SLOVENSKI STANDARD
SIST EN 13924:2006

01-september-2006

Bitumen in bitumenska veziva – Specifikacije za trše cestogradbene bitumne

Bitumen and bituminous binders - Specifications for hard paving grade bitumens

Bitumen und bitumenhaltige Bindemittel - Anforderungen an harte Straßenbaubitumen

Bitumes et liants bitumineux - Spécifications des bitumes routiers de grade dur

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93.080.20	Materiali za gradnjo cest	Road construction materials

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Bitumen and bituminous binders - Specifications for hard paving grade bitumens

Bitumes et liants bitumineux - Spécifications des bitumes routiers de grade dur

Bitumen und bitumenhaltige Bindemittel - Anforderungen an harte Straßenbaubitumen

This European Standard was approved by CEN on 23 March 2006.

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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 Central Secretariat has the same status as the official versions.

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Contents

Foreword

This document (EN 13924:2006) 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of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by December 2008.

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 Construction Products Directive 89/106/EEC.

For relationship with EU 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

This standard is part of a family of European Standards for bitumens as follows:

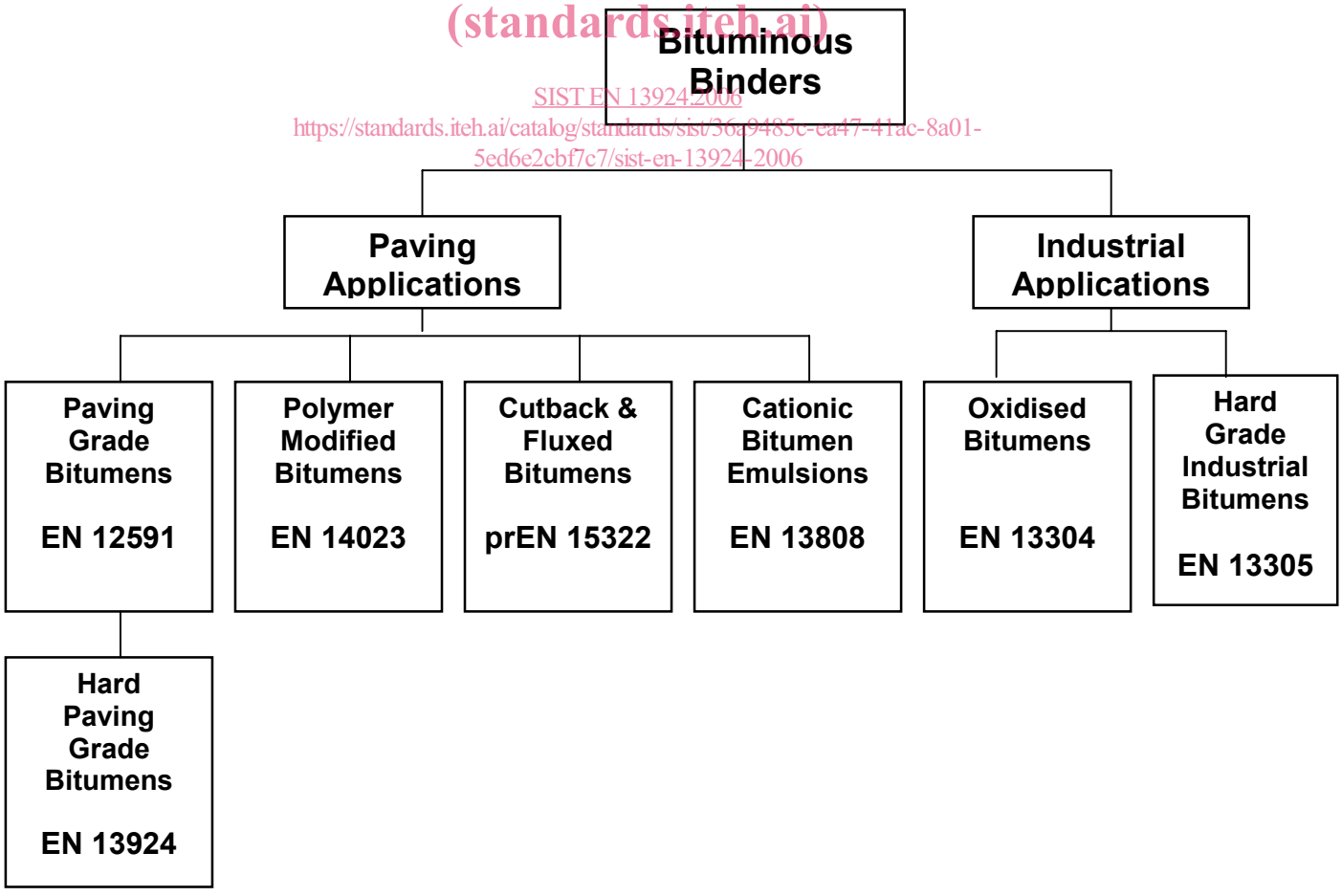

Figure 1 — European Standards for Bitumens

Introduction

This document is closely related to EN 12591 [1]. This introduction gives information on the basis for selection of the grades defined in this document, the status of certain of the properties and test methods, and proposed development of this document.

