

## 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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## **Foreword**

This European Standard (EN 13108-4:2012) has been prepared by Technical Committee CEN/TC 227 "Road materials", the secretariat of which is held by DIN. This document is currently submitted to the Unique Acceptance Procedure.

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 13108-9, *Bituminous mixtures — Material specifications — Part 9: Asphalt for Ultra Thin Layers.*

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

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

Previous version of European Standard EN 13108-4 is superseded.

Annex A, which is 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, which is normative, gives specifications for natural asphalt

Annex C, which is normative, gives specifications for coated chippings

Annex D, which is informative, gives information on the use of the proposed test method for friction after polishing

For relationship with EU Regulations, and Directives, see informative Annex ZA, which is an integral part of this standard.

Standards for mix groups utilizing cutback bitumen or bitumen emulsion and for materials based on in situ recycling will be considered by CEN/TC 227 when the hot mix asphalt standards have been completed.

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

## Introduction

The ultimate aim is to specify bituminous mixtures on a performance level. Specifications for Hot Rolled Asphalt have traditionally been based empirically 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.

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

## 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.

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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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/ISO 11925/2, *Reaction to fire tests - Ignitability of building products subjected to direct impingement of flame - Part 2: Single-flame source test.*

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

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

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 *Bituminous mixtures — Material specifications — Part 20: Type Testing*

EN 13108-21, *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*

EN 13924, *Bitumen and bituminous binders — Specifications for hard paving grade bitumen.*

EN 14023, *Bitumen and bituminous binders - Framework specification for polymer modified bitumens*

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

EN 12697-47, *Determination of the ash content of natural asphalts*

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

### **3 Terms, definitions, symbols and abbreviations**

#### **3.1 Terms and definitions**

For the purpose 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**

homogenous mixture of coarse and fine aggregates, filler aggregate and bituminous binder which is used in the construction of flexible pavement layers.

**Note:** The asphalt may 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

**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. 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** A target composition may be expressed in two ways (see 3.1.11 and 3.1.12).

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

### 3.1.15 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

### 3.1.16 contradictory specification

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

Note: this can occur by combining specific requirements for the composition and constituent materials together with more performance related tests, or when two or more performance or test parameters are selected which measure similar properties using contradictory test methods resulting in a lack of clarity and consistency in the characteristics of the mixture.

NOTE In practice some characteristics will be performance-related.

## 3.2 Symbols and abbreviations

HRA general designation of Hot Rolled Asphalt

HRA %D designation of Hot Rolled Asphalt followed by an indication the percentage of coarse aggregate in the mixture and of  $D$ , the upper sieve size of the aggregate in the mixture, in millimetres (mm).

— Example: HRA 30/14 - Hot Rolled Asphalt containing 30% of a coarse aggregate with maximum aggregate size  $D$  of 14 mm.

## 4 Requirements for constituent materials

### 4.1 General

Only constituent materials with established suitability shall be used. For all constituent materials the relevant properties shall be declared

Note: this should be within the Type Test report

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 provided on their suitability. This evidence may be based on research combined with evidence from practice

Note 1 In the European asphalt industry it is practice to use constituent materials which are not covered by a European Standard or European Technical Assessment.

Note 2 chemical and organic additives may be used to reduce production temperatures by influencing the viscosity of the binder. This can have an effect on the rheology of binders at temperatures in the pavement thereby influencing relevant properties

Note 3. Attention should be given to the effects of all kinds of constituent materials on the potential for future recycling.

## **4.2 Binder**

### **4.2.1 General**

The binder shall be paving grade bitumen, modified bitumen or hard grade bitumen or a blend of either with natural asphalt.. The paving grade bitumen shall conform to EN 12591, the modified bitumen to EN 14023 and the hard grade bitumen to EN 13924. When natural asphalt is used, it shall conform to Annex B of this standard.

The grade of the bitumen, the type and grade of modified bitumen and the amount and category of natural asphalt according to annex B of EN 13108-4: 2012 shall be declared.

Premixed bituminous binders and other bituminous binders that are not covered by the standards EN 12591 or EN 14023 can be used provided information is given as stated in 4.1, provided the base bitumen is conforming to EN 12591, EN 14023 or EN 13924.

When required, the binder shall conform to 4.2.2.

Note 1: It is practice in Europe for special purposes to use other binders or premixed binders (binders mixed with additives or polymers in the asphalt plant).

Note 2 Asphalt mixtures with chemical modified binders not covered by EN 14023 are not covered by this European Standard

### **4.2.2 Selection of binder**

Depending on the conditions of use, the grade of the bitumen, the type and grade of modified bitumen and the amount and category of natural asphalt mayt be specified.

In case of a paving grade bitumen the grade shall be selected from the grades between 30/45 and 100/150 inclusively.

NOTE 1 Given the wide variety of climates, traffic loads, materials used 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 specifications in the standard (e.g. resistance to permanent deformation) additional proof shall be provided. This proof shall be delivered through investigation using European Standards in the EN 12697 series, that the modified bitumen is suitable for improving the desired properties. The proof may be based on earlier research.

NOTE 2 The European Standard for modified bitumen, EN 14023, is a grading system and is only meant to characterise the modified bitumen. The modified bitumen specifications are not performance based. This means that not all requirements or combinations of requirements give information on the expected behaviour of the asphalt mix,

#### 4.2.3 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 specified

The 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 specified grade. The calculation shall be executed according to Annex A. Either the penetration or the softening point requirement shall be selected.

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

Note: the choice for this specification is depending on the choice of requirements in this standard. For more fundamental designed mixes there might be no need to define the pen or softening point rule. Besides, the pen or softening point rule is only valid for penetration bitumen. Using a too high amount of modified bitumen or modifier could lead to a wrong decision for the new to be added binder in an empirical approach. **Bob Noakes to modify when needed**

#### 4.2.4 Regulating courses and binder courses 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 requirement may be specified

**The 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 specified grade. The calculation shall be executed according to Annex A. Either the penetration or the softening point requirement shall be selected.**

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

Note: the choice for this specification is depending on the choice of requirements in this standard. For more fundamental designed mixes there might be no need to define the pen or softening point rule. Besides, the pen or softening point rule is only valid for penetration bitumen. Using a too high amount of modified bitumen or modifier could lead to a wrong decision for the new to be added binder in an empirical approach. **Bob Noakes to modify when needed**

The range of acceptable types and grades of bitumen which may be used in mixtures containing reclaimed asphalt may be specified.

Note 1: In some cases the binder of the old asphalt can be so hardened that a very soft bitumen has to be chosen to fulfil the requirement in 4.2.3. In such cases it might be **appropriate** to choose an **alternative** grade **to that** calculated according annex A. This can be specified on the basis of experience in the place of use

### **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**

Filler aggregate shall conform to EN 13043 as appropriate for the intended use. Based on the experience in the place of use the amount of added filler may be specified.

