



SLOVENSKI STANDARD
SIST EN 1337-1:2001
01-april-2001

Structural bearings - Part 1: General design rules

Lager im Bauwesen - Teil 1: Allgemeine Regelungen

Appareils d'appui structuraux - Partie 1: Indications générales

Ta slovenski standard je istoveten z: EN 1337-1:2000

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ICS:

91.010.30 Technical aspects

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1337-1

June 2000

ICS 91.010.30

English version

Structural bearings - Part 1: General design rules

Appareils d'appui structuraux - Partie 1: Indications
générales

Lager im Bauwesen - Teil 1: Allgemeine Regelungen

This European Standard was approved by CEN on 30 April 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 167 "Structural bearings", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2000, and conflicting national standards shall be withdrawn at the latest by December 2000.

prEN 1337 „Structural bearings“ consists of the following 11 parts:

- Part 1 – General design rules
- Part 2 – Sliding elements
- Part 3 – Elastomeric bearings
- Part 4 – Roller bearings
- Part 5 – Pot bearings
- Part 6 – Rocker bearings
- Part 7 – Spherical and cylindrical PTFE bearings
- Part 8 – Guided bearings and restrained bearings
- Part 9 – Protection
- Part 10 – Inspection and maintenance
- Part 11 – Transport, storage and installation

This Part 1 „General design“ includes Annexes A, B and C (informative).

Further to CEN/TC 167's decision Part 1 and Part 2 form a package of standards and they come into force together, while the other parts come into force separately after the publication of Part 1 and Part 2.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard is applicable to structural bearings, whether used in bridges or in other structures.

This European Standard does not cover:

- a) bearings that transmit moments as a primary function;
- b) bearings that resist uplift;
- c) bearings for moving bridges;
- d) concrete hinges;
- e) seismic devices.

Although it is not intended to regulate temporary bearings this standard may be used as a guide in this case (temporary bearings are bearings used during construction or repair and maintenance of structures).

NOTE 1: Although the specifications given in this European Standard are necessary, they are not sufficient in themselves for the overall design of the structures and for the consideration of geotechnical aspects.

See prEN 1337-2 to prEN 1337-8 for information relating to bearings for which specifications are laid down for certain ranges of temperature only.

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.

prEN 1337-2	Structural bearings – Part 2: Sliding elements
prEN 1337-3	Structural bearings – Part 3: Elastomeric bearings
prEN 1337-4	Structural bearings – Part 4: Roller bearings
prEN 1337-5	Structural bearings – Part 5: Pot bearings
prEN 1337-6	Structural bearings – Part 6: Rocker bearings
prEN 1337-7	Structural bearings – Part 7: Spherical and cylindrical PTFE bearings
prEN 1337-8	Structural bearings – Part 8: Guided bearings and restrained bearings
EN 1337-9 : 1997	Structural bearings – Part 9: Protection
prEN 1337-10	Structural bearings – Part 10: Inspection and maintenance
EN 1337-11: 1997	Structural bearings – Part 11: Transport, storage and installation
ENV 1991-1 : 1994	Eurocode 1: Basis of design and actions on structures – Part 1: Basis of design
ENV 1992-2 : 1996	Eurocode 2: Design of concrete structures – Part 2: Concrete bridges
ENV 1993-2 : 1997	Eurocode 3: Design of steel structures – Part 2: Steel bridges
ENV 1994-2 : 1997	Eurocode 4: Design of composite steel and concrete structures – Part 2: Composite bridges

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See EN 1991-1-1 and EN 1992-1-1

3 Definitions and symbols

3.1 Definitions

For the purposes of this standard, the following definitions apply:

Ultimate limit state (ULS) and serviceability limit state (SLS) are defined in ENV 1991-1. They apply here in the same way.

3.1.1 bearings: Bearings are elements allowing rotation between two members of a structure and transmitting the loads defined in the relevant requirements as well as preventing displacements (fixed bearings), allowing displacements in only one direction (guided bearings) or in all directions of a plane (free bearings) as required.

The most common types of bearings are listed in table 1 and examples of these are are illustrated in figure 1 with the corresponding axes of coordinates.

A distinction is made between the following categories:

Category 1: All-round rotating bearings

Category 2: Bearings with uniaxial rotation

Category 3: Spherical and cylindrical bearings when the horizontal load is supported by the curved sliding surface

Category 4: All other bearings

The bearings of Nos 1.1 to 3.1, 3.3, 3.5 to 4.3, 8.1 and 8.2 belong to category 1.

