



**SLOVENSKI STANDARD**  
**oSIST prEN 1337-1:2018**  
**01-marec-2018**

---

**Konstruktivska ležišča - 1. del: Splošna pravila**

Structural bearings - Part 1: General

Lager im Bauwesen - Teil 1: Allgemeine Regelungen

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**Ta slovenski standard je istoveten z: prEN 1337-1**

[oSIST prEN 1337-1:2018](https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018>

**ICS:**

91.010.30      Tehnični vidiki      Technical aspects

**oSIST prEN 1337-1:2018**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[oSIST prEN 1337-1:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 1337-1**

January 2018

ICS 91.010.30

Will supersede EN 1337-1:2000, EN 1337-10:2003, EN 1337-11:1997, EN 1337-9:1997

English Version

## Structural bearings - Part 1: General

Lager im Bauwesen - Teil 1: Allgemeine Regelungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 167.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

<b>Contents</b>	<b>Page</b>
European foreword.....	6
<b>1 Scope</b> .....	<b>7</b>
<b>2 Normative references</b> .....	<b>7</b>
<b>3 Terms, definitions, symbols, abbreviations and icons</b> .....	<b>9</b>
3.1 Terms and definitions .....	9
3.2 Symbols.....	11
3.2.1 Latin upper case letters .....	11
3.2.2 Latin lower case letters.....	11
3.2.3 Greek letters .....	11
3.2.4 Subscripts.....	11
3.3 Abbreviations .....	12
3.4 Icons.....	13
<b>4 Types of bearings</b> .....	<b>13</b>
<b>5 Materials</b> .....	<b>21</b>
<b>6 Design</b> .....	<b>22</b>
6.1 Principles .....	22
6.2 Bearing layout .....	22
6.3 Basis of bearing design.....	23
6.4 Design movements.....	24
6.4.1 Minimum design movements.....	24
6.4.2 Additional movement capacity.....	24
6.5 Bearing clearances .....	24
6.5.1 Accumulation of clearances.....	24
6.5.2 Movement allowances .....	24
6.6 Bearing design provisions .....	25
6.6.1 Provisions for additional movements .....	25
6.6.2 Safeguarding against loss of bearing components.....	25
6.7 Provisions for transport.....	25
6.7.1 Clamping.....	25
6.7.2 Lifting.....	25
6.8 Provisions for inspection .....	25
6.9 Provision for replacement.....	25
6.10 Joint between bearing and structure .....	25
6.10.1 General.....	25
6.10.2 Bedding with mortar.....	26
6.10.3 Direct connection to the structure.....	26
6.11 Transfer of horizontal forces (resistance to slipping).....	27
6.12 Durability .....	28
6.13 Dangerous substances.....	28
6.14 Protection .....	28
6.14.1 General.....	28
6.14.2 Protection from debris and maintenance activities.....	28
6.14.3 Protection from environmental influences (e.g. corrosion) .....	28
6.14.4 Maintenance.....	30

7	Testing.....	30
8	Manufacturing.....	30
8.1	General .....	30
8.2	Presetting .....	30
9	Transport, storage and installation .....	30
9.1	General .....	30
9.2	Transport.....	31
9.2.1	Packing .....	31
9.2.2	Handling.....	31
9.2.3	Inspection after delivery.....	31
9.3	Storage.....	31
9.4	Installation.....	32
9.4.1	General .....	32
9.4.2	Documents on site .....	33
9.4.3	Formwork.....	33
9.4.4	Contamination .....	33
9.4.5	Installation tolerances.....	34
9.4.6	Joint between bearing and structure.....	34
9.4.7	Presetting .....	35
9.4.8	Final finish.....	36
9.5	Inspection.....	36
10	In-service inspection .....	36
10.1	General .....	36
10.2	General aspects for report and evaluation.....	36
10.3	Sliding element.....	37
10.4	Elastomeric bearings.....	37
10.5	Roller bearings.....	38
10.6	Rocker bearings .....	38
10.7	Pot bearings.....	39
10.8	Guide bearings and restraint bearings .....	39
11	Maintenance .....	40
12	Assessment and verification of constancy of performance .....	40
12.1	General .....	40
12.2	Type Testing .....	41
12.2.1	General .....	41
12.2.2	Test samples, testing and compliance criteria.....	41
12.2.3	Calculation.....	41
12.2.4	Test reports .....	42
12.2.5	Shared other party results .....	42
12.2.6	Cascading determination of the product type results .....	42
12.3	Factory production control.....	44
12.3.1	General .....	44
12.3.2	Requirements for factory production control.....	44
12.3.3	Product specific requirements .....	46
12.3.4	Initial inspection of factory and of FPC.....	47
12.3.5	Continuous surveillance of FPC .....	47
12.3.6	Procedure for modifications.....	47
12.3.7	One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity .....	48
13	Identification and marking .....	48

