



**SLOVENSKI STANDARD**  
**SIST EN 13285:2004**

**01-junij-2004**

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**Nevezane zmesi – Specifikacija**

Unbound mixtures - Specification

Ungebundene Gemische - Anforderungen

Graves non traitées - Spécifications

**Ta slovenski standard je istoveten z: EN 13285:2003**

[SIST EN 13285:2004](https://standards.iteh.ai/catalog/standards/sist/c3062496-ddb9-4381-9b8c-8c4e6a2b07b4/sist-en-13285-2004)

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13285**

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English version

## Unbound mixtures - Specification

Graves non traitées - Spécifications

Ungebundene Gemische - Anforderungen

This European Standard was approved by CEN on 12 December 2002.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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## Foreword

This document (EN 13285:2003) 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of an identical text or by endorsement, at the latest by September 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

Annexes A, B and C are informative. Annex D is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard specifies requirements for unbound mixtures used for construction and maintenance of roads, airfields and other trafficked areas. The requirements are defined with appropriate cross-reference to EN 13242.

This European Standard applies to unbound mixtures of natural, artificial and recycled aggregates (see annex A) with a upper sieve size ( $D$ ) from 8 mm to 80 mm and lower sieve size ( $d$ ) = 0 at the point of delivery.

NOTE 1 Mixtures with an upper sieve size ( $D$ ) greater than 80 mm are not covered by this European Standard but may be specified in the place of use.

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NOTE 2 Water content of the mixture and the density of the installed layer are not specified mixture requirements. Both parameters are related to the control of the construction of the layer, and are outside the scope of this European Standard.

## 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 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method.*

EN 1744-1, *Tests for chemical properties of aggregates — Chemical analysis.*

EN 13242, *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.*

EN 13286-1, *Unbound and hydraulically bound mixtures — Part 1: Test methods for laboratory dry density and water content — Introduction, general requirements and sampling.*

prEN 13286-2, *Unbound and hydraulically bound mixtures — Part 2: Test methods for laboratory dry density and water content — Proctor compaction.*

EN 13286-3, *Unbound and hydraulically bound mixtures — Part 3: Test methods for laboratory dry density and water content — Vibrocompaction with controlled parameters.*

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EN 13286-4, *Unbound and hydraulically bound mixtures — Part 4: Test methods for laboratory dry density and water content — Vibrating hammer.*

EN 13286-5, *Unbound and hydraulically bound mixtures — Part 5: Test methods for laboratory dry density and water content — Vibrating table.*

**3 Terms and definitions**

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

NOTE Other useful terms and definitions are given in EN 13242.

**3.1****unbound mixture**

granular material, normally of a controlled grading with  $d = 0$ , which is generally used in pavement bases and sub-bases

NOTE An unbound mixture does not contain an added binder.

**3.2****category**

level of a property expressed as a range of values or a limiting value

NOTE There is no relationship between the categories of different properties.

**3.3****grading**

particle size distribution expressed as the percentage by mass passing a specified number of sieves

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**3.4****batch**

production quantity, delivery quantity, partial delivery quantity (railway wagon-load, lorry-load, ship's cargo) or stockpile produced at one specific time under conditions that are presumed to be uniform

NOTE With a continuous process the quantity produced during an agreed period is treated as a batch.

**4 Requirements****4.1 General requirements**

The need for testing for all properties in this clause shall be limited according to the particular application or end use or origin of the mixture. When required, the tests specified in 4.2 to 4.5 shall be carried out to determine appropriate properties.

NOTE When a test is not required, it should be specified as a "No requirement".

**4.2 Aggregate requirements**

When required, the following properties of the aggregates used in the mixture shall be in accordance with EN 13242:

- shape of coarse aggregate;
- percentage of crushed or broken particles and of totally rounded particles in coarse aggregates;
- fines quality;

- resistance to fragmentation of coarse aggregate;
- particle density;
- water absorption;
- resistance to wear of coarse aggregate;
- chemical requirements;
- durability requirements.

### 4.3 Mixture requirements

#### 4.3.1 Mixture designation

Mixtures shall be selected from Table 1.