The bearings of Nos 5.1 to 6.2, 7.3 and 7.4 belong to category 2.

The bearings of Nos 3.2, 3.4, 7.1 and 7.2 belong to category 3.

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Table 1: Most common types of bearings

1		2		3		4		5		6		7		8		9		10		11		12		13		14		
Relevant parts of the standard		No.	Symbol in the plan view	Symbol in direction		Kind of bearing		v_x in x-direction	v_y in y-direction	v_z in z-direction	α_x about x-axis	α_y about y-axis	α_z about z-axis	Relative movements		Reactions												
2	3	4	5	6	7	8																						
X																												
X																												
X																												
X																												
X																												
X																												
X																												
X																												
X																												

(continued)

Table 1 (continued)

1		2	3	4	5	6		7	8	9	10	11	12	13	14		
Relevant parts of the standard		No.	Symbol in the plan view	Symbol in direction	Kind of bearing	Relative movements		displacements		rotation		Reactions					
2	3	4	5	6	7	8	9	10	11	12	13	14					
						v_x in x-direction	v_y in y-direction	v_z in z-direction	α_x about x-axis	α_y about y-axis	α_z about z-axis	forces	moment				
						none	none	very small				V_x	V_y	N			
					Pot bearing	sliding											
X					Pot bearing with unidirectional movable sliding part												
					Pot bearing with multidirectional movable sliding part		sliding				sliding and deforming						
X					Spherical bearing with RS beyond the rotating part	none	none	almost none		sliding	sliding	V_x	V_y	N			
					Spherical bearing with rotating part likewise as RS												
					Spherical bearing with unidirectional movable sliding part (ext. guidance)	sliding											
X					Spherical bearing with unidirectional movable sliding part (int. guidance)												
					Spherical bearing with multidirectional movable sliding part		sliding										
X																	
X																	

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Table 1 (continued)

1			2	3	4	5	6			7	8	9	10	11	12	13	14
Relevant parts of the standard			No.	Symbol in the plan view	Symbol in direction		Kind of bearing	Relative movements			displacements		rotation		Reactions		
2	3	4	5	6	7	8		v_x in x-direction	v_y in y-direction	v_z in z-direction	α_x about x-axis	α_y about y-axis	α_z about z-axis	forces	moment		
							Steel point rocker bearing	none	none	almost none	rocking	rocking	sliding)	V_x	N		
X							Steel point rocker bearing with unidirectional movable sliding part	sliding						V_y	N		
X							Steel point rocker bearing with multidirectional movable sliding part	sliding	sliding						N		
							Steel linear rocker bearing	none	none		none ³⁾		none	V_x	N	M_x	
X							Steel linear rocker bearing with unidirectional movable sliding part	sliding						V_y	N	M_x	
X							Steel linear rocker bearing with multidirectional movable sliding part	rolling	sliding		sliding	sliding	sliding		N	M_x	
							Single roller bearing		none		none		none ¹⁾	V_y	N	M_x	
X							Single roller bearing with sliding part movable in the other direction		sliding						N	M_x	

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Table 1 (concluded)

1		2	3	4	5	6		7	8	9	10	11	12	13	14
Relevant parts of the standard		No.	Symbol in the plan view	Symbol in direction	Kind of bearing		Relative movements				Reactions				
2	3	4	5	6	7	8	9	10	11	12	13	14			
					v_x in x-direction	displacements v_y in y-direction	v_z in z-direction	α_x about x-axis	rotation α_y about y-axis	α_z about z-axis	forces V_x V_y N	moment M_x			
X					Fixed cylindrical bearing	none	almost none	none ³⁾	sliding	none	V_x V_y N	M_x			
X					Guided cylindrical bearing movable in y direction	sliding	sliding				V_x N	M_x			
X					Guided cylindrical bearing movable in x direction	sliding	none				V_y N	M_x			
X					Free cylindrical bearing movable in x and y direction	sliding	sliding			sliding	N	M_x			
X					Guide bearing with restraints for two axes = thrust bearing	none	none	sliding or deforming	sliding or deforming	sliding or deforming	V_x V_y				
X					Guide bearing with restraints for one axis	sliding	none	sliding		none	V_y				