## prEN 1337-1:2018 (E)

13.1	General.....	48
13.2	Permanent identification.....	48
13.3	Temporary marking for installation.....	48
Annex A (informative) Bearing schedule.....		49
A.1	General.....	49
A.2	Schedule.....	49
Annex B (informative) Basic course contents for a specialist training.....		55
Annex C (informative) Types of Mortar.....		57
C.1	Overview.....	57
C.2	Ready-mixed cement mortar mixtures.....	57
C.3	Epoxy resin mortar.....	58
C.4	Methacrylate mortar.....	58
Annex D (informative) Determination of the temperature of the structure.....		59
D.1	General.....	59
D.2	Aspects to be considered.....	59
Annex E (informative) Bearing installation report.....		61
E.1	General.....	61
E.2	Report front page.....	61
E.3	Report subsequent pages.....	61
Annex F (normative) Items for structural design.....		64
F.1	General.....	64
F.2	Design situation.....	64
F.3	Reaction to movement of a set of bearings.....	64
F.3.1	General.....	64
F.3.2	Rolling and sliding bearings.....	64
F.3.3	Deformable bearings.....	65
F.4	Bearing clearances.....	65
F.4.1	Accumulation of play.....	65
F.4.2	Simultaneous action.....	65
F.5	Provision for replacement.....	65
Annex G (informative) Determination of the support system and the resulting forces and movements.....		66
G.1	General.....	66
G.2	Basis of design.....	66
G.3	Support plan.....	67
G.4	Bearing schedule.....	67
G.5	Actions.....	68
G.5.1	Actions for persistent and transient design situations.....	68
G.5.2	Bearing replacement and other transient design situations.....	69
G.5.3	Bearing resistances and eccentricities resulting from movements.....	70
G.6	Design values of movements and loads.....	70
G.6.1	Principles.....	70
G.6.2	Climatic thermal actions.....	71
Annex H (informative) Bearings for Railway Bridges.....		74
H.1	General.....	74
H.2	Positioning.....	74
H.2.1	Distance to decks end.....	74
H.2.2	Inclined bridges.....	74
H.3	Bearing selection.....	75

<b>Annex I (normative) Connections with bolts in threaded holes</b> .....	<b>77</b>
<b>I.1 Introduction</b> .....	<b>77</b>
<b>I.2 General</b> .....	<b>77</b>
<b>I.3 Engagement length</b> .....	<b>77</b>
<b>I.4 Preload</b> .....	<b>77</b>
<b>Bibliography</b> .....	<b>79</b>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[oSIST prEN 1337-1:2018](https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018>

**prEN 1337-1:2018 (E)****European foreword**

This document (prEN 1337-1:2018) has been prepared by Technical Committee CEN/TC 167 “Structural bearings”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1337-1:2000, EN 1337-9:1997, EN 1337-10:2003 and EN 1337-11:1997.

prEN 1337, *Structural bearings*, consists of the following 8 parts:

- *Part 1: General;*
- *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: Guide bearings and Restraint bearings.*

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

oSIST prEN 1337-1:2018  
<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1dfl-4fe8-b784-88ab0881758e/osist-pr-en-1337-1-2018>

The main changes with respect to the previous edition are:

- a) The clauses of all parts of prEN 1337-1:2018 to prEN 1337-8:2018 were aligned to give the series a common structure.
- b) Complete technical and editorial revision of all clauses of the document. The technical content was completely revised and enlarged.

