



**SLOVENSKI STANDARD  
SIST EN 1337-7:2004**

**01-junij-2004**

**BUXca Yý U  
SIST EN 1337-7:2001**

**Štrukturalni nosilci - Del 7: Kroglični in cilindrični PTFE nosilci**

Structural bearings - Part 7: Spherical and cylindrical PTFE bearings

Lager im Bauwesen - Teil 7: Kalotten- und Zylinderlager mit PTFE

Appareils d'appui structuraux - Partie 7: Appareils d'appui cylindriques et sphériques comportant du PTFE

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**ICS:**

91.010.30      V^ @ ã } ã ã ã ã      Technical aspects

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English version

## Structural bearings - Part 7: Spherical and cylindrical PTFE bearings

Appareils d'appui structuraux - Partie 7: Appareils d'appui  
cylindriques sphériques comportant du PTFE

Lager im Bauwesen - Teil 7: Kalotten- und Zylinderlager mit  
PTFE

This European Standard was approved by CEN on 2 January 2004.

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.

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## Foreword

This document (EN 1337-7:2004) 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of an identical text or by endorsement, at the latest by September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

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 EU Directive(s).

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

Annexes A and B are informative.

This document supersedes EN 1337-7:2000.

This European Standard EN 1337 "Structural bearings", consists of the following 11 Parts:

Part 1: General design rules **iTeh STANDARD PREVIEW**

Part 2: Sliding elements **(standards.iteh.ai)**

Part 3: Elastomeric bearings

Part 4: Roller bearings [SIST EN 1337-7:2004  
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Part 5: Pot bearings

Part 6: Rocker bearings

Part 7: Spherical and cylindrical PTFE bearings

Part 8: Guide bearings and restrain bearings

Part 9: Protection

Part 10: Inspection and maintenance

Part 11: Transport, storage and installation

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

## Introduction

This standard considers a minimum operating temperature of  $-35^{\circ}\text{C}$ .

An extension down to  $-40^{\circ}\text{C}$  will be considered in a future amendment.

Applications beyond the range of temperature given in clause 1 need special consideration not covered by this standard. Characteristics, requirements and test procedures given in this standard do not apply in such cases.

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## 1 Scope

This European Standard deals with the requirements for the design and manufacture of spherical and cylindrical PTFE bearings. The requirements and properties of the curved sliding surfaces are included in EN 1337-2. Spherical and cylindrical bearings with an included angle  $2\theta > 60^\circ$  and  $2\theta > 75^\circ$  respectively are beyond the scope of this European Standard. (see Figure 6).

For the purpose of controlling the degree of freedom the bearings may be combined with flat sliding elements and guides according to EN 1337-2:2004 and restraining rings as per 6.3.4.

Cylindrical bearings are susceptible to unexpected moments about the transverse axis of the cylindrical surface.

Additional limitation of application to be taken into consideration is given in clause 1 of EN 1337-2:2004.

## 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).

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EN 1337-1:2000, *Structural bearings - Part 1: General design rules*

EN 1337-2:2004, *Structural bearings - Part 2: Sliding elements*  
<https://standards.iteh.ai/catalog/standards/sist/ad8f4bbd-17b0-4bba-9981-6e4859d621e1/en-1337-7-2004>

prEN 1337-5:1996, *Structural bearings - Part 5: Pot bearings*

## 3 Terms and definitions, symbols and abbreviations

### 3.1 Terms and definitions

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

#### 3.1.1

##### **backing plate**

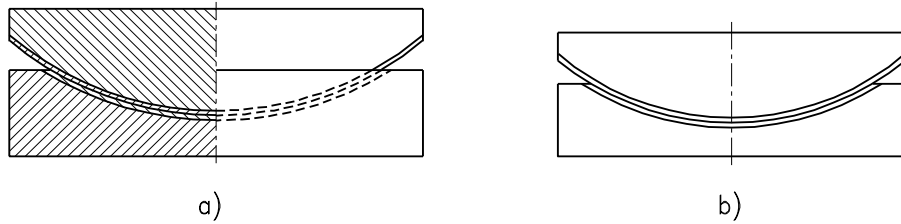
metallic component which supports sliding materials

#### 3.1.2

##### **cylindrical PTFE bearing**

bearing consisting of a backing plate with a convex cylindrical surface (rotational element) and a backing plate with a concave cylindrical surface between which a PTFE sheet and the mating material form a curved sliding surface (see Figure 1). Cylindrical PTFE bearings are also used in combination with flat sliding elements and guides to form free or guided bearings (see Figure 2)

