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Bituminous mixtures - Material specifications - Part 4: Hot Rolled Asphalt

Asphaltmischgut - Mischgutanforderungen - Teil 4: Hot Rolled Asphalt

Mélanges bitumineux - Spécifications des matériaux - Partie 4: Hot Rolled Asphalt

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English Version

**Bituminous mixtures - Material specifications - Part 4: Hot
Rolled Asphalt**

Mélanges bitumineux - Spécifications des matériaux -
Partie 4: Hot Rolled Asphalt

Asphaltmischgut - Mischgutanforderungen - Teil 4: Hot
Rolled Asphalt

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 13108-4:2016 (E)

European foreword

This document (EN 13108-4:2016) 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of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by March 2018.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 13108-4:2006.

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 European Standard.

Compared with EN 13108-4:2006, the following changes have been made:

- a) general, empirical and fundamental approaches have been merged into one list with different properties;
- b) new properties introduced (low temperature properties);
- 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 to CPR rules.

This European Standard is one of a series 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 Layer (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.

Annex B (normative) gives specifications for natural asphalt.

Annex C (normative) gives specifications for coated chippings.

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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Introduction

The aim of this European Standard is to specify bituminous mixtures on a performance level. Specifications for Hot Rolled Asphalt have traditionally been based on compositional recipes combined with specifications for the constituent materials with additional requirements based on tests on the product. Although more tests are available to provide information on the performance of the material, they are still insufficient to cover the actual performance of the material in the road. Therefore a combination with composition and specifications for the constituent materials will still be necessary.

This European Standard covers a large variety of materials for different applications, traffic and climate conditions. EN 13108-4 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 Hot Rolled Asphalt for use on roads, airfields and other trafficked areas. Hot Rolled Asphalt is used for surface courses, binder courses, regulating courses and bases.

The mixtures of the mix group Hot Rolled Asphalt 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 1097-6:2013, *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 12592, *Bitumen and bituminous binders — Determination of solubility*

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

EN 12697-4, *Bituminous mixtures — Test methods — Part 4: Bitumen recovery: Fractionating column*

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

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

EN 12697-37, *Bituminous mixtures — Test methods for hot mix asphalt — Part 37: Hot sand test for the adhesivity of binder on precoated chippings for HRA*

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

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

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

EN 12697-47, *Bituminous mixtures — Test methods for hot mix asphalt — Part 47: Determination of the ash content of natural asphalts*

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

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 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)*

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 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

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

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

3.1.8

asphalt

homogenous mixture typically of coarse and fine aggregates, filler aggregate and bituminous binder which is used

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

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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

Hot Rolled Asphalt

dense, gap graded bituminous mixture in which the mortar of fine aggregate, filler and high viscosity binder are major contributors to the performance of the laid material

3.1.11

coated chippings

nominally single size aggregate particles with a high resistance to polishing, which are lightly coated with high viscosity binder

Note 1 to entry: The chippings are rolled into and form part of a Hot Rolled Asphalt surface course which generally has coarse aggregate content of $\leq 35\%$.

3.1.12

mix formulation

composition of a single mixture expressed as a target composition

Note 1 to entry: A target composition is expressed in one of two ways (see 3.1.13 and 3.1.14).

EN 13108-4:2016 (E)**3.1.13****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 1 to entry: This will usually be the result of a laboratory mix design and validation.

3.1.14**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 1 to entry: This will usually be the result of a production validation.

3.1.15**additive**

constituent material which 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.

3.1.16**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.

3.1.17**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

3.1.18**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 $B_{\min} 6,0$ means that the minimum binder content shall be 6,0 %.

Note 2 to entry: Defined categories for each property are listed in EN 13108-4.

3.1.19**class**

range of levels delimited by a minimum and a maximum value

3.2 Symbols and abbreviations

HRA	general designation of Hot Rolled Asphalt;
HRA %/ <i>D</i> (<i>F</i> or <i>C</i>)	designation of Hot Rolled Asphalt followed by an indication the percentage of coarse aggregate in the mixture and of <i>D</i> , the upper sieve size of the aggregate in the mixture in millimetres (mm). For surface course mixtures the designation of the type of fine aggregate used in their manufacture immediately follows <i>D</i> . Type F fine aggregate is predominantly natural/uncrushed sand and Type C is predominantly crushed rock fine aggregate.

EXAMPLE HRA 30/14 F Hot Rolled Asphalt containing 30 % of a coarse aggregate with maximum aggregate size *D* of 14 mm containing a Type F fine aggregate.

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

4.2.1 General

The binder shall be a paving grade bitumen, a 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 grade bitumen to EN 13924-1 and the multigrade bitumen to EN 13924-2. When natural asphalt is used, it shall conform to Annex B.

Premixed bituminous binders that are not covered by the standards 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.