NOTE 1 Filler includes materials such 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 and/or the courses from which the reclaimed asphalt has been or will be derived may be specified.

The properties of reclaimed asphalt in accordance with EN 13108-8 shall conform to the specified requirements appropriate to the intended use according to paragraph 4.2 and 4.3 of 13108-8.

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 selected for the aggregate for the mixture.

The amount of reclaimed asphalt in the mixture and when required the mix group and /or the courses from which the reclaimed asphalt has been or will be derived shall be declared

### **4.5 Additives**

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

### **4.6 Coated chippings**

Coated chippings for application to Hot Rolled Asphalt surface course shall conform to Annex C.

NOTE It is normal practice for coated chippings to be applied to Hot Rolled Asphalt surface courses with nominal coarse aggregate content of 35 % or less when laid on roads. These chippings impart texture to the surface and the use of appropriately polish resistant aggregate in the chippings ensures tyre/road friction.

## **5 Requirements for the mixture**

### **5.1 General**

The target composition of the mixture in terms of its constituent materials, the percentages passing the specified sieves, the binder content and where relevant the binder from natural asphalt and the percentage(s) of additive(s) shall be documented and declared.

At the target composition the mixture shall conform to the specified requirements in accordance with this standard.

### **5.2 Composition, grading, binder content and additives**

#### **5.2.1 Composition**

At the target composition the grading shall conform to 5.2.2.

At the target composition the binder content shall conform to 5.2.3.

At the target composition<sup>0</sup> the binder volume shall conform to 5.2.4.

At the target composition the additive content shall conform to 5.2.5.

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 and any additive content shall be expressed to 0,1 %.

### 5.2.2 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 of the percentages passing the sieves as defined in Tables 1 to 4. 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.

The optional fine sieve shall be selected from the following sieves: 1 mm; 0,5 mm; 0,25 mm and 0,125 mm.

Tables 1, 2, 3 and 4 specify the grading envelopes for Hot Rolled Asphalt. The target composition of the mix shall be within this grading envelope.

**Table 1 — Grading of target composition for base and binder course mixtures — basic sieve set plus set 1**

<i>D</i>	50/11	50/16	50/22	60/22	60/32
Sieve	Passing sieve % by mass				
45	—	—	—	—	100
31,5	—	—	100	100	97
22,4	—	100	95	97	59 to 71
16	100	95	74 to 91	39 to 56	39 to 56
11,2	95	76 to 93	44 to 66	—	—
2	35 to 45	35 to 45	35 to 45	32	32
0,5	17 to 45	17 to 45	18 to 44	13 to 32	13 to 32
0,25	10 to 27	10 to 27	11 to 26	9 to 21	9 to 21
0,063	5,5	5,5	4,5	4,0	4,0

**Table 2 — Grading of target composition for base and binder course mixtures - basic sieve set plus set 2**

<i>D</i>	50/10	50/14	50/20	60/20	60/32
<b>Sieve</b>	<b>Passing sieve % by mass</b>				
40	—	—	—	—	100
31,5	—	—	100	100	99 to 100
20	—	100	99 to 100	99 to 100	59 to 71
14	100	98 to 100	74 to 91	39 to 65 <sup>a</sup>	39 to 65 <sup>a</sup>
10	98 to 100	72 to 93	44 to 66	—	—
2 <sup>b</sup>	40 to 50	40 to 50	40 to 50	37	37
0,5	17 to 51	17 to 51	18 to 50	13 to 39	13 to 39
0,25	14 to 31	14 to 31	15 to 30	10 to 25	10 to 25
0,063	3,0 to 6,0	3,0 to 6,0	4,0 to 5,0	4,0	4,0

<sup>a</sup> The upper compliance value of 65 (target + FPC) can be extended to 85 where evidence is available that the mixture so produced is suitable. To ensure the consistency of the finish of the laid mixture, supplies from any one source should be controlled within the requirements of FPC to the chosen upper target value.

<sup>b</sup> For mixtures containing rock fine aggregate, and in some instances sands or blends of sand and crushed rock fines, the minimum binder content given may be reduced by up to 0.5 %, where experience shows this to be advisable to avoid an over-rich mixture. Alternatively, a reduction in the target passing 2 mm of up to 5 % can be permitted.

**Table 3 — Grading of target composition for surface course mixtures – basic set plus set 1**

<i>D</i>	0/4 F	0/4C	15/11F	30/11F	55/11F	55/11C	30/16F	30/16C	35/16F	35/16C	55/16F	55/16C
<b>Sieve</b>	<b>Passing sieve % by mass</b>											
22.4	—	—	—	—	—	—	100	100	100	100	100	100
16	—	—	100	100	100	100	95	95	95	95	97	97
11.2	—	—	100	95	97	97	67 to 83	67 to 83	62 to 81	62 to 81	42 to 63	42 to 63
8	100	100	82 to 88	67 to 83	42 to 63	42 to 63	—	—	—	—	—	—
2	90 to 100	95 to 100	81	65	41	38	65	65	61	56	41	38
0,5	85 to 90	40 to 55	59 to 81	48 to 65	29 to 41	19 to 31	48 to 65	29 to 41	44 to 61	24 to 41	29 to 43	19 to 31
0,25	40 to 75	30 to 40	29 to 71	22 to 58	9 to 31	9 to 31	22 to 58	24 to 36	19 to 51	19 to 31	9 to 31	9 to 31
0,063	14,0	14,0	12,0	9,0 to 11,0	6,0	6,0	9,0	9,0	8,0	8,0	6,0	6,0

**Table 4 — Grading of target composition for surface course mixtures – basic set plus set 2**

D	0/2 F	0/2C	15/10F	30/10F	0/10F	55/10F	55/10C	30/14F	30/14C	35/14F	35/14C	55/14F	55/14C
Sieve	Passing sieve % by mass												
20	—	—	—	—	—	—	—	100	100	100	100	100	100
14	—	—	100 (	100	100	100	100	93 to 100)	93 to 100	95 to 100	95	98 to 100	98 to 100
10	—	—	100	93 to 100	90 to 100	98 to 100	98 to 100	67 to 83	67 to 83	62 to 81	62 to 81	42 to 63	42 to 63
6,3	100	100 (	82 to 88	67 to 83	73 to 88	42 to 63	42 to 63	—	—	—	—	—	—
2	98 to 100	98 to 100	79	65	63 to 67	41	40	65	66	61	59	41	40
0,5	80 to 90	40 to 55	59 to 83	49 to 68	25 to 50	29 to 43	19 to 31	49 to 68	29 to 41	44 to 63	24 to 41	29 to 43	19 to 31
0,25	40 to 65	25 to 35	24 to 61	19 to 51	10 to 30	9 to 31	9 to 31	19 to 51	19 to 36	16 to 46	16 to 26	9 to 31	9 to 31
0,063	14,0	14,0	12,0	9,0	8,0 to 13,0	6,0	6,0	9,0	9,0	8,0	8,0	6,0	6,0

For Type F surface course mixtures, the maximum percentage of aggregate passing a 2 mm sieve and retained on a 0,5 mm sieve, shall conform to Table 5.