Forces

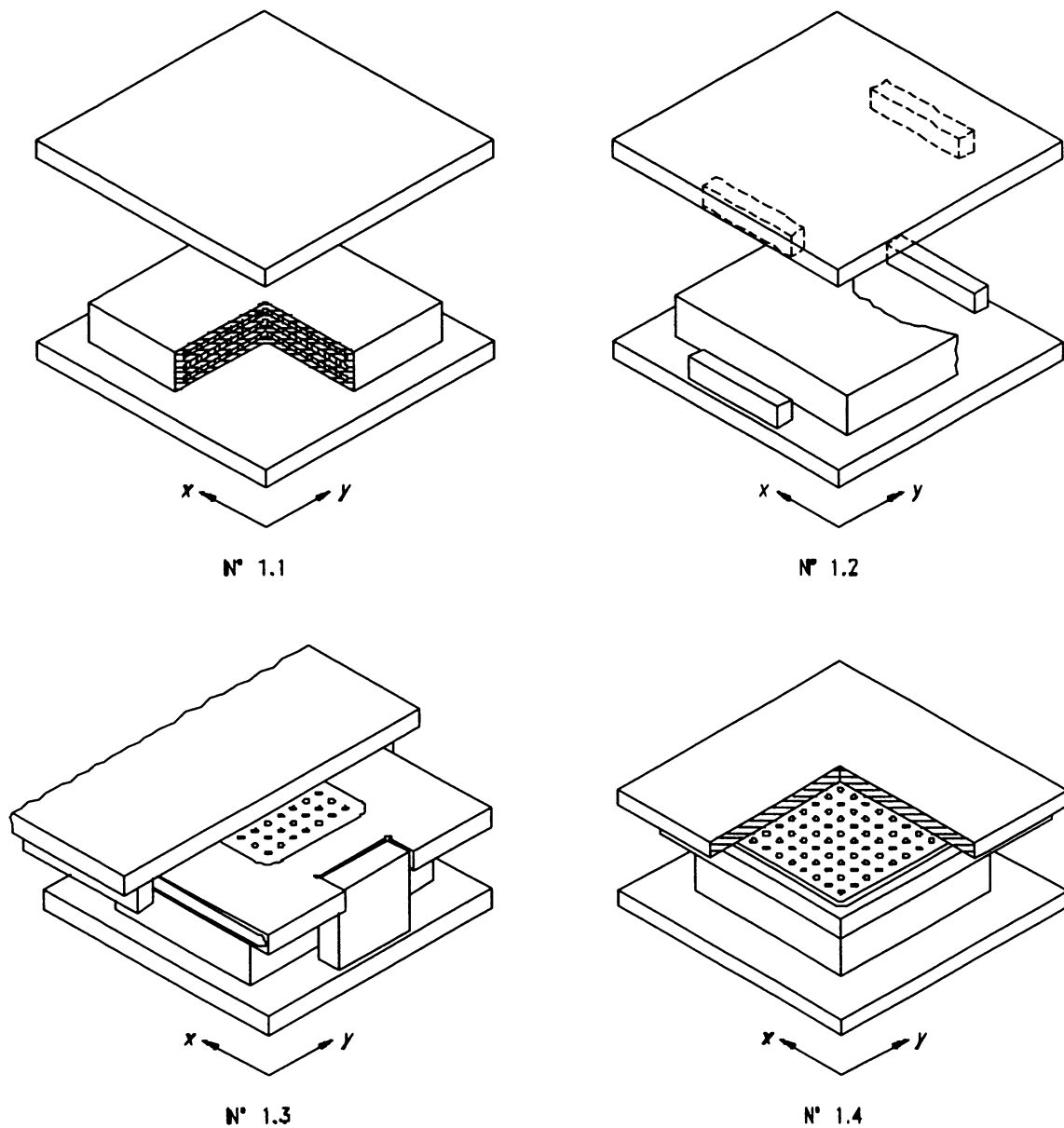
Moments

Displacements

Rotations

¹⁾ For individual types of bearings α_z may have strict tolerances, special design will be necessary if so required. For normal design purposes "none" means no movement other than that due to manufacturing tolerances and deformation.
²⁾ Whether or not v_z is of importance to be checked in individual cases.
³⁾ Combination with a sliding bearing results in unfavourable stresses in the PTFE.
⁴⁾ Device to transfer the forces V_x or V_y .

NOTE: In practice x is the main direction of movement for bridges (see ENV 1992-2 and ENV 1993-2) and z the direction of the forces due to vertical loads.



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Figure 1: Examples of the most common types of bearings listed in table 1

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