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Bitumenske zmesi - Specifikacije materialov - 1. del: Bitumenski beton

Bituminous mixtures - Material specifications - Part 1: Asphalt Concrete

Asphaltmischgut - Mischgutanforderungen - Teil 1: Asphaltbeton

Mélanges bitumineux - Spécifications sur le matériau - Partie 1: Enrobés bitumineux

Ta slovenski standard je istoveten z: **EN 13108-1:2016**

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EUROPEAN STANDARD
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Bituminous mixtures - Material specifications - Part 1: Asphalt Concrete

Mélanges bitumineux - Spécifications pour le matériau
- Partie 1: Enrobés bitumineux

Asphaltemischgut - Mischgutanforderungen - Teil 1:
Asphaltbeton

This European Standard was approved by CEN on 27 February 2016.

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-CENELEC Management Centre or to any CEN member.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 13108-1:2016 (E)**European foreword**

This document (EN 13108-1:2016) 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of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by March 2018.

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 13108-1:2006.

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 Regulation (EU) No 305/2011 for construction products (CPR).

For relationship with Regulation (EU) No 305/2011 see informative Annex ZA which is an integral part of this document.

Compared with EN 13108-1:2006, the following changes have been made:

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- a) general, empirical and fundamental approaches have been merged into one list with different properties;
- b) new properties introduced (saturation, tensile stiffness, conditioning test, low temperature properties, fracture toughness, friction after polishing);
- c) additional optional sieves for the characterization of the grading;
- d) for several properties additional categories are introduced;
- e) possibility to define specific conditions in documents related to the application of the product;
- f) CPR reference and new Annex ZA according CPR rules.

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 (BBTM)*
- 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 13108-9, *Bituminous mixtures — Material specifications — Part 9: Asphalt for Ultra-Thin Layers (AUTL)*
- EN 13108-20, *Bituminous mixtures — Material specifications — Part 20: Type Testing*
- EN 13108-21, *Bituminous mixtures — Material specifications — Part 21: Factory Production Control*

Annex A (normative) details the calculation of the penetration or the softening point in mixtures containing reclaimed asphalt from the penetrations or softening points of the added binder and the recovered binder from the reclaimed asphalt.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 13108-1:2016 (E)**Introduction**

The aim of this European Standard is to enable specification of Asphalt Concrete mixtures on a performance basis. In general, however, there are currently more empirical tests available to describe the mixtures. Depending on the experience with the combination of requirements in this European standard more or less degrees of freedom for the producer may be given.

This European Standard covers a large variety of materials for different applications, traffic and climate conditions. EN 13108-1 gives properties and listings of possible categories. It has to accommodate the road industry for all of Europe. For this reason the menu approach for properties has been chosen. The Tables represent categories that are required all over Europe. For this reason numerical values in Tables do not always obey statistical rules. Based on conditions of use specific properties and categories may be defined in documents related to the application of the product. The categories defined in those documents need to take into account the reproducibility of the test when this is given in the appropriate test method.

Care should be taken to only select those tests which are relevant to the application of the asphalt and the use of the pavement and to avoid a combination of potentially conflicting requirements.

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

The mixtures of the mix group Asphalt Concrete are produced on the basis of hot bitumen. Mixtures utilizing bitumen emulsion and bituminous materials based on *in situ* recycling are not covered by this standard.

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.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 the softening point — Ring and Ball method*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

EN 12697-44, *Bituminous mixtures — Test methods for hot mix asphalt — Part 44: Crack propagation by semi-circular bending test*

EN 12697-45, *Bituminous mixtures — Test methods for hot mix asphalt — Part 45: Saturation Ageing Tensile Stiffness (SATS) conditioning test*

EN 12697-46, *Bituminous mixtures — Test methods for hot mix asphalt — Part 46: Low temperature cracking and properties by uniaxial tension tests*

EN 12697-49, *Bituminous mixtures — Test methods for hot mix asphalt — Part 49: Determination of friction after polishing*

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

EN 13108-4:2016, *Bituminous mixtures — Material specifications — Part 4: Hot Rolled Asphalt*

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

EN 13108-20:2016, *Bituminous mixtures — Material specifications — Part 20: Type Testing*

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

EN 13501-1:2007+A1:2009, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13924-1, *Bitumen and bituminous binders — Specification framework for special paving grade bitumen — Part 1: Hard paving grade bitumens*

EN 13924-2, *Bitumen and bituminous binders — Specification framework for special paving grade bitumen — Part 2: Multigrade paving grade bitumens*

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

EN ISO 11925-2, *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2)*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, 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**

element of a pavement constructed with a single asphalt mixture

Note 1 to entry: A course can 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**

structural course 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

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Note 1 to entry: The base can be laid in one or more courses, described as “upper” base, “lower” base.

