SLOVENSKI STANDARD

SIST EN 12737:2004+A1:2008

01-januar-2008

Montažni betonski izdelki - Hlevske gredice

Precast concrete products - Floor slats for livestock

Betonfertigteile - Spaltenböden für die Tierhaltung

Produits préfabriqués en béton - Caillebotis pour bétail

Ta slovenski standard je istoveten z: **EN 12737:2004+A1:2007**

ICS:

65.040.10	Poslopja, naprave in oprema za živino	Livestock buildings, installations and equipment
91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 12737:2004+A1:2008 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12737:2004+A1

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ICS 65.040.10; 91.100.30

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English Version

Precast concrete products - Floor slats for livestock

Produits préfabriqués en béton - Caillebotis pour bétail

Betonfertigteile - Spaltenböden für die Tierhaltung

This European Standard was approved by CEN on 24 June 2004 and includes Amendment 1 approved by CEN on 30 August 2007.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

A1 The numbering of clauses is strictly related to EN 13369:2004, Common rules for precast concrete products, at least for the first three digits. When a clause of EN 13369:2004 is not relevant or included in a more general reference of this standard, its number is omitted and this may result in a gap on numbering. A1

page

Foreword

This document (EN 12737:2004+A1:2007) has been prepared by Technical Committee CEN/TC 229 “Precast concrete products”, the secretariat of which is held by AFNOR and was examined by and agreed with a joint working party appointed by the Liaison Group CEN/TC 229-TC250, particularly for its compatibility with structural Eurocodes.

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of an identical text or by endorsement, at the latest by April 2008, and conflicting national standards shall be withdrawn at the latest by July 2009.

This document supersedes EN 12737:2004.

This document includes Amendment 1, approved by CEN on 2007-08-30.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

⟨A1⟩ *deleted text* ⟨A1⟩

⟨A1⟩ 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 the Construction Products Directive (89/106/EEC).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document. ⟨A1⟩

This document is consistent with the Council Directive 2001/88/EC of 23 October 2001 amending Directive 91/630/EEC laying down minimum standards for the protection of pigs.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This document specifies the requirements for reinforced and prestressed precast concrete floor slats used in slatted floors for the housing of livestock and provides for the evaluation of conformity of these products. This document does not cover slats for loadings other than stock and stockmen.

2 Normative references

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

EN 13369:2004, *Common rules for precast concrete products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13369:2004 and the following apply.

3.1
floor slat
floor component suitable for use by livestock situated above a slurry pit or channel and provided with openings for the draining of slurry, feed and straw waste to the slurry pit or channel underneath (see Figure 1)

3.2
slat beam
single beam used as a floor slat

3.3
twin slat
assembly of two parallel spaced beams, mutually linked by means of two or more transversal connections, perpendicular to the longitudinal direction of those beams used as a floor slat

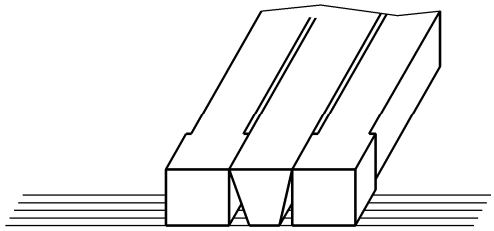
3.4
multiple slat
assembly of two or more parallel spaced beams, mutually linked by means of two or more transversal connections, perpendicular to the longitudinal direction of those beams, and/or with a perforated slab in between used as a floor slat

3.5
perforated panel
panel with a regular pattern of holes used as a floor slat

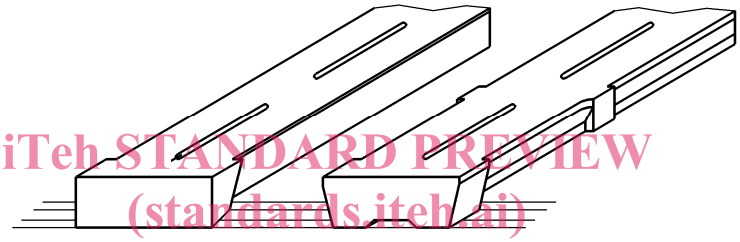
3.6
load class
class of floor slats according to the type of stock and mass of animal (see Table 3)

3.7
acceptance number
highest number of nonconforming products for which the consignment is accepted