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 document extends the range of grades specified in EN 12591 [1], following the wider use of materials for road construction and maintenance having very high modulus values.

This standard can be read in conjunction with National Guidance Documents, where they exist, which have the opportunity to identify the appropriate grade in the territory of use.

This document has been based on the regional requirements identified when the process started. It is a first step in harmonising the so-called "empirical" specifications and it is intended to evaluate alternative properties 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. The progress of those work programmes are reported in CEN/TR 15352 [2], and the results will be considered for future revisions of this European Standard.

For paving grade bitumen the testing of the three essential characteristics, according to the mandate M/124 ,also gives an indication that its intrinsic cohesive properties are adequate for its normal use. The properties of "adhesion" and "setting ability" are indicated by tests used on the finished asphalt mixtures, EN 12697–1, EN 12697–11, EN 12697–12, EN 12697–26 (respectively [3] to [6]), rather than tests on the bitumen itself.

The introduction of technical classes of convenience (see Table 1) enables the selection of the most suitable specification for the bitumen taking account of local conditions of climate and use.

Hard paving grade bitumens are designated by the penetration range at 25 °C, e.g. 10/20 pen or 15/25 pen (see Table 1).

Table B.1 (Annex B) lists informative properties which suppliers of hard paving grades of bitumen are encouraged to produce as “Supplier Declared Values”. It is hoped that the data so provided will form the basis for developing performance-related specifications in the future.

1 Scope

This document provides a framework for specifying the properties and relevant test methods for hard paving grade bitumens which are suitable for use in the construction and maintenance of roads, airfields and other paved areas.

This framework covers three essential characteristics according to the mandate M/124: EU Construction Products Directive 89/106/EEC :

— "Consistency at intermediate service temperature";

— "Consistency at elevated service temperature";

— "Durability" of the above.

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 12592, *Bitumen and bituminous binders – Determination of solubility*

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

prEN 15326, Bitumen and bituminous binders – Measurement of density and specific gravity – Capillary-stoppered pyknometer method

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/DIS 4259:2004)*EN ISO 9001, *Quality management systems - Requirements (ISO 9001:2000)*

3 Terms and definitions

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

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 Properties and related test methods

5.1.1 General

The properties of and related test methods for hard paving grade bitumens shall be in accordance with Table 1. When tested by the methods given in the tables, the various paving grades shall conform to the limits specified by classes in that table.

NOTE 1 For specifying bitumen the appropriate class for each technical requirement is selected in turn, different classes may be selected for different properties. The selection of classes should be made from past experience to avoid unworkable combinations, also see in Table 1, Table footnote f.

NOTE 2 Table 1 includes a "No Performance Determined" class (NPD), a “No Requirement” class (NR) and a "To Be Reported" class (TBR).

The NPD class has been included to accommodate countries where the characteristic, for a given intended use, is not subject to regulatory requirements. (See Annex ZA for further information).

The NR class has been included for characteristics that are **not** mentioned in Table ZA.1 (i.e. not required for the purpose of regulatory marking), where there is no requirement to specify or declare a value.

The TBR class has been included to facilitate selection in countries which merely wish to record a supplier's declared value or range for a particular requirement. It should not be considered as a 'Class' for the purpose of regulatory marking. These values can be used as a basis for the development of future technical specifications.

NOTE 3 Each country is anticipated to have a specific selection of specifications, which, more than likely, will be different, and each country could publish the table of its applicable specifications in a national guide to determine the appropriate specification from this document.

5.1.2 Consistency at intermediate service temperatures

Consistency at intermediate service temperature for these hard paving grade 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 these hard paving bitumens shall comply with the requirements for softening point Ring and Ball and, if selected, viscosity as indicated in Table 1.

Hard paving grade bitumens are supplied for a variety of end uses, and thus the specifications include a wide range of softening point Ring and Ball values. A restricted softening point range, of ± 5 °C about a mid-point, shall be declared by the supplier; the overall range shall be within the range in the tables.

NOTE The properties and related test methods, given in Table 1, provide for different climatic, traffic and other conditions across Europe.

5.1.4 Durability – Resistance to hardening

Durability shall be demonstrated by compliance with the required surrogate characteristics of Table 1.

Resistance to hardening shall be tested according to the Rolling Thin Film Oven Test (RTFOT) (EN 12607-1). NOTE 1 Appropriate tests and classes, for measurements on material after the hardening procedure, are given in Table 1. The choice will depend upon the intended use of the product.