The major technical changes are listed below:

- Complete technical and editorial revision of the whole document; it is not possible to list all implemented changes to this edition of EN 1337-1.



## 1 Scope

This document specifies general rules for design, manufacturing, protection, transport, storage, installation, and inspection of structural bearings for use in bridges and other structures, e.g. buildings.

This document does not give rules for:

- bearings subjected to uplift forces;
- bearings for the specific moving function of moveable bridges (for example bascule bridges, lift bridges, etc.);
- concrete hinges;
- levelling pads.

It can be used for guidance in the case of temporary bearings and the principles can be applied to the design and manufacture of other types of structural bearings not included in this European Standard.

If bearings are used as or as part of anti-seismic devices with the aim of modifying the dynamic response of the structure, EN 15129 also applies.

This document will be used in conjunction with the other relevant parts of the prEN 1337 series.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1090-1:2009+A1:2011, *Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components*

EN 1090 (all parts), *Execution of steel structures and aluminium structures*

prEN 1337-2:2018, *Structural bearings — Part 2: Sliding elements*

prEN 1337-3:2018, *Structural bearings — Part 3: Elastomeric bearings*

prEN 1337-4:2018, *Structural bearings — Part 4: Roller bearings*

prEN 1337-5:2018, *Structural bearings — Part 5: Pot bearings*

prEN 1337-6:2018, *Structural bearings — Part 6: Rocker bearings*

prEN 1337-7:2018, *Structural bearings — Part 7: Spherical and cylindrical PTFE bearings*

prEN 1337-8:2018, *Structural bearings — Part 8: Guide bearings and Restraint bearings*

EN 1990:2002, *Eurocode — Basis of structural design*

EN 1991-1-5:2003<sup>1</sup>, *Eurocode 1: Actions on structures — Part 1-5: General actions — Thermal actions*

---

<sup>1</sup> This reference is currently impacted by EN 1991-1-5:2003/AC:2009.

**prEN 1337-1:2018 (E)**

- EN 1991 (all parts), *Eurocode 1 — Actions on structures*
- EN 1992 (all parts), *Eurocode 2: Design of concrete structures*
- EN 1993 (all parts), *Eurocode 3: Design of steel structures*
- EN 1994 (all parts), *Eurocode 4 — Design of composite steen and concrete structures*
- EN 1995 (all parts), *Eurocode 5: Design of timber structures*
- EN 1996 (all parts), *Eurocode 6 — Design of masonry structures*
- EN 1997(all parts), *Eurocode 7 — Geotechnical design*
- EN 1998 (all parts), *Eurocode 8: Design of structures for earthquake resistance*
- EN 1999 (all parts), *Eurocode 9 — Design of aluminium structures*
- EN 10088-1:2005, *Stainless steels — Part 1: List of stainless steels*
- EN ISO 2081, *Metallic and other inorganic coatings — Electroplated coatings of zinc with supplementary treatments on iron or steel (ISO 2081)*
- EN ISO 3506 (all parts), *Mechanical properties of corrosion-resistant stainless steel fasteners (ISO 3506, all parts)*
- EN ISO 10684, *Fasteners — Hot dip galvanized coatings (ISO 10684)*
- EN ISO 12944-5:2007, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems (ISO 12944-5:2007)*
- EN ISO 12944 (all parts), *Paints and varnishes — Corrosion protection of steel structures by protective paint systems (ISO 12944, all parts)*
- ISO 3522:2007, *Aluminium and aluminium alloys — Castings — Chemical composition and mechanical properties*
- VDI 2240, *Shaft couplings; systematic classification according to their properties*

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

#### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in the EN ISO 12944 series and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

The bearings described in this part of the prEN 1337 series may be required to operate in a plane inclined to the horizontal. Then the terms “vertical” and “horizontal” shall be interpreted appropriately.