**Table 5 — Maximum percentage of aggregate passing 2 mm and retained on 0,5 mm sieves in surface course mixtures**

Designation	15/11 F	30/11 F	30/16F	35/16 F	55/11 F	55/16 F
	15/10 F	30/10 F	30/14 F	35/14 F	55/10 F	55/14 F
Maximum percentage	18	14	14	13	9	9

**5.2.3 Binder content**

The target binder content of the target composition shall be selected from the categories in Table 6. The binder content required shall be corrected by multiplying by the factor

$$\alpha = \frac{2,650}{\rho_a}$$

(1)



where

$\rho_a$  is the apparent particle density in megagrams per cubic metre ( $\text{Mg/m}^3$ ), determined on the weighted mean of the total mineral fraction according to EN 1097-6. For porous aggregates the density will be calculated according to EN-12697-5 (procedure A). The apparent density shall be declared.

Based on experience in the place of use and for certain specific aggregates the corrected minimum binder content may be adjusted. The adjustment shall be documented and declared.

NOTE The binder content includes that contained in any reclaimed asphalt and natural asphalt when used.

Table 6 — Minimum binder content,  $B_{\min}$ 

Minimum binder content % by mass	Category $B_{\min}$
4,6	$B_{\min4,6}$
4,8	$B_{\min4,8}$
5,0	$B_{\min5,0}$
5,2	$B_{\min5,2}$
5,4	$B_{\min5,4}$
5,6	$B_{\min5,6}$
5,8	$B_{\min5,8}$
6,0	$B_{\min6,0}$
6,2	$B_{\min6,2}$
6,4	$B_{\min6,4}$
6,6	$B_{\min6,6}$
6,8	$B_{\min6,8}$
7,0	$B_{\min7,0}$
7,2	$B_{\min7,2}$
7,4	$B_{\min7,4}$
7,6	$B_{\min7,6}$
7,8	$B_{\min7,8}$
8,0	$B_{\min8,0}$
8,2	$B_{\min8,2}$
8,4	$B_{\min8,4}$
8,6	$B_{\min8,6}$
8,8	$B_{\min8,8}$
9,0	$B_{\min9,0}$
9,2	$B_{\min9,2}$
9,4	$B_{\min9,4}$
9,6	$B_{\min9,6}$
9,8	$B_{\min9,8}$
10,0	$B_{\min10,0}$
10,2	$B_{\min10,2}$
10,4	$B_{\min10,4}$
10,6	$B_{\min10,6}$
10,8	$B_{\min10,8}$
11,0	$B_{\min11,0}$
No requirement	$B_{\minNR}$

### 5.2.4 Binder volume

The minimum binder volume at the target composition shall be selected from the categories in Table 7.

The binder volume shall be determined according to EN 12697-8.

The method for determining bulk density shall be selected from EN 13108-20:2005, Table D.1.

**Table 7 — Minimum binder volume,  $B_{vol}$**

Minimum binder volume % by mass	Category $B_{vol}$
16,0	$B_{vol16,0}$
15,5	$B_{vol15,5}$
15,0	$B_{vol15,0}$
14,5	$B_{vol14,5}$
14,0	$B_{vol14,0}$
13,5	$B_{vol13,5}$
13,0	$B_{vol13,0}$
12,5	$B_{vol12,5}$
12,0	$B_{vol12,0}$
11,5	$B_{vol11,5}$
11,0	$B_{vol11,0}$
No requirement	$B_{volINR}$

NOTE When using the binder volume for mix validation at Type Testing stage the equivalent binder content shall be declared in the mix formulation for the purposes of evaluation of conformity during Factory Production Control.

## 5.3 Properties

### 5.3.1 Void content

The void content of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall lie between maximum and minimum values selected from the categories for void content in Tables 8 and 9.

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1.

The void content shall be determined in accordance with EN 13108-20:2012, D.2.

**Table 8 — Maximum void content,  $V_{\max}$**

Maximum void content %	Category $V_{\max}$
3,0	$V_{\max3,0}$
4,0	$V_{\max4,0}$
5,0	$V_{\max5,0}$
6,0	$V_{\max6,0}$
7,0	$V_{\max7,0}$
8,0	$V_{\max8,0}$
No requirement	$V_{\maxNR}$

**Table 9 — Minimum void content,  $V_{\min}$**

Minimum void content %	Category $V_{\min}$
0,5	$V_{\min0,5}$
1,0	$V_{\min1,0}$
1,5	$V_{\min1,5}$
2,0	$V_{\min2,0}$
No requirement	$V_{\minNR}$

### 5.3.2 Water sensitivity

The water sensitivity of specimens prepared in accordance with EN 13108-20:2005, 6.5, shall be selected from the categories for the indirect tensile strength ratio, *ITSR*, in Table 10.

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1.

The water sensitivity shall be determined according with EN 13108-20: 2012, D.3.

**Table 10 — Minimum indirect tensile strength ratio, *ITSR***

Minimum indirect tensile strength ratio %	Category <i>ITSR</i>
80	$ITSR_{80}$
70	$ITSR_{70}$
60	$ITSR_{60}$
No requirement	$ITSR_{NR}$

### 5.3.3 Resistance to permanent deformation

The resistance to permanent deformation of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall be selected from the categories from Tables 11 and 12.

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1.

The range between the upper and lower limits selected shall be 2 % based on compaction degree and 3 % based on void content.

The void content of the specimens shall be specified in accordance with EN 13108-20:2012, D.2.

The resistance to permanent deformation, in terms of wheel tracking shall be determined in accordance with EN 13108-20:2012, D.6.

**Table 11 — Resistance to permanent deformation, small size device, procedure A, conditioning in air, maximum wheel-tracking rate,  $WTS_{Aair}$**

Maximum wheel-tracking rate $\mu\text{m}/\text{cycle}$	Category $WTS_{Aair}$
5,0	$WTS_{Aair5,0}$
7,5	$WTS_{Aair7,5}$
10,0	$WTS_{Aair10,0}$
12,5	$WTS_{Aair12,5}$
15,0	$WTS_{Aair15,0}$
17,5	$WTS_{Aair17,5}$
20,0	$WTS_{Aair20,0}$
No requirement	$WTR_{AairNR}$

**Table 12 — Resistance to permanent deformation, small size device, procedure A, conditioning in air, maximum rut depth,  $Rd_{Aair}$**

Maximum rut depth mm	Category $Rd_{Aair}$
3,0	$Rd_{Aair3,0}$
5,0	$Rd_{Aair5,0}$
7,0	$Rd_{Aair7,0}$
9,0	$Rd_{Aair9,0}$
11,0	$Rd_{Aair11,0}$
13,0	$Rd_{Aair13,0}$
16,0	$Rd_{Aair16,0}$
No requirement	$Rd_{AairNR}$

#### 5.3.4 Stiffness

The stiffness of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall comply with values selected from the categories in Tables 13 and 14.

