



SLOVENSKI STANDARD
SIST EN 13108-1:2006
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Bitumenske zmesi - Specifikacije materialov - 1. del: Bitumenski beton

Bituminous mixtures - Material specifications - Part 1: Asphalt Concrete

Asphaltnischgut - Mischgutanforderungen - Teil 1: Asphaltbeton

Mélanges bitumineux - Spécifications des matériaux - Partie 1: Enrobés bitumineux

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Bituminous mixtures - Material specifications - Part 1: Asphalt Concrete

Mélanges bitumineux - Spécifications des matériaux -
Partie 1: Enrobés bitumineux

Asphaltmischgut - Mischgutanforderungen - Teil 1:
Asphaltbeton

This European Standard was approved by CEN on 12 October 2005.

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Contents

Page

Foreword.....4

Introduction5

1 Scope6

2 Normative references6

3 Terms, definitions, symbols and abbreviations7

3.1 Terms and definitions7

3.2 Symbols and abbreviations8

4 Requirements for constituent materials.....8

4.1 General.....8

4.2 Binder.....9

4.2.1 General.....9

4.2.2 Binder in empirically specified mixtures.....9

4.3 Aggregates 10

4.3.1 Coarse aggregate..... 10

4.3.2 Fine aggregate 10

4.3.3 All-in aggregates 10

4.3.4 Added filler 10

4.4 Reclaimed asphalt 10

4.5 Additives 10

5 Requirements for the mixture..... 11

5.1 Empirical or fundamental requirements..... 11

5.1.1 Declaration of the target composition..... 11

5.1.2 Empirical requirements..... 11

5.1.3 Fundamental requirements..... 11

5.2 General requirements..... 11

5.2.1 Composition and grading 11

5.2.2 Void content 12

5.2.3 Coating and homogeneity 14

5.2.4 Water sensitivity 14

5.2.5 Resistance to abrasion by studded tyres 15

5.2.6 Resistance to permanent deformation 15

5.2.7 Reaction to fire..... 17

5.2.8 Resistance to fuel for application on airfields..... 17

5.2.9 Resistance to de-icing fluid for application on airfields..... 17

5.2.10 Temperature of the mixture 18

5.2.11 Durability 18

5.3 Empirical requirements..... 18

5.3.1 Composition, grading, binder content and additives 18

5.3.2 Marshall values for application on airfields 20

5.3.3 Voids filled with bitumen 22

5.3.4 Voids in mineral aggregate..... 24

5.3.5 Void content at 10 gyrations..... 24

5.3.6 Over-specification..... 24

5.4 Fundamental requirements..... 25

5.4.1 Composition - grading and binder content..... 25

5.4.2 Stiffness..... 25

5.4.3 Resistance to permanent deformation in triaxial compression test 26

5.4.4 Resistance to fatigue..... 27

5.4.5 Over-specification..... 28

6 Evaluation of conformity..... 28

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SIST EN 13108-1:2006
<https://standards.iteh.ai/catalog/standards/sist/041d3c5-3641-476a-ab08-2a161bcc554e/sist-en-13108-1-2006>

7	Identification	29
Annex A (normative) Calculations of the penetration or the softening point of the binder of a mixture when reclaimed asphalt is used		30
A.1	General	30
A.2	Calculation of the penetration of the binder of a mixture	30
A.3	Calculation of the softening point of the binder of a mixture.....	30
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Construction Products Directive.....		32

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SIST EN 13108-1:2006

<https://standards.iteh.ai/catalog/standards/sist/0f41d3c5-3641-476a-a608-2a1b1bce554e/sist-en-13108-1-2006>

Foreword

This European Standard (EN 13108-1:2006) 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 November 2006, and conflicting national standards shall be withdrawn at the latest by January 2008.

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 Directive(s).