If the supplier wishes to declare the penetration index (for the purpose of regulatory marking), it shall be calculated in accordance with Annex A.

5.1.5 Informative properties

The specifications include a table of informative properties (Table B.1) based on new test methods that are under development. Suppliers of hard paving grade bitumens are encouraged to produce data from these measurements as "Supplier Declared Values". It is hoped that the data so provided will be of assistance in developing performance-related specifications in the future.

5.1.6 Other properties

5.1.6.1 Flash point

Flash point shall be determined by the Cleveland open cup method in EN ISO 2592.

NOTE The Pensky-Martens closed cup method (see EN ISO 2719 [9]) can be used to investigate possible contamination but is likely to give lower values.

5.1.6.2 Density

If the supplier wishes to declare the density of hard paving grade bitumens it shall be determined in accordance with prEN 15326.

5.2 Precision and dispute

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

5.2.2 The test methods referred to in this document shall be those used in cases of dispute.

Table 1 - Specifications for hard paving grade bitumens [a]

Essential Requirement	Surrogate characteristic	Test methods	Unit	Classes				
				0	1	2	3	4
Consistency at Intermediate Service Temperature	Penetration at 25 °C	EN 1426	0,1 mm	NPD	TBR	15 to 25 [f]	10 to 20	
Consistency at Elevated Service Temperature	Softening point [d]	EN 1427	°C	NPD	TBR	55 to 71 [d-f]	58 to 78 [d]	60 to 76 [d]
	Dynamic viscosity at 60 °C	EN 12596	Pa · s	NR	TBR	≥ 550 [f]	≥ 700	
Durability (Resistance to hardening at 163 °C, EN 12607-1) [b]	Change of mass	EN 12607-1 or -3	%	NPD	TBR	≤ 0,5		
	Retained penetration	EN 1426	%	NPD	TBR	≥ 55		
	Softening point after hardening	EN 1427	°C	NPD	TBR	≥ Orig. Min. +2 [g]		
	Increase in softening point	EN 1427	°C	NPD	TBR	≤ 8	≤ 10	
	Increase in softening point & Penetration Index before test (i.e. on original bitumen)	EN 1427 I_p calculation (see Annex A)	°C	NR	TBR	≤ 10 from -1,5 to +0,7	≤ 10 ≤ -1,5	
Other properties [c]	Kinematic Viscosity at 135 °C	EN 12595	mm²/s	NR	TBR	≥ 600 [f]	≥ 700	
	Fraass breaking point	EN 12593	°C	NR	TBR	≤ 0 [f]	≤ 3	
	Flash point [e]	EN ISO 2592	°C			≥ 235	≥ 245	
	Solubility	EN 12592	% mass fraction	NR	TBR	≥ 99,0		

NPD: No Performance Determined (i.e. there are no regulations for the property in the territory of intended use)
NR: No Requirement
TBR: Level or range To Be Reported by the supplier (i.e. declared values – see 5.1.1 NOTE 2), this class shall not be used for the purpose of regulatory marking.

[a] The grades are designated by the nominal penetration range at 25 °C.

[b] Only RTFOT shall be used for referee purposes. See 5.1.4.

[c] These additional properties are not part of the mandated essential characteristics but have been considered useful in specification of hard paving grade bitumens in some cases.

[d] IMPORTANT — A restricted softening point range, of ± 5 °C about a mid-point, shall be declared by the supplier; the overall range shall be within the range in the table.

[e] See 5.1.6.1.

[f] In selecting combinations of classes it is intended that values marked "[f]", if selected, shall only be used with the softer grade, 15/25 pen.

[g] The softening point after treatment shall be at least 2 °C above the selected minimum value for the original bitumen (see Note [d] above).

6 Evaluation of conformity

6.1 General

The compliance of hard paving grade bitumens with the requirements of this document and with the stated values (including classes) shall be demonstrated by:

— initial type testing;

— factory production control.

NOTE The information from evaluation of conformity can be available for audit as detailed in the Quality Plan.

6.2 Type testing

6.2.1 Initial type testing

Initial type tests shall be performed to show conformity with this standard. Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc…) may be taken into account.

All the characteristics required in the standard shall be subject to initial type testing except dangerous substances, which may be declared based upon control of the base materials.

6.2.2 Further type testing

Whenever a change occurs in the base materials or the production process which would change significantly one or more of the characteristics, the type test shall be repeated for the appropriate characteristic(s).

6.2.3 Sampling, testing and compliance criteria

Sampling shall be carried out in accordance with EN 58.

The results of all type tests (initial and further type tests) shall be recorded, held by the manufacturer at least five years from the date of the test or until the type test is no longer valid (whichever is the longer) and be available for inspection.