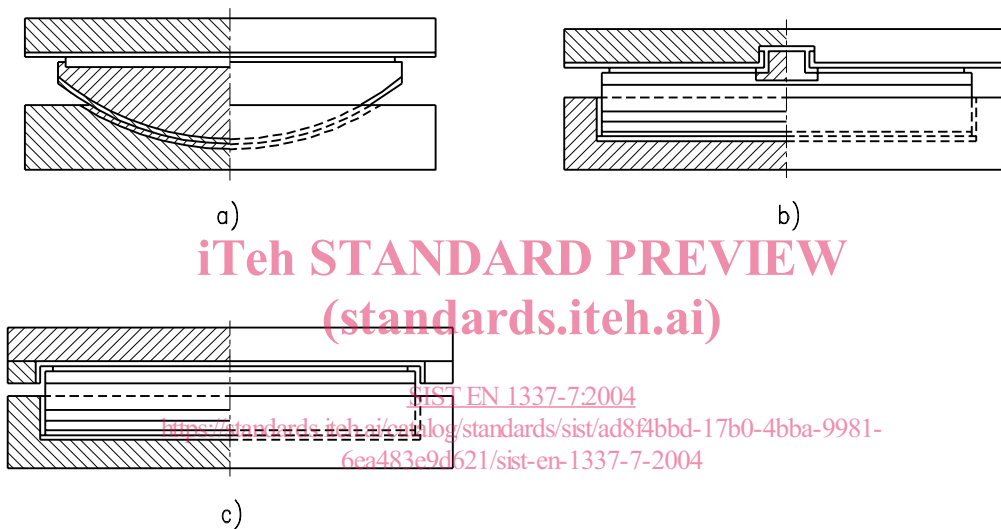
NOTE Numbers in brackets in Figures 1 and 2 refer to the examples shown in Figure 1 of EN 1337-1:2000.



**Key**

- a) Fixed by end stops and sliding surface (7.1)
- b) Without end stops for displacements in y direction (7.2)

**Figure 1 — Cylindrical PTFE bearings**



**Key**

- a) Free for displacements in any direction (7.4)
- b) Guided by an internal guide for displacements in x direction (7.3)
- c) Guided by external guides for displacements in x direction

**Figure 2 — Cylindrical PTFE bearings combined with flat sliding elements**

**3.1.3 guide**

sliding element which restrains a sliding bearing from moving in one axis

**3.1.4 lubricant**

special grease used to reduce the friction and wear in the sliding surfaces

**3.1.5 mating surface**

hard smooth metallic surface against which the PTFE slides

**3.1.6 polytetrafluoroethylene (PTFE)**

thermoplastic material used for its low coefficient of friction



**3.1.7****sliding materials**

materials which form sliding surfaces

**3.1.8****sliding surface**

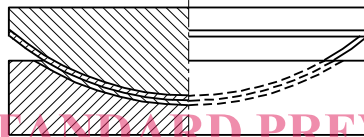
combination of a pair of flat or curved surfaces of different materials which allow relative displacements

**3.1.9****spherical PTFE bearing**

bearing consisting of a backing plate with a convex spherical surface (rotational element) and a backing plate with a concave spherical surface between which a PTFE sheet and the mating material form a curved sliding surface (see Figure 3)

Spherical PTFE bearings are also used in combination with flat sliding elements and guides to form free and guided bearings (see Figures 4 a) to 4 c)). Spherical PTFE bearings combined with a flat sliding element can be used together with a restraining ring to form fixed bearings (see Figure 4 d))

NOTE 1 Numbers in brackets in Figures 3 and 4 refer to the examples shown in Figure 1 of EN 1337-1:2000.

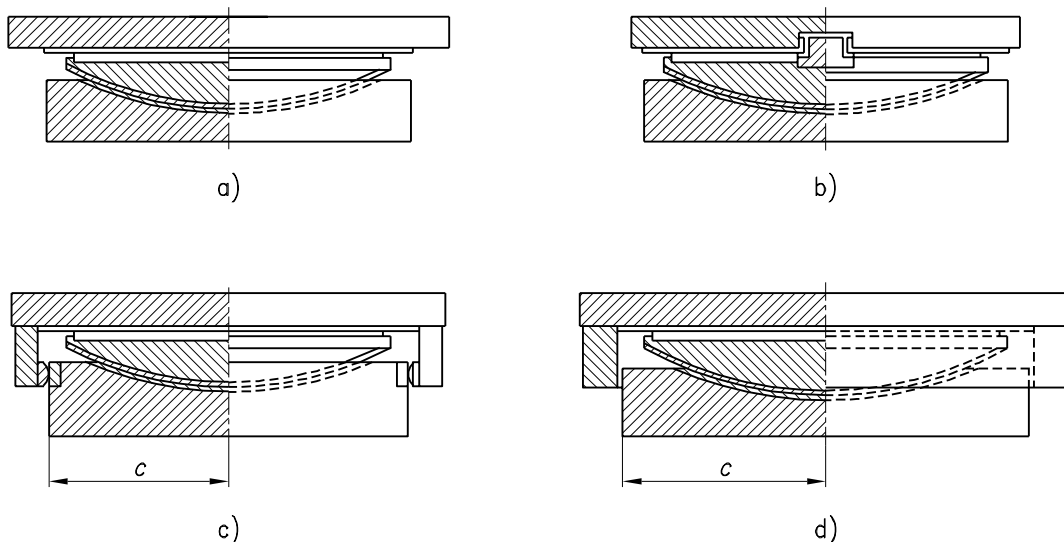


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NOTE 2 Fixed by sliding surface (3.2).