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

This European Standard is one of a series of standards as listed below:

EN 13108-1, *Bituminous mixtures — Material specifications — Part 1: Asphalt Concrete.*

EN 13108-2, *Bituminous mixtures — Material specifications — Part 2: Asphalt Concrete for very thin layers.*

EN 13108-3, *Bituminous mixtures — Material specifications — Part 3: Soft Asphalt.*

EN 13108-4, *Bituminous mixtures — Material specifications — Part 4: Hot Rolled Asphalt.*

EN 13108-5, *Bituminous mixtures — Material specifications — Part 5: Stone Mastic Asphalt.*

EN 13108-6, *Bituminous mixtures — Material specifications — Part 6: Mastic Asphalt.*

EN 13108-7, *Bituminous mixtures — Material specifications — Part 7: Porous Asphalt.*

EN 13108-8, *Bituminous mixtures — Material specifications — Part 8: Reclaimed asphalt.*

EN 13108-20, *Bituminous mixtures — Material specifications — Part 20: Type Testing.*

EN 13108-21, *Bituminous mixtures — Material specifications — Part 21: Factory Production Control.*

No existing European Standard is superseded.

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.

Introduction

The ultimate aim is to specify Asphalt Concrete in terms of fundamental, performance based properties. However given the differences in knowledge and experience with fundamental specifications for this mix type in Europe, it is not possible to choose only the fundamental approach.

This European Standard therefore provides two ways of specifying Asphalt Concrete:

- The first, or empirical approach specifies Asphalt Concrete in terms of compositional recipes and requirements for constituent materials with additional requirements based on performance related tests. These requirements are in 5.2 and 5.3.
- The second, or fundamental approach specifies Asphalt Concrete in terms of performance-based requirements linked to limited prescription of composition and constituent materials, offering a greater degree of freedom. These requirements can be found in 5.2 and 5.4.

It is envisaged that, as users gain experience with performance based testing, there will be a shift towards greater use of the fundamental approach to specification.

Asphalt Concrete is used for surface courses, binder courses regulating courses, and bases.

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1 Scope

This European Standard specifies requirements for mixtures of the mix group Asphalt Concrete for use on roads, airfields and other trafficked areas.

NOTE A mixture specification derived from this Standard can be used either to declare the conformity of a mixture with known requirements or to make known what those requirements are.

This European Standard includes requirements for the selection of the constituent materials. It is designed to be read in conjunction with EN 13108-20 and EN 13108-21.

Asphalt Concrete mixtures with chemical modified binders not covered by EN 14023 are not covered by this European Standard.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1097-6, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

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 12591, *Bitumen and bituminous binders — Specifications for paving grade bitumens*

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

EN 13043, *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*

EN 13108-4:2005, *Bituminous mixtures — Material specifications — Part 4: Hot Rolled Asphalt*

EN 13108-8, *Bituminous mixtures — Material specifications — Part 8: Reclaimed asphalt*

EN 13108-20:2005, *Bituminous mixtures — Material specifications — Part 20: Type Testing*

EN 13108-21:2005, *Bituminous mixtures — Material specifications — Part 21: Factory Production Control*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

prEN 13924, *Bitumen and bituminous binders — Specifications for hard paving grade bitumens*

EN 14023, *Bitumen and bituminous binders — Specifications for polymer modified bitumens*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

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

3.1.1

pavement

structure, composed of one or more courses, to assist the passage of traffic over terrain

3.1.2

layer

element of a pavement laid in a single operation

3.1.3

course

structural element of a pavement constructed with a single material. A course may be laid in one or more layers

3.1.4

surface course

upper course of the pavement, which is in contact with the traffic

3.1.5

binder course

part of the pavement between the surface course and the base

3.1.6

regulating course

course of variable thickness applied to an existing course or surface to provide the necessary profile for a further course of consistent thickness

3.1.7

base

main structural element of a pavement. The base may be laid in one or more courses, described as “upper” base, “lower” base etc.

3.1.8

Asphalt Concrete

asphalt in which the aggregate particles are continuously graded or gap-graded to form an interlocking structure

3.1.9

mix formulation

composition of a single mixture expressed as a target composition

NOTE A target composition may be expressed in two ways (see 3.1.10 and 3.1.11).

3.1.10

input target composition

expression of a mix formulation in terms of the constituent materials, the grading curve and the percentage of bitumen added to the mixture

NOTE This will usually be the result of a laboratory mix design and validation.