##### 3.1.1

##### **bearing**

structural device which transmits loads and allows a combination of reversible and irreversible movements between two members of a structure

##### 3.1.2

##### **fixed bearing**

bearing which prevents displacements (the vertical load transfer is, generally, the main function)

##### 3.1.3

##### **guided bearing**

bearing which prevents displacements in one direction and allows displacements in a perpendicular direction (the vertical load transfer is, generally, the main function)

##### 3.1.4

##### **free bearing**

bearing which allows displacements in all directions of a plane (the vertical load transfer is, generally, the main function)

##### 3.1.5

##### **restraint bearing**

bearing which prevents horizontal displacements without transferring any vertical loads

##### 3.1.6

##### **guide bearing**

bearing which prevents displacements in one direction and allows displacements in a perpendicular direction without transferring any vertical loads

iTeh STANDARD PREVIEW

(standards.iteh.ai)

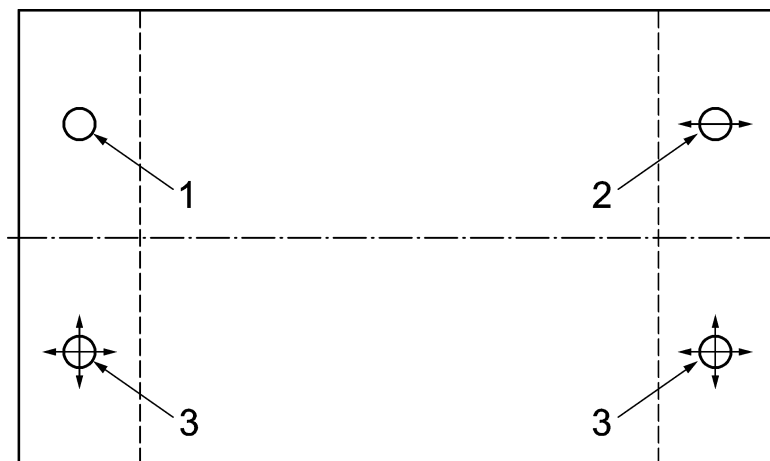
<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1dfl-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018>

## prEN 1337-1:2018 (E)

## 3.1.7

**support system**

arrangement of bearings and other structural devices and elements which support the structure and provide for movements

**Key**

- 1 fixed bearing
- 2 guided bearing
- 3 free bearing

iTeh STANDARD PREVIEW

Figure 1 — Support System  
(standards.iteh.ai)

## 3.1.8

**accidental damage**

damage inflicted on the bearing from factors to which it is not intentionally exposed

oSIST prEN 1337-1:2018

[https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-](https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-89eb0881795c/sist-pr-en-1337-1-2018)

[89eb0881795c/sist-pr-en-1337-1-2018](https://standards.iteh.ai/catalog/standards/sist/4799d14d-1df1-4fe8-b784-89eb0881795c/sist-pr-en-1337-1-2018)

## 3.1.9

**environmental damage**

damage caused by effect of environmental factors (including weather) associated with the location in which the bearing is intended to function and which can be predicted at the time the bearing is installed

## 3.1.10

**protection against corrosion**

measures taken to prevent damage to the bearing due to corrosion for a specified time period

## 3.1.11

**protective coating**

coating applied to the bearing, or parts thereof, to protect them from environmental damage

## 3.1.12

**protective measures**

measures taken to protect the bearing, or parts thereof, from the effects of the environment and other external causes, that would otherwise reduce its working life

## 3.1.13

**debris**

accumulated foreign particles which may solidify and obstruct proper functioning (i.e. dust)

**3.1.14****working life**

period of time during which the performance of a product will be maintained at a level that enables a properly designed and executed work to fulfil the Essential Requirements

Note 1 to entry: National regulations may distinguish between durability of corrosion protection in terms of discolouration and blistering, etc. or the period of time until minor maintenance and period of time until major maintenance.

