and 2 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).

iTeh STANDARD PREVIEW

2 Normative references (standards.iteh.ai)

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

EN 12607-3, *Bitumen and bituminous binders – Determination of the resistance to hardening under the influence of heat and air – Part 3: RFT method.*

EN 13357, *Bitumen and bituminous binders – Determination of the efflux time of petroleum cut-back and fluxed bitumens.*

EN 13398, *Bitumen and bituminous binders – Determination of elastic recovery of modified bitumen.*

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

EN 14023:2005 (E)

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 13702-2, *Bitumen and bituminous binders – Determination of dynamic viscosity of modified bitumen – Part 2: Coaxial cylinders method.*

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

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

EN ISO 3838, *Crude petroleum and liquid or solid petroleum products – Determination of density or relative density – Capillary-stoppered pyknometer and graduated bicapillary pyknometer methods (ISO 3838:2004).*

EN ISO 4259, *Petroleum products – Determination and application of precision data in relation to methods of test (ISO 4259:1992/Cor 1:1993).*

EN ISO 9001, *Quality management systems – Requirements (ISO 9001:2000).*

ITEN STANDARD PREVIEW

3 Symbols and abbreviations standards.iteh.ai

The following abbreviation terms are used in the specification tables of this document (see Tables 1 and 2):

[https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-](https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-4196063805/sist-en-14023-2005)

NPD for "No Performance Determined": this class has been included to accommodate countries where the characteristic, for a given intended use, is not subject to regulatory requirements (see ZA.1).

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

NOTE These reported values may be used for future specifications.

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 Characteristics and related test methods

5.1.1 General

The values for the characteristics are given in Table 1 which is subdivided into eleven classes. The characteristics of, and the related test methods for polymer modified bitumens shall be selected from the classes given in Table 1. When tested by the methods given in a table, the various grades shall conform to the limits specified in that table.

In Table 2 further characteristics that have been considered useful for specifications are described.

If no data is given on the storage stability test (see EN 13399), information shall be given by the supplier regarding storage conditions for the polymer modified bitumen to avoid separation of the components.

NOTE 1 Each country will then have a particular selection of specifications, which, if regulated, are covered in Table 1 and which, if commonly used by industry, are covered in Table 2. 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 and Table 2. 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.

Class 1 TBR shall not be used for regulatory declaration and marking purposes.

5.1.2 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.

5.1.3 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.

5.1.4 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: 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.

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

5.1.5 Durability – Resistance to hardening

Resistance to hardening shall be tested according to the Rolling Thin Film Oven Test (RTFOT) (see EN 12607-1). For a transitional period of three years from the date of availability of this document, resistance to hardening may also be tested using the Rotating Flask Test (RFT) (see EN 12607-3). For referee purposes, only RTFOT (see EN 12607-1) shall be used.

NOTE 1 The transitional period is intended to provide new users with the opportunity to gather empirical data and experience of the RTFOT.

NOTE 2 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 Tables 1 and 2. The choice will depend upon climatic conditions, traffic and local use.

Resistance to hardening is not appropriate for surface dressing bitumens.

EN 14023:2005 (E)**5.1.6 Informative characteristics**

The framework specifications include a table of informative characteristics (see Annex B) based on new test methods that are under development. 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.

5.1.7 Flash point

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.

For safety reasons, classes 0 and 1 shall not be used for flash point.

5.1.8 Density

Although requirements for the density of polymer modified bitumens are not given in this document, density shall be determined, when necessary, in accordance with EN ISO 3838.

5.1.9 Plasticity range

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

Table 1 — Framework specifications for essential requirements and classes of polymer modified bitumens

ESSENTIAL REQUIREMENT	CHARACTERISTIC	TEST METHOD	UNIT	Classes for the essential requirements of polymer modified bitumens										
				0 ^a	1 ^b	2	3	4	5	6	7	8	9	10
Consistency at Intermediate Service Temperature	Penetration at 25 °C	EN 1426	0,1 mm		TBR	10-40	25-55	45-80	40-100	65-105	75-130	90-150	120-200	200-300
Consistency at Elevated Service Temperature	Softening Point	EN 1427	°C		TBR	≥ 80	≥ 75	≥ 70	≥ 65	≥ 60	≥ 55	≥ 50	≥ 45	≥ 40
Cohesion ^c	Force ductility ^c (Low speed traction) or	EN 13589 followed by EN 13703	J/cm ²	NPD	TBR	≥ 3 at 5 °C	≥ 2 at 5 °C	≥ 1 at 5 °C	≥ 2 at 0 °C	≥ 2 at 10 °C	-	-	-	-
	Tensile test at 5 °C ^c (High speed traction) or	EN 13587 followed by EN 13703	J/cm ²	NPD	TBR	≥ 3	≥ 2	≥ 1	-	-	-	-	-	-
	Vialit pendulum ^c (Impact test)	EN 13588	J/cm ²	NPD	TBR	≥ 0,7	-	-	-	-	-	-	-	-
Durability ^d (Resistance to hardening, EN 12607-1 or -3)	Change of mass	EN 12607-1 EN 12607-3	%	NPD	TBR	≤ 0,3	≤ 0,5	≤ 0,8	≤ 1,0	-	-	-	-	-
	Retained Penetration	EN 1426	%	NPD	TBR	≥ 35	≥ 40	≥ 45	≥ 50	≥ 55	≥ 60	-	-	-
	Increase in Softening Point	EN 1427	°C	NPD	TBR	≤ 8	≤ 10	≤ 12	-	-	-	-	-	-
Other characteristics	Flash Point ^e	EN ISO 2592	°C			≥ 250	≥ 235	≥ 220	-	-	-	-	-	-

https://standards.iteh.ai/catalog/standards/sist/c716a040-4846-4062-a216-019090c678cd/sist-c716a040-4846-4062-a216-019090c678cd-en-14023-2005

ITeH STANDARD PREVIEW
(sampled.iteh.ai)