**Table 1 — Mixture designation**

0/8	0/10	0/11,2	0/12,5	0/14	0/16	0/20
0/22,4	0/31,5	0/40	0/45	0/56	0/63	0/80

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#### 4.3.2 Fines content

When required, the percentage of particles which pass the 0,063 mm sieve (fines) determined in accordance with EN 933-1 shall not exceed the values in Table 2, according to the category chosen.

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**Table 2 — Maximum fines content**

Percentage passing 0,063 mm sieve by mass	Category
≤ 3	$UF_3$
≤ 5	$UF_5$
≤ 7	$UF_7$
≤ 9	$UF_9$
≤ 12	$UF_{12}$
≤ 15	$UF_{15}$
No requirement	$UF_N$

When required, the percentage of particles passing the 0,063 mm sieve shall also be greater than the values given in Table 3, according to the category chosen.

Table 3 — Minimum fines content

Percentage passing 0,063 mm sieve by mass	Category
≥ 2	LF <sub>2</sub>
≥ 4	LF <sub>4</sub>
≥ 8	LF <sub>8</sub>
No requirement	LF <sub>N</sub>

The categories in Table 2 and Table 3 shall be chosen so that the difference between the maximum fines content and the minimum fines content is not less than 3 %.

#### 4.3.3 Oversize

When determined in accordance with EN 933-1, the percentage of particles passing the upper (*D*) sieve shall lie within the ranges given in Table 4 according to the category chosen.

Table 4 — Oversize

Percentage passing by mass			Category
2 <i>D</i> <sup>a b</sup>	1,4 <i>D</i> <sup>b</sup>	<i>D</i> <sup>c</sup>	
—	100	90 to 99	OC <sub>90</sub>
—	100	85 to 99	OC <sub>85</sub>
100	—	80 to 99	OC <sub>80</sub>
100	—	75 to 99	OC <sub>75</sub>

<sup>a</sup> For aggregate sizes where *D* is greater than 63 mm, only the oversize requirements related to the 1,4 *D* sieve apply because there is no ISO 565/R20 series sieve size larger than 125 mm.

<sup>b</sup> Where the sieves calculated as 1,4 *D* and 2 *D* are not exact sieve numbers in the ISO 565/R20 series then the next higher sieve size shall be adopted.

<sup>c</sup> The percentage passing sieve size *D* may be greater than 99 % but in such cases the supplier shall declare the typical grading.

## 4.4 Grading requirements

### 4.4.1 General grading curve

When required, the percentage by mass passing sieve *A*, sieve *B*, sieve *C*, sieve *E* and where specified in Table 6 sieve *F* and sieve *G* determined in accordance with EN 933-1 using the sieves defined in Table 5 shall be within the overall grading range appropriate to the category selected from Table 6.



Table 5 — Sieves for grading

Mixture designation	Sieve A	Sieve B	Sieve C	Sieve E	Sieve F	Sieve G
0/8	4	2	—	1	0,5	—
0/10	4	2	—	1	0,5	—
0/11,2	5,6	4	2	1	0,5	—
0/12,5	6,3	4	2	1	0,5	—
0/14	8	4	2	1	0,5	—
0/16	8	4	2	1	0,5	—
0/20	10	4	2	1	0,5	—
0/22,4	11,2	5,6	2	1	0,5	—
0/31,5	16	8	4	2	1	0,5
0/40	20	10	4	2	1	0,5
0/45	22,4	11,2	5,6	2	1	0,5
0/56	31,5	16	8	4	2	1
0/63	31,5	16	8	4	2	1
0/80	40	20	10	4	2	1
NOTE	Table 5 does not define sieve C and sieve G for all mixtures.					

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In addition, for categories  $G_A$ ,  $G_B$ ,  $G_C$ ,  $G_O$  and  $G_P$  the mean value calculated from all gradings shall be within the supplier declared value grading range appropriate to the category selected from Table 6.