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1. The range between the upper and lower limits selected shall be 2 % based on compaction degree and 3 % based on void content.

The void content of the specimens shall be specified in accordance with EN 13108-20:2012, D.2.

The stiffness shall be determined in accordance with EN 13108-20:2012, D.8.

**Table 13 — Minimum stiffness,  $S_{min}$**

<b>Minimum stiffness MPa</b>	<b>Category <math>S_{min}</math></b>
21 000	$S_{min21\ 000}$
17 000	$S_{min17\ 000}$
14 000	$S_{min14\ 000}$
11 000	$S_{min11\ 000}$
9 000	$S_{min9\ 000}$
7 000	$S_{min7\ 000}$
5 500	$S_{min5\ 500}$
4 500	$S_{min4\ 500}$
3 600	$S_{min3\ 600}$
2 800	$S_{min2\ 800}$
2 200	$S_{min2\ 200}$
1 800	$S_{min1\ 800}$
1 500	$S_{min1\ 500}$
Declared value	$S_{mindcl}$
No requirement	$S_{minNR}$

Table 14 — Maximum stiffness,  $S_{\max}$ 

Maximum stiffness MPa	Category $S_{\max}$
30 000	$S_{\max 30\ 000}$
25 000	$S_{\max 25\ 000}$
21 000	$S_{\max 21\ 000}$
17 000	$S_{\max 17\ 000}$
14 000	$S_{\max 14\ 000}$
11 000	$S_{\max 11\ 000}$
9 000	$S_{\max 9\ 000}$
7 000	$S_{\max 7\ 000}$
Declared value	$S_{\text{mindcl}}$
No requirement	$S_{\max \text{NR}}$

### 5.3.5 Low temperature properties

The low temperature properties of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall be selected from the categories in Table 15.

The compaction of test samples shall be selected from EN 13108-20:2012, Table C.1.

The range between the upper and lower limits selected shall be 2 % based on compaction degree and 3 % based on void content.

The void content of the specimens shall be specified in accordance with EN 13108-20:2012-..., clause D.2.

The low temperature properties shall be determined in accordance with EN 13108-20:2012, D.16.

Table 15 - Maximum failure temperature,  $\text{TSRST}_{\max}$ 

Maximum failure temperature °C	Category $\text{TSRST}_{\max}$
-15,0	$\text{TSRST}_{\max -15,0}$
-17,5	$\text{TSRST}_{\max -17,5}$
-20,0	$\text{TSRST}_{\max -20,0}$
-22,5	$\text{TSRST}_{\max -22,5}$
-25,0	$\text{TSRST}_{\max -25,0}$
-27,5	$\text{TSRST}_{\max -27,5}$
-30,0	$\text{TSRST}_{\max -30,0}$
No requirement	$\text{TSRST}_{\max \text{NR}}$

**5.3.6 Friction after polishing**

Friction after polishing is regarded as a property with direct relation to the development of friction in the road in time. As insufficient experience with the test method is available, it was considered to be too early to introduce this property as a mandatory requirement. In order to gain experience in Europe with this test method it is advised to investigate on voluntary basis data with this test. See Annex D.

**5.3.7 Coating and homogeneity**

The material when discharged from the mixer shall be homogenous in appearance with the aggregate completely coated with binder, and there shall be no evidence of balling of fine aggregate.

**5.3.8 Reaction to fire**

Where subject to regulation, the manufacturer shall declare the reaction to fire class according to EN13501-1 Table 2 according to the test method EN ISO 11925-2.

**5.3.9 Resistance to fuel for application on airfields**

The resistance to fuel of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall be selected from the categories in Table 16

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1.

The resistance to fuel shall be determined according with EN 13108-20:2012, D.11.

**Table 16 — Resistance to fuel**

	<b>Category</b>
No requirement	NR

**5.3.10 Resistance to de-icing fluid for application on airfields**

The resistance to de-icing fluid of specimens prepared in accordance with EN 13108-20:2012, 6.5, shall be selected from the categories from Table 17.

The compaction of test specimens shall be selected from EN 13108-20:2012, Table C.1.

The resistance to de-icing fluids shall be determined according with EN 13108-20:2012, D.12.



**Table 17 — Minimum retained strength,  $\beta$** 

<b>Minimum retained strength %</b>	<b>Category <math>\beta</math></b>
100	$\beta_{100}$
85	$\beta_{85}$
70	$\beta_{70}$
55	$\beta_{55}$
No requirement	$\beta_{NR}$

#### 5.4 Temperature of the mixture

. The maximum temperature requirements apply at any place in the plant and shall be declared.

The minimum temperature of the mixture at delivery shall be declared by the manufacturer.

Depending on local conditions and for specific application the minimum temperature, measured according to EN 12697-13, may be specified.

When using paving grade binder, the maximum temperature, measured according to EN 12697-13, shall not exceed the limits given in Table 18

**Table 18 — Maximum temperature limits of the mixture**

<b>Paving grade of binder</b>	<b>Temperature °C</b>
30/45,35/50	200
40/60	190
50/70	185
70/100	180
100/150	170

When using modified bitumen or hard grade bitumen, additives or premix bitumen, different temperatures may be applicable. These shall then be documented and declared.

## **5.5 Dangerous substances**

When required, products covered by this standard shall comply with relevant regulations on dangerous substances in force in the intended place of use.

In the absence of International or European test methods, manufacturers shall verify and declare the release of dangerous substances in accordance with provisions applicable in the intended place of use of the product.

NOTE 1 An informative database of European and national regulations on dangerous substances is available at the Construction web site on EUROPA (accessed through <http://ec.europa.eu/enterprise/construction/cpd-ds>).

## **5.6 Contradictory -specification**

The overall quality of a Hot Rolled Asphalt mixture can be covered by different combinations of requirements,. The selection of requirements and the appropriate values shall be selected in such a way that contradictory specification is prevented.

To prevent the this contradictory of mixtures the following combinations of requirements are not permissible:

- Requirements for binder content combined with requirements for binder volume shall not be recognised as being in conformity with this European Standard.

## **6 Assessment and verification of constancy of performance - AVCP**

The compliance of Hot Rolled Asphalt with the requirements of this standard and with the performances declared by the manufacturer in the Declaration of performance (DoP) shall be demonstrated by:

- determination of the product type in accordance with EN 13108-20
- factory production control by the manufacturer, including product assessment in accordance with EN 13108-21

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s)

For the purpose of Type Testing, Hot Rolled Asphalt may be grouped into families as described in EN 13108-20, where it is considered that the selected property or properties is or are common to all the mixtures within that family.