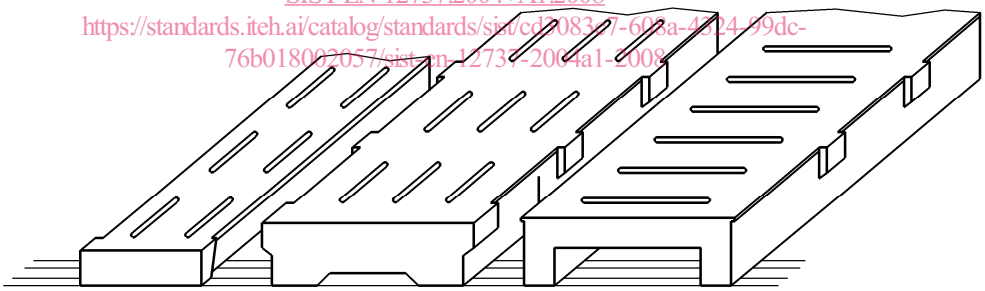
3.8
rejection number
smallest number of nonconforming products for which the consignment is rejected



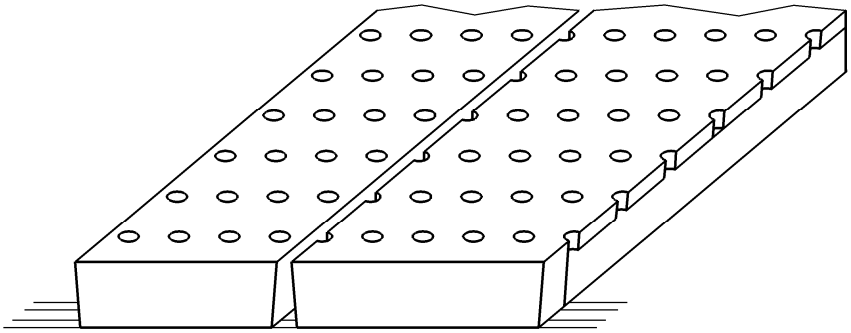
a) Slat beams



b) Twin slats



c) Multiple slats



d) Perforated panels

Figure 1 — Examples of floor slats

4 Requirements

4.1 Material requirements

4.1.1 General

Subclause 4.1.1 of EN 13369:2004 shall apply.

4.1.2 Constituent materials of concrete

Subclause 4.1.2 of EN 13369:2004 shall apply, provided that high alumina and super-sulphated cement are not used.

Special consideration shall be given to aggregates which may become slippery under the abrasion of hooves.

4.1.3 Reinforcing steel

4.1.3.1 Bars, coils and welded fabric

Subclause 4.1.3 of EN 13369:2004 shall apply.

4.1.3.2 Lattice girders

The suitability of lattice girders shall be verified following 4.1.1 of EN 13369:2004.

4.1.4 Prestressing steel

Subclause 4.1.4 of EN 13369:2004 shall apply.

4.2 Production requirements

4.2.1 Concrete production

Subclause 4.2.1 of EN 13369:2004 shall apply.

4.2.2 Hardened concrete

Subclause 4.2.2 of EN 13369:2004 shall apply, provided that the strength class is at least C35/45 for reinforced concrete and at least C 45/55 for prestressed concrete.

4.2.3 Structural reinforcement

Subclause 4.2.3 of EN 13369:2004 and the following shall apply.

The reinforcement shall be positioned correctly throughout the component.

The longitudinal reinforcement of reinforced concrete components shall continue to less than 10 mm and more than 25 mm before the head-end of the component.

The exposed ends of prestressing tendons shall be protected.

4.3 Finished product requirements

4.3.1 Geometrical characteristics

4.3.1.1 Dimensions

The nominal length of the floor slat shall be declared by the manufacturer.

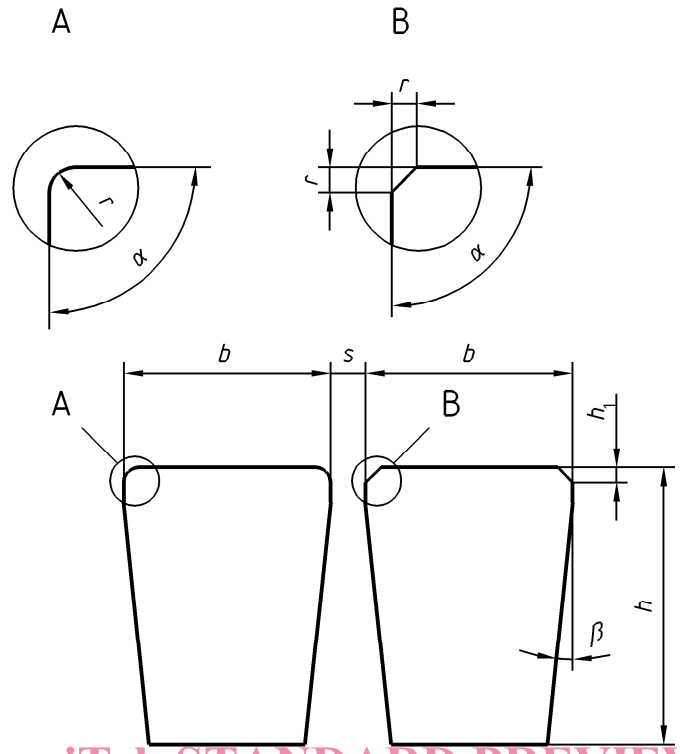
The nominal sizes of the beam width and gap width between beams, or for perforated slabs the diameter of round holes shall be as given in Table 1 (see also Figure 2).