3.1.11

output target composition

expression of a mix formulation in terms of the constituent materials and the mid point grading and soluble binder content to be found on analysis

NOTE This will usually be the result of a production validation.

3.1.12

additive

constituent material, which can be added in small quantities to the mixture, e.g. inorganic or organic fibres or polymers, to influence the mechanical properties, the workability or the colour of the mixture

3.1.13

performance-based requirement

requirement for a fundamental engineering property (e.g. stiffness, fatigue properties) that predicts performance and appears in primary performance prediction relationships

3.1.14

performance-related requirement

requirement for a characteristic (e.g. wheel tracking properties, Marshall properties) that has been found to correlate with a fundamental engineering property that predicts performance

3.1.15

empirical specification

combination of requirements for composition and constituent materials together with performance-related requirements

3.1.16

fundamental specification

combination of performance-based requirements together with limited requirements for composition and constituent materials, with more degrees of freedom than for an empirical specification

NOTE In practice some characteristics will be performance-related.

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3.2 Symbols and abbreviations

AC Asphalt Concrete

D upper sieve size of the aggregate in the mixture, in millimetres (mm)

4 Requirements for constituent materials

4.1 General

Only constituent materials with established suitability shall be used.

The establishment of suitability shall result from one or more of the following:

- European Standard;
- European Technical Approval;
- specifications for materials based on a demonstrable history of satisfactory use in asphalt. Evidence shall be provided on their suitability. This evidence may be based on research combined with evidence from practice.

NOTE In the European asphalt industry it is common practice to use additives like inorganic or organic fibres, pigments, waxes etc., which are not covered by a European Standard or ETA. This European Standard allows the use of those materials.

4.2 Binder

4.2.1 General

The binder for empirically and fundamentally specified mixtures shall be paving grade bitumen, modified bitumen or hard grade bitumen. The paving grade bitumen shall conform to EN 12591, the modified bitumen to EN 14023 and the hard grade bitumen to prEN 13924.

The binder in empirically specified mixtures shall conform to 4.2.2.

Natural asphalt conforming to EN 13108-4:2005, Annex B, may be added.

4.2.2 Binder in empirically specified mixtures

4.2.2.1 Selection of binder

The grade of the bitumen, the type and grade of modified bitumen and the amount and category of natural asphalt shall be as specified. In case of a paving grade bitumen the grade shall be selected from the grades between 20/30 and 330/430 inclusively and in case of a hard grade bitumen the grade shall be selected from the grades 10/20 and 15/25.

NOTE 1 Given the wide variety of climates, traffic loads, used materials etc. it can be necessary to select on a regional level specific binders.

When modified bitumen is used to improve properties that are not covered by the empirical specification additional proof shall be provided. This proof shall be delivered through investigation using standards in the EN 12697 series, that the modified bitumen is suitable for improving the desired functional characteristics. The proof may be based on earlier research.

NOTE 2 EN 14023 is a grading system and is only meant to characterise the modified bitumen. The modified bitumen specifications are not functionally based, and it is not possible to combine these specifications with empirical asphalt specifications to demonstrate functional behaviour. The proof required would normally be a Type Testing on a similar mixture incorporating the modified binder showing fulfilment of the relevant property. The grade of the bitumen, the type and grade of the modified bitumen, the grade of the hard grade bitumen and the amount and category of natural asphalt may be selected.

4.2.2.2 Surface courses with reclaimed asphalt

When using more than 10 % by mass of the total mixture of reclaimed asphalt from mixtures in which only paving grade bitumen has been used and when the binder added to the mixture is a paving grade bitumen and the grade of the bitumen is selected, the binder shall conform to the following requirement:

- Penetration or the softening point of the binder in the resulting mixture, calculated from the penetrations or the softening points of the added binder and the recovered binder from the reclaimed asphalt, shall meet the penetration or softening point requirements of the selected grade. The calculation shall be executed according to Annex A. Either the penetration or the softening point requirement shall be selected.