## **6 Identification**

The delivery ticket shall contain at least the following information relating to identification:

- manufacturer and mixing plant;
- mix identification code;

- designation of the mixture (when applicable for safety reasons by national regulation, for mixtures subject to vehicular trafficking, the PSV or source of the coarse aggregate shall be identified)

HRA	grading designation	surf/reg/bin/base	binder
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where

HRA	is Hot Rolled Asphalt;
grading designation	from Tables 1 to 4;
surf	is surface course;
reg	is regulating course;
base	is base course;
bin	is binder course;
binder	designation of the binder used.

EXAMPLE HRA 30/14 F surf 40/60,

Hot Rolled Asphalt containing 30% of a coarse aggregate with maximum aggregate size of 14 mm and a Type F fine aggregate which is natural/uncrushed sand, surface course with a 40/60 penetration grade bitumen.

- how to obtain the full details demonstrating conformity with this European Standard;
- details of compliance with 5.3.8 and 5.3.9 where requested for specific use on airfields specifications;
- details of any additives (see 4.5).

NOTE Information concerning regulatory marking accompanies the product (For CE marking and labelling see ZA.3) but characteristics which are not necessarily part of regulatory marking, for example, special requirements for airfields could be made available by alternative means i.e. retained by the dispatching depot if agreed with the client.



## Annex A (normative)

### Calculations of the penetration or the softening point of the binder of a mixture when reclaimed asphalt is used

#### A.1 General

These calculations shall only be applied when paving grade bitumen has been used in the reclaimed asphalt and will be used as added binder.

#### A.2 Calculation of the penetration of the binder of a mixture

Use the following calculation:

$$a \lg pen_1 + b \lg pen_2 = (a + b) \lg pen_{mix} \quad (A.1)$$

where

$pen_{mix}$  is the calculated penetration of the binder in the mixture containing reclaimed asphalt;

$pen_1$  is the penetration of the binder recovered from the reclaimed asphalt;

$pen_2$  is the penetration of the added binder;

$a$  and  $b$  are the portions by mass of the binder from the reclaimed asphalt ( $a$ ) and from the added binder ( $b$ ) in the mixture;  $a + b = 1$ .

EXAMPLE  $pen_1 = 20$ ;  $pen_2 = 90$ ;  $a = 0,25$  and  $b = 0,75$   
 $0,25 \lg 20 + 0,75 \lg 90 = \lg pen_{mix}$   
 $\lg pen_{mix} = 1,790 94$ ; therefore  $pen_{mix} = 62$

The recovery of binder from mixtures for testing shall be executed according to EN 12697-3 or EN 12697-4.

The penetrations of the added binder and the recovered binder shall be determined according to EN 1426.

#### A.3 Calculation of the softening point of the binder of a mixture

Use the following calculation:

$$T_{R\&B\ mix} = a \times T_{R\&B\ 1} + b \times T_{R\&B\ 2} \quad (A.2)$$

where

$T_{R\&Bmix}$  is the calculated softening point of the binder in the mixture containing reclaimed asphalt;

$T_{R\&B1}$  is the softening point of the binder recovered from the reclaimed asphalt;

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$T_{R\&B2}$  is the softening point of the added binder;

$a$  and  $b$  are the portions by mass of binder from the reclaimed asphalt ( $a$ ) and from the added binder ( $b$ ) in the mixture ;  $a + b = 1$ .

EXAMPLE  $T_{R\&B1} = 62$  °C;  $T_{R\&B2} = 48$  °C;  $a = 0,25$  and  $b = 0,75$   
 $T_{R\&Bmix} = 0,25 \times 62 + 0,75 \times 48 = 51,5$  °C

The softening points of the added binder and the recovered binder shall be determined according to EN 1427.

## **Annex B** (normative)

### **Natural asphalt**

#### **B.1 Scope**

This annex specifies requirements for the naturally occurring asphalt and its methods of use.

#### **B.2 Terms and definitions**

For the purposes of this annex, the following definition applies.

##### **B.2.1**

##### **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

#### **B.3 Requirements**

The refined natural asphalt shall comply with the requirements in either Table B.1, B.2 or B.3

Table B.1 — High ash content

Properties	Test method	Requirement
Penetration at 25 °C, dmm	EN 1426	0 to 4
Softening point, °C	EN 1427	93 to 99
Solubility, %	EN 12592	52 to 55
Ash content by mass, % by mass	EN 12697-47	35 to 39
Density at 25 °C, g/ml	EN ISO 3838	1,39 to 1,42
NOTE Trinidad Lake asphalt as traditionally supplied meets these requirements.		

Table B.2 - Medium ash content

Properties	Test method	Requirement
Penetration at 25 °C, dmm	EN 1426	0 to 1
Softening point, °C	EN 1427	115 to 120
Solubility, %	EN 12592	83 to 85
Ash content by mass, % by mass	EN 12697-47	15 to 17
Density at 25 °C, g/ml	EN ISO 3838	1,16 to 1,25
NOTE Selenizza ® asphalt as traditionally supplied meets these requirements		

Table B.3 — Low ash content

Properties	Test method	Requirement
Penetration at 25 °C, dmm	EN 1426	0 to 1
Softening point, °C	EN 1427	160 to 182
Solubility, %	EN 12592	> 95
Ash content by mass, % by mass	EN 12697-47	0 to 2
Density at 25 °C, g/ml	EN ISO 3838	1,01 to 1,09
NOTE Gilsonite as traditionally supplied meets these requirements.		

## B.4 Methods of use

Natural asphalt is blended with paving grade bitumen to EN 12591 or polymer modified bitumen to EN 14023 in varying proportions for use in Mastic Asphalt, Hot Rolled Asphalt, Stone Mastic Asphalt and other bituminous paving mixtures. The penetration grade of the paving grade bitumen and the proportions of the natural asphalt blended with it depend on the traffic and climatic requirements of the finished bituminous layer and are to be selected. The natural asphalt may be heated and combined as a liquid with the paving grade bitumen in a mixing tank prior to use in the mixing plant.



Alternatively, it can be added to the mixer as a powder or as granulate with a particle size not exceeding 12mm. It can also be extruded or moulded with or without organic, mineral or vegetable additives in the modified bitumen mixtures framework, in order to be added in the mixing tank or directly in the mixer during the asphalt mixing process in the mixing plant.

### **B.5 Determination of ash content**

The ash content of natural asphalt shall be determined using the method described in EN 12697-47.

## **Annex C** (normative)

### **Coated chippings for application to surface course**

#### **C.1 Scope**

This annex specifies requirements for coated chippings for application to Hot Rolled Asphalt surface courses with a nominal course aggregate content of 35 % or less prior to rolling.

#### **C.2 Chippings**

Chippings shall be coarse aggregate conforming to 4.3.1.

NOTE It is important that appropriate categories of resistance to polishing and resistance to abrasion are selected from EN 13043.

#### **C.3 Binder content**

Binder used to coat the chippings shall be either 30/45 or 40/60 grade complying with EN 12591. The target binder content shall be not less than 1,5 %.