Table 1 — Nominal sizes for floor slats

(dimensions in millimetres)

Load class	Beam width (b)	Gap width (s)	Hole diameter (d)
A1	70 - 120	20 - 28	≤ 30
A2	70 - 160	30 - 35	≤ 50
A3	70 - 180	30 - 40	
B1	50 - 80	10 – 14 [a]	≤ 20
B2	80 - 120	14 - 18	≤ 25
B3	80 - 120	14 - 20	

[a] For piglets, the maximum gap width is 11 mm (see Council Directive 2001/88/EC of 23 October 2001).



Key

$r \leq 5$ mm for load class A

≤ 3 mm for load class B

$88° \leq \alpha \leq 90°$

$5 \leq h_1$ (mm) ≤ 20

$\beta \geq 5°$

Figure 2 — Geometry of slat beam sections

4.3.1.2 Dimensional tolerances

The maximum permitted dimensional deviations of length ($\Delta\ \ell$), height ($\Delta\ h$), beam width ($\Delta\ b$) or gap width ($\Delta\ s$) and diameter ($\Delta\ d$) of round holes shall be as given in Table 2.

Table 2 — Maximum permitted dimensional deviations

(dimensions in millimetres)

Load class	Maximum permitted deviation			
	$\Delta\ \ell$	$\Delta\ h$	$\Delta\ b = \Delta\ s$	$\Delta\ d$
A1	+ 0 – 10	± 3	± 3	± 5
A2			± 5	
A3				
B1	+ 0 – 6	± 3	± 2	± 2
B2			± 3	± 3
B3				

4.3.1.3 Shape of the gaps

The inclination of the side faces of the openings in floor slats shall conform to Figure 2 so as to enable efficient slurry drainage. The top of the beams shall have no sharp edges. Where radius or chamfer are provided these shall not exceed 5 mm for load class A and 3 mm for load class B.

4.3.1.4 Flatness

The upper face of the floor slats shall be flat across the width.

The flatness of end supported floor slats subjected only to their self weight shall conform to the following:

— for reinforced concrete components the upper face of the component shall not deviate more than 5 mm from the connection line between the upper faces at the ends;

— for prestressed concrete components the vertical camber along the length of the component shall not deviate from the declared camber by more than 5 mm.

4.3.2 Surface characteristics

Before use, the upper face and edges shall be free from burrs and projections.

At departure from the factory, slats shall show no cracks with a width greater than 0,1 mm.

4.3.3 Mechanical resistance

4.3.3.1 General

Subclause 4.3.3.1 of EN 13369:2004 shall apply.

4.3.3.2 Loads

Table 3 gives the classification of the slats for livestock housing defined on the base of type of stock and mass of animals.

Table 3 — Classification of floor slats for livestock housing

Load class	Type of stock	Mass of animal (kg)
A1	Calves	< 200
A2	Cattle	200 - 825
A3		
B1	Piglets and weaner pigs	< 40
B2	Rearing and finishing pigs, sheep and goats	20 - 125
B3	Gilts after service, sows and boars, sheep and goats	25 - 250

NOTE 1 Mass of animal relates to the average of a group. The mass of a single animal can exceed the tabulated mass by up to 15 %.

NOTE 2 Type of livestock not mentioned in this table should be classified according to their mass.

Floor slats for use solely by stock and stockmen shall be designed in accordance with the indicated vertical and horizontal variable characteristic loads. Self weight of floor slats and other additional loads (e.g. self weight of pen partitions, feeding troughs, ...) shall be dealt with in the design.

The following variable characteristic loads shall be taken:

— a vertical characteristic linear load q_k;

— a vertical characteristic point load $F_{k,v}$;

— a horizontal characteristic point load $F_{k,h}$.

Values of q_k, $F_{k,v}$ and $F_{k,h}$ shall be as given in Table 4. For single beams these values shall be multiplied by 1,1.

Table 4 — Characteristic loading values

Load class	Linear load q_k (kN/m)	Vertical point load $F_{k,v}$ (kN)	Distance a (m)	Horizontal point load $F_{k,h}$ (kN)
A1	2,5	1,2	0,5	0,5
A2	5,0	4,2	0,8	2,5
A3	5,0	4,2	0,8	2,5
B1	0,8	0,8	0,3	0,1
B2	1,5	1,0	0,5	0,5
B3	2,5	1,3	0,5	1,0

The given loading values include possible dynamic effects.