4.2.2.3 Regulating courses, binder courses and bases with reclaimed asphalt

When using more than 20 % by mass of the total mixture of reclaimed asphalt from mixtures in which only paving grade bitumen has been used and when the binder added to the mixture is a paving grade bitumen and the grade of the bitumen is selected, the binder shall conform to the following requirement:

— Penetration or the softening point of the binder in the resulting mixture, calculated from the penetrations or the softening points of the added binder and the recovered binder from the reclaimed asphalt, shall meet the penetration or softening point requirements of the selected grade. The calculation shall be executed according to Annex A. Either the penetration or the softening point requirement shall be selected.

4.3 Aggregates

4.3.1 Coarse aggregate

Coarse aggregate shall conform to EN 13043 as appropriate for the intended use.

4.3.2 Fine aggregate

Fine aggregate shall conform to EN 13043 as appropriate for the intended use.

For fundamentally specified mixtures the angularity shall not be selected.

4.3.3 All-in aggregates

All-in aggregate shall conform to EN 13043 as appropriate for the intended use.

4.3.4 Added filler

Filler aggregate shall conform to EN 13043 as appropriate for the intended use. The amount of added filler shall be as specified.

For fundamentally specified mixtures, the stiffening properties shall not be selected.

NOTE 1 Filler includes materials as cement and hydrated lime.

NOTE 2 The expression “as appropriate for the intended use” in 4.3.1 to 4.3.4 means that the selection of the requirements and the particular category depends on a number of conditions. These conditions will include traffic density, climatic conditions, the construction of the course in which the mixture will be used, and economic considerations.

4.4 Reclaimed asphalt

The use and the amount of reclaimed asphalt, and the mix group from which the reclaimed asphalt has been or will be derived shall be as specified.

The properties of reclaimed asphalt declared in accordance with EN 13108-8 shall conform to specified requirements appropriate to the intended use.

NOTE The expression “appropriate to the intended use” means that the selection of the requirements and the particular category depends on a number of conditions. These conditions will include traffic density, climatic conditions, the construction of the course in which the mixture will be used, and economic considerations.

The upper sieve size D of the aggregate in the reclaimed asphalt shall not exceed the upper sieve size D of the mixture. The aggregate properties of the reclaimed asphalt shall fulfil the requirements specified for the aggregate for the mixture.

4.5 Additives

The nature and properties of all additives shall be declared and they shall conform to the specifications required in 4.1.

5 Requirements for the mixture

5.1 Empirical or fundamental requirements

5.1.1 Declaration of the target composition

The mix formulation shall be declared and documented.

5.1.2 Empirical requirements

At the target composition the mixture shall fulfil general requirements plus empirical requirements selected from 5.2 and 5.3.

5.1.3 Fundamental requirements

At the target composition the mixture shall fulfil general requirements plus fundamental requirements selected from 5.2 and 5.4.

5.2 General requirements

5.2.1 Composition and grading

5.2.1.1 Composition

The grading shall be expressed in percentages by mass of total aggregate. The binder and additive content shall be expressed in percentages by mass of total mixture. The percentages passing the sieves, with exception of the sieve 0,063 mm shall be expressed to 1 %, the binder content, the percentage passing sieve 0,063 mm and any additive content shall be expressed to 0,1 %.

5.2.1.2 Grading

The sieves to be used shall be either basic sieve set plus set 1 or basic sieve set plus set 2, according to EN 13043.

The requirements for the grading shall be expressed in terms of maximum and minimum values by selection for the percentages passing the sieves 1,4 D , D , 2 mm and 0,063 mm. A combination of sieve sizes from set 1 and set 2 shall not be permissible.

D and the sieves between D and 2 mm shall be selected from the following sieves:

- basic sieve set plus set 1: 4 mm; 5,6 mm; 8 mm; 11,2 mm; 16 mm; 22,4 mm, 31,5 mm;
- basic sieve set plus set 2: 4 mm; 6,3 mm; 8 mm; 10 mm; 12,5 mm; 14 mm; 16 mm; 20 mm, 31,5 mm.

Tables 1 and 2 specify the overall grading limits for Asphalt Concrete. The percentage passing the sieves D ; 2 mm and 0,063 mm of the selected grading envelope shall not exceed the maximum and minimum values indicated in Table 1 or Table 2.