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3.1.8**asphalt**

homogenous mixture typically of coarse and fine aggregates, filler aggregate and bituminous binder which is used in the construction of a pavement

Note 1 to entry: Asphalt can include one or more additives to enhance the laying characteristics, performance or appearance of the mixture.

3.1.9**natural asphalt**

naturally occurring mixture of bitumen and finely divided mineral matter which is found in well-defined surface deposits and which is processed to remove unwanted components such as water and vegetable matter

Note 1 to entry: Natural asphalt is described in EN 13108-4.

3.1.10**Asphalt Concrete**

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

3.1.11**mix formulation**

composition of a single mixture expressed as a target composition

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Note 1 to entry: A target composition is expressed in one of two ways (see 3.1.12 and 3.1.13).

3.1.12**input target composition**

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

Note 1 to entry: This will usually be the result of a laboratory mix design and validation.

3.1.13**output target composition**

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

Note 1 to entry: This will usually be the result of a production validation.

3.1.14**additive**

constituent material that can be added in small quantities to influence specific properties of the mixture

Note 1 to entry: For example additives are used to influence the affinity of binder to aggregate, and the mechanical properties when using inorganic and organic fibres and polymers. They are also used to influence the colour of the mixture.

3.1.15**conflicting requirements**

combination of requirements or properties which are impracticable to fulfil in their entirety

Note 1 to entry: This can occur by combining specific requirements for the composition and constituent materials together with more performance related tests. These are also relevant when two or more performance or test parameters are selected which measure similar properties using conflicting test methods resulting in a lack of clarity and consistency in the characteristics of the mixture.

3.1.16**premixed binder**

bitumen which is blended on the site of the asphalt mixing plant, with an additive before or during the addition of the binder to the plant mixer, which in the case of a continuous plant, will be before or during the delivery of the binder to the mixing zone of the drier drum

3.1.17**category**

defined level of a property of an asphalt mixture

Note 1 to entry: The designation of a category is expressed with a symbol and a numerical value representing the level.

EXAMPLE $B_{\min} 4,0$ means that the minimum binder content shall be 4,0 %.

Note 2 to entry: Defined categories for each property are listed in EN 13108-1.

3.1.18**class**

range of levels defined by a minimum and a maximum value

3.2 Symbols and abbreviations

AC general designation of Asphalt Concrete

AC *D* designation of Asphalt Concrete followed by an indication of *D*, the upper sieve size of the aggregate in the mixture, in millimetres (mm)

EXAMPLE AC 6 Asphalt Concrete with an upper sieve size of the aggregate of 6 mm.

4 Requirements for constituent materials

4.1 General

Only constituent materials with established suitability shall be used. For all constituent materials the properties relevant to the performance of the mixture shall be made available.

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

- European Standard;
- European Technical Assessment;
- specifications for materials based on a demonstrable history of satisfactory use in asphalt; evidence shall be based on research and/or the evidence of satisfactory practical use. In documents related to the application of the product details for the assessment of this proof may be defined.

There can be technical limitations regarding the future recycling possibilities. Also traceability of the nature of constituent materials can affect the potential for future recycling.

4.2 Binder

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4.2.1 General

The binder shall be a paving grade bitumen, a polymer modified bitumen, a hard paving grade bitumen, a multigrade bitumen or a blend of one of them with natural asphalt. The paving grade bitumen shall conform to EN 12591, the modified bitumen to EN 14023, the hard paving grade bitumen to EN 13924-1 and the multigrade bitumen to EN 13924-2. When natural asphalt is used, it shall conform to EN 13108-4:2016, Annex B.

Premixed binders that are not covered by EN 12591, EN 14023 or EN 13924-1 and EN 13924-2 may be used provided that information is given as stated in 4.1, and that the base bitumen is conforming to EN 12591, EN 14023 or EN 13924-1 and EN 13924-2. The use of these binders may be defined in documents related to the application of the product.

4.2.2 Selection of binder

4.2.2.1 General

Depending on the conditions of use, the type and grade of bitumen and the amount and category of natural asphalt may be defined in documents related to the application of the product.