When tested in accordance with EN 12697-37, the proportion of retained sand shall be not less than 4,0 % for  $D \geq 16$  mm and 5,0 % for  $D < 16$  mm. Not more than 7,5 % shall fail the visual assessment.

#### **C.4 Evaluation of conformity**

Evaluation of conformity shall be carried out in accordance with Clause 6.

#### **C.5 Identification**

Identification shall be in accordance with Clause 7. The delivery ticket shall contain at least the following information relating to identification:

- manufacturer and mixing plant;
- nominal size and source of the aggregate.

## Annex D (informative) Friction after polishing

### Friction after polishing

Friction after polishing is regarded as a property with direct relation to the development of friction in the road in time. As insufficient experience with the test method is available, it was considered to be too early to introduce this property as a mandatory requirement. In order to gain experience in Europe with this test method it is advised to investigate on voluntary basis data with this test.

Below information on sample preparation is given.

The testmethod requires a roller compaction without any further specifications on type or degree of compaction . What is wise to recommend??

The compaction of test specimens shall be selected from EN 13108-20:20xx, Table C.1.

The range between the upper and lower limits selected shall be 2 % based on compaction degree and 3 % based on void content.

The void content of the specimens shall be specified in accordance with EN 13108-20:20xx, D.2.

The laboratory friction after polishing shall be determined in accordance with EN 12697-49.

Based on experiences from different countries values between 0,30 and 0,50 can be expected.

#### Note:

The combination of requirements for resistance to polishing of coarse aggregates according EN 13043 and for skid resistance after polishing of the mixture is not permissible.

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**Annex ZA**  
(informative)

**Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation**

**ZA.1 Scope and relevant characteristics**

This European Standard has been prepared under Mandate M124 Road Construction Products given to CEN by the European Commission and the European Free Trade Association.

This annex deals with the CE marking of the Hot Rolled Asphalt intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table ZA.1

**Table ZA.1 — Relevant clauses related to essential characteristics**

<b>Product:</b> Hot Rolled Asphalt as covered in the Scope of this European Standard				
<b>Intended use:</b> For surface courses, binder courses and regulating courses of roads and other trafficked areas, whether subject or not to reaction to fire regulations				
Essential Characteristics	Requirement clauses in this and other European Standard(s)		Levels and/or classes	Notes
Adhesion of binder to aggregate	5.4	Void content	None	Categories
	5.2.3	Binder content	None	Categories
	5.5	Water sensitivity	None	Categories
	5.11	Temperature of the mixture	None	Pass/Fail threshold value

Table ZA.1 (continued)

Essential Characteristics	Requirement clauses in this and other European Standard(s)	Levels and/or classes	Notes
Stiffness	5.8 Stiffness	None None None None None	Categories Threshold Values
Resistance to permanent deformation	5.2.2 Grading 5.2.3 Binder content 5.4 Void content 5.11 Temperature of the mixture 5.7 Resistance to permanent deformation	None None None None None	Values % Categories Categories Threshold values Categories
Resistance to fatigue	5.4 Void content 5.11 Temperatures of the mixture 5.2.3 Binder content	None None None	Categories Threshold Values Categories
Skid resistance	5.2.2 Grading 5.2.3 Binder content 5.4 Void content	None None None	Values % Categories Categories
Resistance to abrasion	5.2.2 Grading 5.2.3 Binder content	None None	Values % Categories
Reaction to fire <sup>a</sup>	5.6	Euroclasses	
Dangerous substances	See note above	None	
Durability of the above characteristics against ageing, weathering, oxidation, wear, ravelling, chemicals, wear of studded tyres, stripping, ... as relevant	All above mentioned requirement clauses are related to durability. 5.2.4 Binder volume	None None	see above Categories
<sup>a</sup> Relevant only for Hot Rolled Asphalt intended for uses subject to reaction to fire regulations.			
NOTE The manufacturer may wish to declare actual values as well or instead of categories or threshold parameters.			

In order to fulfil the essential characteristics a combination of requirements has to be fulfilled. Nevertheless not all requirements can be combined.

The requirement on a certain characteristic is not applicable in those Member States (MS's) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MS's are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product.

In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option "No performance determined" (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

## **ZA.2 Procedure for AVCP of Hot Rolled Asphalt**

### **ZA.2.1 System(s) of AVCP**

The AVCP systems of Hot Rolled Asphalt indicated in Table ZA.1, established by EC Decision 1998/601/EC (OJ L 287 ,241.1998,p.41) amended by the Commission decision 2001/596/EC of 8 January 2001 (OJ L209 p.33) are shown in Table ZA.2 for the indicated intended uses and relevant levels or classes of performance.

Table ZA.2 — Systems of AVCP

Products	Intended uses	Levels or classes of performance	AVCP systems
Bituminous mixtures	For road construction and surface treatment of roads	—	2+
Bituminous mixtures	For uses subject to reaction to fire regulations	A1 <sub>FL</sub> <sup>(1)</sup> , A2 <sub>FL</sub> <sup>(1)</sup> , B <sub>FL</sub> <sup>(1)</sup> , C <sub>FL</sub> <sup>(1)</sup>	1
		A1 <sub>FL</sub> <sup>(2)</sup> , A2 <sub>FL</sub> <sup>(2)</sup> , B <sub>FL</sub> <sup>(2)</sup> , C <sub>FL</sub> <sup>(2)</sup> , D <sub>FL</sub> , E <sub>FL</sub>	3
		(A1 <sub>FL</sub> to E <sub>FL</sub> ) <sup>(3)</sup> , F <sub>FL</sub>	4
<p>System 1: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.2</p> <p>System 2+: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.3 including certification of the factory production control by a notified production control certification body on the basis of initial inspection of the manufacturing plant and of factory production control as well as of continuous surveillance, assessment and evaluation of factory production control.</p> <p>System 3: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.4</p> <p>System 4: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.5</p>			
<p><sup>(1)</sup> Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).</p> <p><sup>(2)</sup> Products/materials not covered by footnote 1.</p> <p><sup>(3)</sup> Products/materials that do not require to be tested for reaction to fire (e.g. Products/materials of Classes A1 according to Commission Decision 96/603/EC).</p>			

The AVCP of the Hot Rolled Asphalt in Table ZA.1 shall be according to the AVCP procedures indicated in Tables ZA.3.1 to ZA.3.3 resulting from application of the clauses of this or other European Standard indicated therein. The content of tasks of the notified body shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

**Table ZA.3.1 — Assignment of AVCP tasks for Hot Rolled Asphalt under system 2+ and subject to reaction to fire under system 1**

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN13108-21
	Determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared except reaction to fire	EN13108-20
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN13108-21
Tasks for the notified product certification body	Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	EN13108-20
	Initial inspection of manufacturing plant and of FPC	Parameters related to essential characteristic of Table ZA.1, relevant for the intended use which is declared, namely Reaction to fire. Documentation of the FPC.	EN13108-21
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristic of Table ZA.1, relevant for the intended use which is declared, namely Reaction to fire. Documentation of FPC	EN13108-21 Clause ???
Tasks for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared, except reaction to fire. Documentation of the FPC.	EN13108-21
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared, except reaction to fire. Documentation of the FPC.	EN13108-21 Clause ???