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Table 6 — Overall grading

Grading range	Percentage passing by mass						Category <i>G</i>
	Sieve A	Sieve B	Sieve C	Sieve E	Sieve F	Sieve G	
<b>Normal graded mixtures</b>							
Overall	55 to 85	35 to 65	22 to 50	15 to 40	10 to 35	0 to 20	<i>G<sub>A</sub></i>
Supplier declared value (S)	63 to 77	43 to 57	30 to 42	22 to 33	15 to 30	5 to 15	
Overall	55 to 85	35 to 68	22 to 60	16 to 47	9 to 40	5 to 35	<i>G<sub>B</sub></i>
Supplier declared value (S)	63 to 77	43 to 60	30 to 52	23 to 40	14 to 35	10 to 30	
Overall	50 to 90	30 to 75	20 to 60	13 to 45	8 to 35	5 to 25	<i>G<sub>C</sub></i>
Supplier declared value (S)	61 to 79	41 to 64	31 to 49	22 to 36	13 to 30	10 to 20	
<b>Open graded mixtures</b>							
Overall	50 to 78	31 to 60	18 to 46	10 to 35	6 to 26	0 to 20	<i>G<sub>O</sub></i>
Supplier declared value (S)	58 to 70	39 to 51	26 to 38	17 to 28	11 to 21	5 to 15	
Overall	43 to 81	23 to 66	12 to 53	6 to 42	3 to 32	No req.	<i>G<sub>P</sub></i>
Supplier declared value (S)	54 to 72	33 to 52	21 to 38	14 to 27	9 to 20		
<b>Other mixtures</b>							
Overall	50 to 90	30 to 75	15 to 60	no req.	0 to 35	No req.	<i>G<sub>E</sub></i>
Supplier declared value (S)	No requirement						
Overall	50 to 90	30 to 75	15 to 60	No requirement		<i>G<sub>U</sub></i>	
Supplier declared value (S)	No requirement						
Overall	47 to 87	No requirement		15 to 75	No requirement		<i>G<sub>V</sub></i>
Supplier declared value (S)	No requirement						
Overall	No requirement						<i>G<sub>N</sub></i>
Supplier declared value (S)	No requirement						

For the control of individual batches of mixtures, the supplier of categories  $G_A$ ,  $G_B$ ,  $G_C$ ,  $G_O$  and  $G_P$  shall nominate a supplier declared value within the supplier declared value grading range appropriate to the mixture type.

NOTE Use of the supplier declared value is illustrated in annex B.

#### 4.4.2 Grading of individual batches

When required in addition to conforming to the overall grading range given in Table 6, the grading of at least 90 % of batches assessed over a maximum period of six months within a system of factory production control shall conform to the following requirements, to ensure that production is consistent and that the mixture has a continuous grading:

- the percentage by mass passing each sieve shall have a value which conforms to the appropriate tolerances given in Table 7, when compared with the relevant supplier declared value.
- the calculated difference between the values of percentage by mass passing selected sieves shall conform to the appropriate range given in Table 8.

**Table 7 — Grading of individual batches — comparison with supplier declared value**

Categories	Comparison with supplier declared value (S)		
	Tolerances in percentage by mass		
	Sieves A, B and C	Sieve E	Sieves F and G
$G_A$ , $G_B$ and $G_O$	±8	±7	±5
$G_C$	±11	±9	±5
$G_P$	±15	±13	±10
$G_E$ , $G_U$ , $G_V$ and $G_N$	No requirement		

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**Table 8 — Grading of individual batches — differences in values passing each sieve**

Categories	Differences in values passing each sieve					
	Percentage by mass passing sieve					
	Between A and B and between B and C		Between C and E		Between E and F	
	not more than	not less than	not more than	not less than	not more than	not less than
$G_A$ , $G_B$ and $G_O$	25	10	20	7	15	4
$G_C$	30	7	20	7	15	4
$G_P$	30	7	No requirement			
$G_E$	35	5	No requirement			
$G_U$ , $G_V$ and $G_N$	No requirement					

#### 4.5 Other requirements

Under certain conditions frost susceptibility, permeability and leaching shall be considered.

NOTE 1 There is currently insufficient experience to define test methods and set specification limits which can be used in all parts of Europe. The test method may be a direct frost heave, permeability or an indirect method. The requirements may be given in regulations in the place of use.

NOTE 2 Guidance on the assessment of the mechanical behaviour of unbound mixtures is given in annex C.