The type and grade of the bitumen and the amount and category of natural asphalt shall be declared in the Type Test report.

NOTE EN 14023 for modified bitumen is a framework for classification and is only meant to characterize the modified bitumen. The modified bitumen specifications are not performance based. The same applies to multigrade bitumen according to EN 13924-2.

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When an additive is used to lower the production temperature of the Asphalt Concrete and thereby changes relevant properties of the binder at temperatures representative for the climatic conditions in the place of use, evidence shall be provided to show what the influence of the additive is on the performance of the mix. This proof shall be based on research or evidence of satisfactory performance according to 4.1.

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 following requirements may be defined in documents related to the application of the product.

The penetration and/or the softening point of the binder in the resulting mixture, calculated from the penetrations and/or the softening points of the added binder and the recovered binder from the reclaimed asphalt, shall meet the penetration and/or softening point requirements of the specified grade. The calculation shall be performed according to Annex A (normative). In some cases the binder of the reclaimed asphalt can be so hardened that a very soft bitumen has to be chosen to fulfil these requirements. In such cases an alternative grade to that calculated according to Annex A (normative) may be defined.

When using reclaimed asphalt from mixtures in which a modified bitumen and/or an additive has been used, and/or the mixture itself contains a modified bitumen or an additive, the amount of reclaimed asphalt may be limited in documents related to the application of the product to a maximum of 10 % by mass of the total mixture.

NOTE 1 The choice for this specification depends on the choice of requirements within this European Standard. For more performance designed mixes there might be no need to apply the pen and/or softening point rule. (However, the pen or softening point rule is only valid for paving grade bitumen.)

NOTE 2 When applying a recipe approach to the mixture, using too great a proportion of modified bitumen or additive could lead to an incorrect decision in respect to the addition of the new bitumen.

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 following requirements may be defined in documents related to the application of the product.

The penetration and/or the softening point of the binder in the resulting mixture, calculated from the penetrations and/or the softening points of the added binder and the recovered binder from the reclaimed asphalt, shall meet the penetration and/or softening point requirements of the selected grade. The calculation shall be executed according to Annex A (normative). In some cases the binder of the recovered asphalt can be so hardened that a very soft bitumen has to be chosen to fulfil these requirements. In such cases an alternative grade to that calculated according to Annex A (normative) may be defined.

When using reclaimed asphalt from mixtures in which a modified bitumen and/or an additive has been used, and/or the mixture itself contains a modified bitumen or an additive, the amount of reclaimed asphalt for regulating courses, binder courses and base courses may be limited in documents related to the application of the product to a maximum of 20 % by mass of the total mixture.

NOTE 1 The choice for this specification depends on the choice of requirements within this standard. For performance designed mixes there might be no need to apply the pen and/ or softening point rule. (However, the pen or softening point rule is only valid for paving grade bitumen).

NOTE 2 When applying a recipe approach to the mixture, using too great a proportion of modified bitumen or additive could lead to an incorrect decision in respect to the addition of the new bitumen.

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.

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

Added filler shall conform to EN 13043 as appropriate for the intended use and may include materials such as cement, limestone and hydrated lime. Based on the experience in the place of use the type and amount of added filler may be defined in documents related to the application of the product.

NOTE 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 include traffic density, climatic conditions, the construction of the course in which the mixture will be used, and economic considerations.

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4.4 Reclaimed asphalt

The use and the amount of reclaimed asphalt and the mix group and/or the courses from which the reclaimed asphalt has been or will be derived may be defined in documents related to the application of the product.

The properties of reclaimed asphalt declared in accordance with EN 13108-8 shall conform to requirements that may be selected appropriate for the intended use.

NOTE The expression “appropriate for the intended use” means that the selection of the requirements and the particular category depends on a number of conditions. These conditions 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 or of the mixed aggregates from the reclaimed asphalt with the other aggregates shall fulfil the requirements for aggregate defined in documents related to the application of the mixture.

When required, the amount of reclaimed asphalt, the mix group and/or the courses from which the reclaimed asphalt has been or will be derived shall be declared in the Type Test report.

4.5 Additives

The nature and properties of all additives shall be declared and they shall conform to the requirements referred to in 4.1. For specific applications and based on the experience in the place of use the amount of additives may be defined in documents related to the application of the product.

NOTE Chemical and organic additives can be used for example, to reduce production temperatures by influencing the viscosity of the binder. This might have an effect on other relevant mixture properties.