T



**Table ZA.3.2 — Assignment of AVCP tasks for Hot Rolled Asphalt under system 2+ and subject to reaction to fire under system 3**

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN13108-21
	determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared except reaction to fire	EN13108-20
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	EN13108-21
Tasks for a notified testing laboratory	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	EN13108-20
Tasks for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared. Documentation of the FPC.	EN13108-21
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared, namely. Documentation of the FPC.	EN13108-21 Clause ???

**Table ZA.3.3 — Assignment of AVCP tasks for Hot Rolled Asphalt under system 2+ and subject to Reaction to fire under system 4**

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which is declared	EN13108-21
	determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which is declared	EN13108-20
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which is declared	EN13108-21
Tasks for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared. Documentation of the FPC.	EN13108-21
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared. Documentation of the FPC.	EN13108-21

## ZA.2.2 Declaration of performance (DoP)

### ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No 305/2011:

#### In case of products under system 1

- the factory production control and further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and
- the certificate of constancy of performance issued by the notified product certification body on the basis of determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control and continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 2+

- the determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; the factory production control and the testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and
- the certificate of conformity of the factory production control, issued by the notified production control certification body on the basis of:
  - initial inspection of the manufacturing plant and of factory production control and
  - continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 3

- the factory production control carried out by the manufacturer; and
- the determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product, carried out by the notified testing laboratory.

In case of products under system 4

- the factory production control carried out by the manufacturer
- the determination by the manufacturer of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product.

#### **ZA.2.2.2 Content**

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011.

According to this Regulation, the DoP shall contain, in particular, the following information:

- the reference of the product-type for which the declaration of performance has been drawn up;
- the AVCP system or systems of the construction product, as set out in Annex V of the CPR;
- the reference number and date of issue of the harmonised standard which has been used for the assessment of each essential characteristic;
- where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

- (a) the intended use or uses for the construction product, in accordance with the applicable harmonised technical specification;
- (b) the list of essential characteristics, as determined in the harmonised technical specification for the declared intended use or uses;
- (c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;
- (d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared.
- (e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;
- (f) for the listed essential characteristics for which no performance is declared, the letters "NPD" (No Performance Determined);

Regarding the supply of the DoP, article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006, (REACH) shall be provided together with the DoP.

### ZA.2.2.3 Example of DoP

The following gives an example of a filled-in DoP for vertical air/flue terminals

#### DECLARATION OF PERFORMANCE

No. 001CPR2013-07-14

1. Unique identification code of the product-type Hot Rolled Asphalt HRA 30/14 F surf 40/60,  
D123450 - HRA 30/14 F surf Design 40/60,
2. Type, batch or serial number or any other element allowing identification of the construction product as required under Article 11(4):  
D123450 - HRA 30/14 F surf Design 40/60,
3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:

For surface courses, binder courses and regulating courses

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required under Article 11(5):  
AnyCo SA,  
PO Box 21  
B-1050 Brussels, Belgium  
Tel. +32987654321  
Fax: +32123456789  
Email: [anyco.sa@provider.be](mailto:anyco.sa@provider.be)
5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2):  
Anyone Ltd  
Flower Str. 24  
West Hamfordshire  
UK-589645 United Kingdom  
Tel. +44987654321  
Fax: +44123456789  
e-mail: [anyone.ltd@provider.uk](mailto:anyone.ltd@provider.uk)
6. System or systems of assessment and verification of constancy of performance of the construction product as set out in CPR, Annex V:  
System 2+ and system 4 (reaction to fire)
7. In case of the declaration of performance concerning a construction product covered by a harmonised standard:

Notified factory production control certification body No. 5678 performed the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment and evaluation of factory production control and issued the certificate of conformity of the factory production control.

8. Declared performance

Essential characteristics	Performance	Harmonised technical specification
Adhesion of binder to aggregate		EN 13108-1:2012
Reaction to Fire	F <sub>fl</sub>	

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 8. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4. Signed for and on behalf of the manufacturer by:

.....  
 (name and function)

.....  
 (place and date of issue)

.....  
 (signature)

### ZA.3 CE marking and labelling

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

- to the ~~[insert here the name of the construction products as given in the title of the standard]~~

or

- to a label attached to it.

Where this is not possible or not warranted on account of the nature of the product, it shall be affixed:

- to the packaging

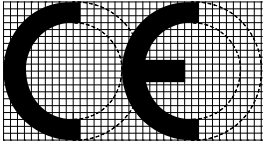
or

- to the accompanying documents.

The CE marking shall be followed by:

- - the last two digits of the year in which it was first affixed,
- the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity,
- the unique identification code of the product-type
- the reference number of the declaration of performance *[see example of DoP]*
- the level or class of the performance declared
- the dated reference to the harmonised technical specification applied
- the identification number of the notified body,
- the intended use as laid down in the harmonised technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

		
01234		
AnyCo Ltd, PO Box 21, B-1050		
06		
01234-CPD-00234		
<b>EN 13108-4</b>		
<b>Hot Rolled Asphalt for roads and other trafficked areas</b>		
HRA 30/14 F surf 40/60		
Euro asphalt plant		
H027		
Binder content		$B_{\min 6,6}$ (6,6 %)
Binder volume *		$B_{\text{vol}11,0}$ (11%)
Void content *		
– maximum		$V_{\max 8}$ (8,0 %)
– minimum		$V_{\min 2}$ (2,0 %)
Water sensitivity *		ITSR <sub>70</sub> (70 %)
Reaction to fire		Euroclass Cf**
Temperature of the mixture		150 °C to 190 °C
Grading (passing)	20 mm sieve	100 %
	14 mm sieve	93 %
	10 mm sieve	76 %
	6,3 mm sieve	NPD %
	2,0 mm sieve	62 %
	0,5 mm sieve	55 %
	0,25 mm sieve	35 %
	0,063 mm sieve	7 %
– Stiffness *		$S_{\min 1800}$ (1 800 MPa)
Resistance to permanent deformation *		
– small size device procedure A:		
– wheel-tracking rate		$WTS_{\text{Air}5,0}$ (5,0 mm/h)
– rut depth		$Rd_{\text{Air}7,0}$ (7,0 mm)
* Stating test conditions selected in accordance with EN 13108-20.		

CE conformity marking, consisting of the “CE”-symbol given in directive 93/68/EEC.

Identification number of the certification body

Name or identifying mark and registered address of the producer

Last two digits of the year in which the marking was affixed

Certificate number

No. of European Standard

Description of product

Standard designation

Name of the plant

Mix Identification code

And

information on regulated characteristics which should reconcile with Table ZA.1 however, the manufacturer may wish to declare the actual performance value in addition to the category or class specified in this European Standard.