**3.1.15****levelling pads**

plain pads used at the supports to prevent the direct contact between structural elements (e.g. prefabricated elements) and to transmit vertical loads only

**3.2 Symbols****3.2.1 Latin upper case letters**

*M* Moment

*N* Axial, normal force

*T* Temperature

*V* Shear force

**3.2.2 Latin lower case letters**

*k* Correction factor

*n* Number of bearings

*u* Displacement

*x* Longitudinal axis

*y* Transverse axis

*z* Axis normal to the principle bearing surface

**3.2.3 Greek letters**

$\alpha$  Coefficient of thermal expansion; factor; angle, rotation

$\gamma$  Partial factor

$\Delta$  Difference; increment

$\mu$  Coefficient of friction

**3.2.4 Subscripts**

d Design

E Effect arising from actions and imposed deformations

inf Inferior value in relation to a favourable action

k Characteristic

max. Maximum

min. Minimum

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

oSIST prEN 1337-1:2018  
<https://standards.iteh.ai/catalog/standards/sist/4799d14d-1dfl-4fe8-b784-88ab0881758e/osist-pren-1337-1-2018>

**prEN 1337-1:2018 (E)**

p	Anchorage, fixing device
x, y, z	Coordinates
R	Resistance, load bearing resistance
r	relieving
sup	Superior value in relation to an unfavourable action
$\varphi$	Geometric parameter
0	Initial value

**3.3 Abbreviations**

Abbreviations and designations as used in Table 1.

E	Elastomeric bearing
P	Pot bearing
S	Spherical bearing
R	Roller bearing
C	Cylindrical bearing
F	Restraint bearing (fixed in the horizontal plane)
LR	Line rocker bearing
PR	Point rocker bearing
G	Guide bearing
0	No movement capability in any horizontal direction (fixed)
1	Movement capability in the horizontal plane in one direction (guided)
2	Movement capability in the horizontal plane in two directions (free)
d	Movement is achieved by deformation of the bearing
s	Movement is achieved by sliding in the bearing
r	Movement is achieved by rolling in the bearing
Ref.	The relevant part of the prEN 1337 series













**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

oSIST prEN 1337-1:2018

<https://standards.iteh.ai/catalog/standards/sist/479d14d-1df1-4fe8-b784-88ab0881758e/osist-pr-en-1337-1-2018>

### 3.4 Icons

System of icons used in this document.

No.	Symbol	Description
1		Generic bearing (elastomeric, pot, roller, etc.)
2		Guides restraining the displacement in one direction (irrelevant if internal or external)
3		Displacement obtained through a sliding element
4		Displacement obtained through a roller
5		Laminated elastomeric bearing (irrelevant if circular, square or rectangular)
6		Line rocker or roller bearing
7		Point rocker bearings
8		Pot bearing
9		PTFE spherical bearing
10		PTFE spherical bearing fixed by a restraining ring
11		PTFE cylindrical bearing
12		Restraint bearing

## 4 Types of bearings

In Tables 1 to 9, common types of bearings and their load transfer and movement capabilities in the horizontal plane are characterized by an unambiguous code, consisting of a combination of letters from the abbreviations indicating the type of bearing, followed by a number from the abbreviations, indicating the numbers of directions in which horizontal displacement is allowed. The latter can be followed by a letter, which indicates whether the movement is allowed by deformation or sliding in the bearing. The icons are meant to be used for bearing schedules in order to avoid confusion.

Due to the nature of the bearings, acting in their environment, reaction moments can occur and shall be considered where relevant.

The designs given in the table are neither normative nor exhaustive.

The load transfer and movement possibilities of the bearings are expressed in a Cartesian coordinate system, in which x and y define the horizontal plane and z the vertical direction. x is normally oriented in the longitudinal direction of the superstructure and y in the transverse direction. The orientation of the local coordinate system of the bearings may deviate from the superstructures global coordinate system, e.g. when a guide slides in a direction other than main direction of the superstructure. In Tables 1 to 9 the load and movement direction are given for the local coordination system of the bearings. The figures in Table 1 to Table 9 are informative only.

Figure 2 shows the relationship between the directions for loads and movements. x is usually the main direction of displacement.