**Figure 3 — Spherical PTFE bearing**

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**Key**

- a) Free for displacements in any direction (3.5)
- b) Guided by an internal guide for displacements in one direction (3.4)
- c) Guided by external guides for displacements in one direction (3.3)
- d) Fixed by a restraining ring (3.1)

**Figure 4 — Spherical PTFE bearings combined with flat sliding elements**

3.2 Symbols

The most frequently occurring symbols are defined below. Those that are local, and unique to a particular clause, are defined at their first appearance.

3.2.1 Latin upper case letters

- A contact area of sliding surface; projected area of the curved sliding surface mm<sup>2</sup>
- L diameter or diagonal of the projected area of the PTFE sheet ..... mm

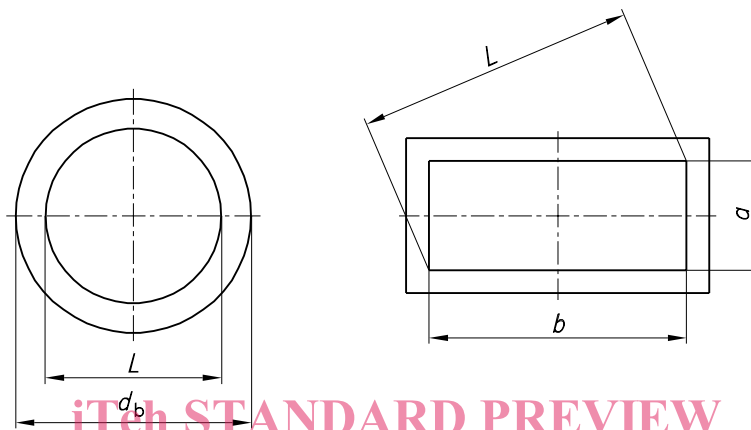


Figure 5 — Plan dimensions of spherical and cylindrical bearings

- N axial or normal force ..... N; kN
- V lateral or shear force ..... N; kN

3.2.2 Latin lower case letters

- a minor side of the projection in plan of cylindrical PTFE surfaces ..... mm
- b major side of the projection in plan of cylindrical PTFE surfaces;  
distance from the projected area of the curved sliding surface ..... mm
- c dimension ..... mm
- d diameter ..... mm
- e eccentricity ..... mm
- f nominal compressive strength ..... N/mm<sup>2</sup>
- h protrusion of PTFE sheet from its recess ..... mm
- r radius of curvature ..... mm
- t thickness ..... mm
- x longitudinal axis
- y transverse axis
- z axis normal to the principal bearing surface

3.2.3 Greek letters

- $\alpha$  rotation angle ..... radians

$\beta$	deviation angle from vertical axis of the line of action of the applied load .....	degrees, radians
$\Delta z$	maximum deviation of plane or curved sliding surfaces from theoretical surface .....	mm
$\theta$	half included angle of PTFE curved surfaces .....	degrees, radians
$\lambda$	ratio, coefficient	
$\mu$	coefficient of friction	
$\sigma$	normal pressure .....	N/mm <sup>2</sup>

### 3.2.4 Subscripts

b	backing plate
d	design value
min	minimum
p	PTFE
S	internal forces and moments from actions
t	total

### 3.3 Abbreviations

PTFE	Polytetrafluoroethylene
NDP	Nationally Determined Parameters

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## 4 Requirements

<https://standards.iteh.ai/catalog/standards/sist/ad8f4bbd-17b0-4bba-9981-6ea483e9d621/sist-en-1337-7-2004>

### 4.1 General

Cylindrical PTFE bearings shall permit rotational movements about one axis, spherical PTFE bearings about any axis. They shall be capable of transferring specified forces between superstructure and substructure.

### 4.2 Requirements for load bearing capacity

The curved PTFE sheet shall meet the requirements given in 6.2.1 to 6.2.3 and the backing plate with concave surface those given in 6.3.3.

### 4.3 Requirements for rotation capability

The sliding surfaces shall meet the requirements given in 6.2.4 and clause 4 of EN 1337-2:2004.

## 5 Material properties

The materials to be used and the properties to be verified shall be in accordance with clause 5 of EN 1337-2:2004.

## 6 Design requirements

NOTE This clause gives requirements for the design of components which are specific to spherical and cylindrical bearings and which are in addition to those given in clause 6 of EN 1337-2:2004.