Figure ZA.1a — Example CE marking information



In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

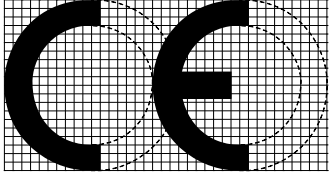

 <p>01234</p>	<p><i>CE conformity marking, consisting of the "CE"-symbol given in directive 93/68/EEC.</i></p> <p><i>Identification number of the certification body</i></p>
<p>AnyCo Ltd, PO Box 21, B-1050</p> <p>13</p> <p>001-CPR-2013/07/14</p>	<p><i>Name or identifying mark and registered address of the producer</i></p> <p><i>Last two digits of the year in which the marking was affixed</i></p> <p><i>Certificate number</i></p>
<p><b>EN 13108-4</b></p> <p><b>Hot Rolled Asphalt for roads, and other trafficked areas</b></p> <p>HRA 30/14 F surf 40/60</p> <p>Euro asphalt plant</p> <p>H027</p>	<p><i>No. of European Standard</i></p> <p><i>Description of product</i></p> <p><i>Standard designation</i></p> <p><i>Name of the plant</i></p> <p><i>Mix Identification code</i></p>

Figure ZA.1b — Shortened CE marking for delivery note

**THE FOLLOWING FORMAT OF CE MARK DECLARATION IS UNACCEPTABLE DUE TO THE USE OF TEST VALUES AND NOT CATEGORIES/LEVELS.**

Figures ZA.1 and ZA.2 give examples of the information related to products subject to AVCP under each of the different systems to be given on the accompanying documents.

 0123	<p><i>CE marking, consisting of the “CE”-symbol</i></p> <p><i>Identification number of the product certification body</i></p>
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium  13  001-CPR-2013/07/14	<p><i>name and the registered address of the manufacturer, or identifying mark</i></p> <p><i>Last two digits of the year in which the marking was first affixed</i></p> <p><i>Reference number of the DoP</i></p>
<p><b>EN 13108-1: 2012</b></p> <p><b>Hot Rolled Asphalt AC XV124</b></p> <p><b>intended to be used for surface courses</b></p> <p><b>Void content :</b>                  max..... %                  min. .... %</p>	<p><i>No. of European standard applied, as referenced in OJEU</i></p> <p><i>Unique identification code of the product-type</i></p> <p><i>Intended use of the product as laid down in the European standard applied</i></p> <p><i>Level or class of the performance declared</i></p>

Voids filled with bitumen.....	%
Voids in mineral aggregate.....	%
Water sensitivity .....	%
Resistance to abrasion by studded tires :	
AbrAr or AbrB	cm <sup>3</sup>
Reaction to fire	C <sub>fl</sub>
Resistance to fuel.....	%
Resistance to de-icing fluid	%
Temperature of the mixture	°C
Grading	%
Binder content	%
Marshall values	P
F	mm
Q	kN/mm
Resistance to permanent deformation	
- Large size device: proportional rut depth	%
- Extra large size device: proportional rut depth	%
- Small size device model A air:	
wheel-tracking rate	□m/cycle
rut depth	mm
- Small size device model B , air :	
rut depth	mm
- Small size device model B, water	
rut depth .....	mm
<b>Dangerous substance X : Less than 0,2 ppm</b>	

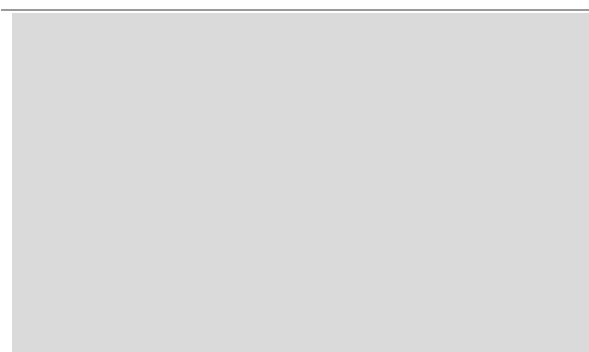
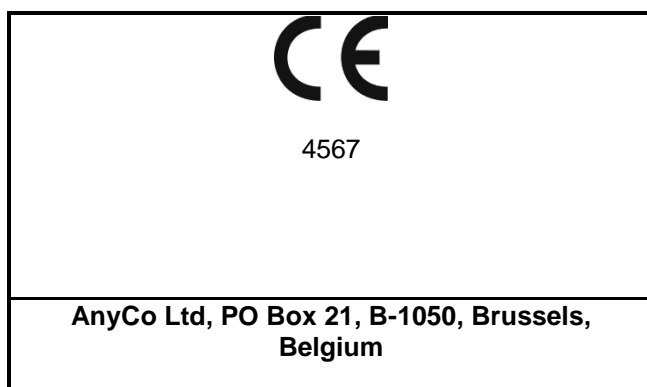


Figure ZA.1 — Example CE marking information of products under AVCP system 1 affixed to the accompanying documents.



CE marking, consisting of the “CE”-symbol

Identification number of the notified production control certification body

name and the registered address of the manufacturer, or identifying mark

<p><b>13</b></p> <p>001-CPR-2013/07/14</p>
<p><b>EN 13108-1: 2012</b></p> <p><b>Hot Rolled Asphalt AC XV124</b></p> <p><b>intended to be used for surface courses</b></p> <p><b>Void content :</b></p> <p>max..... %</p> <p>min. %</p> <p>Voids filled with bitumen %</p> <p>Voids in mineral aggregate %</p> <p>Water sensitivity %</p> <p><b>Resistance to abrasion by studded tires :</b></p> <p>AbrAr or AbrB cm<sup>3</sup></p> <p>Reaction to fire F<sub>fl</sub></p> <p>Resistance to fuel %</p> <p>Resistance to de-icing fluid %</p> <p>Temperature of the mixture °C</p> <p>Grading %</p> <p>Binder content %</p> <p>Marshall values P</p> <p>F mm</p> <p>Q kN/mm</p> <p><b>Resistance to permanent deformation</b></p> <p>- Large size device: proportional rut depth %</p> <p>- Extra large size device: proportional rut depth %</p> <p>- Small size device model A air:</p> <p>wheel-tracking rate □m/cycle</p> <p>rut depth mm</p> <p>- Small size device model B , air :</p>

*Last two digits of the year in which the marking was first affixed*

*Reference number of the DoP*

**No. of European standard applied, as referenced in OJEU**

**Unique identification code of the product-type**

**Intended use of the product as laid down in the European standard applied**

**Level or class of the performance declared**

---

rut depth	mm
- Small size device model B, water	
rut depth .....	mm
<b>Dangerous substance X : Less than 0,2 ppm</b>	

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**Figure ZA.2 — Example CE marking information of products under AVCP system 2 affixed to the accompanying documents.**