BRITISH STANDARD

BS EN
1337-7:2004

Structural bearings —

Part 7: Spherical and cylindrical PTFE bearings

The European Standard EN 1337-7:2004 has the status of a British Standard

ICS 91.010.30

BSI
British Standards

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 1337-7:2004. It supersedes BS EN 1337-7:2001 which is withdrawn. It partially supersedes BS 5400-9-1:1983 and BS 5400-9-2:1983 which will remain current until the remaining parts of the BS EN 1337 series have been published, the last part being Part 8.

The UK participation in its preparation was entrusted to Technical Committee B/522, Structural bearings.

A list of organizations represented on B/522 can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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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.

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Contents

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of an identical text or by endorsement, at the latest by September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.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

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 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°C.

An extension down to –40°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.

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 $2\theta > 60°$ and $2\theta > 75°$ 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).

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

EN 1337–2:2004, *Structural bearings - Part 2: Sliding elements*

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

3 Terms and definitions, symbols and abbreviations

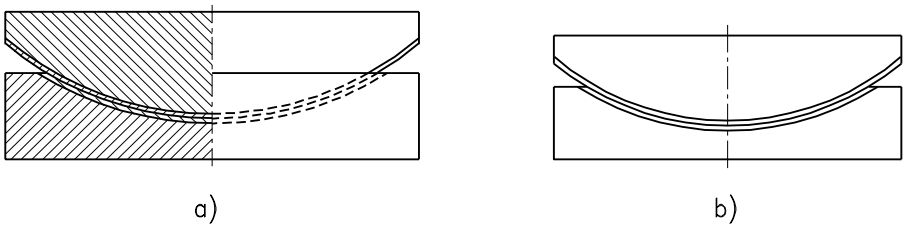
3.1 Terms and definitions

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)

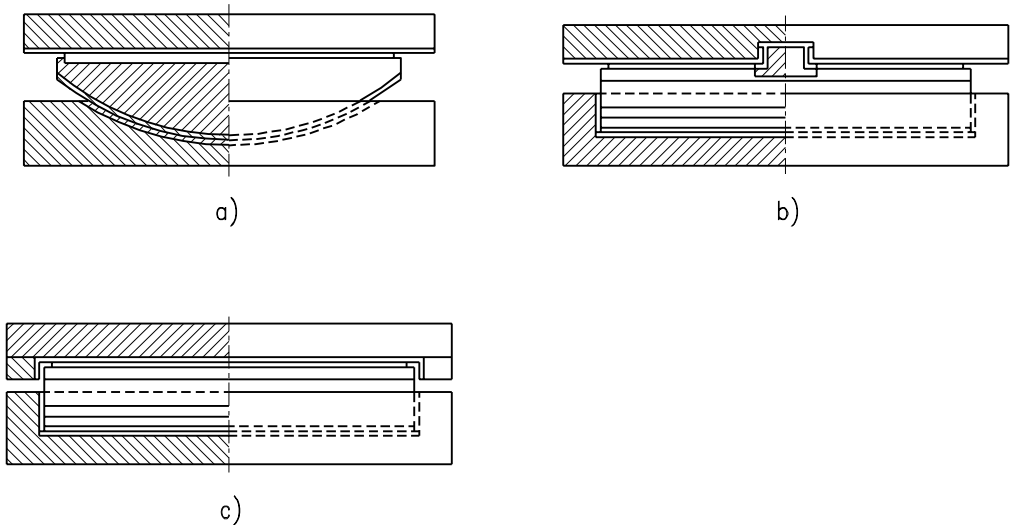
NOTE Numbers in brackets in Figures 1 and 2 refer to the examples shown in Figure 1 of EN 1337-1:2000.



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

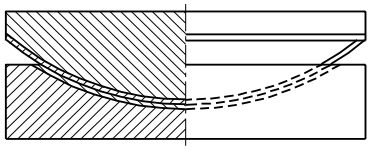
3.1.7
sliding materials
materials which form sliding surfaces

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)

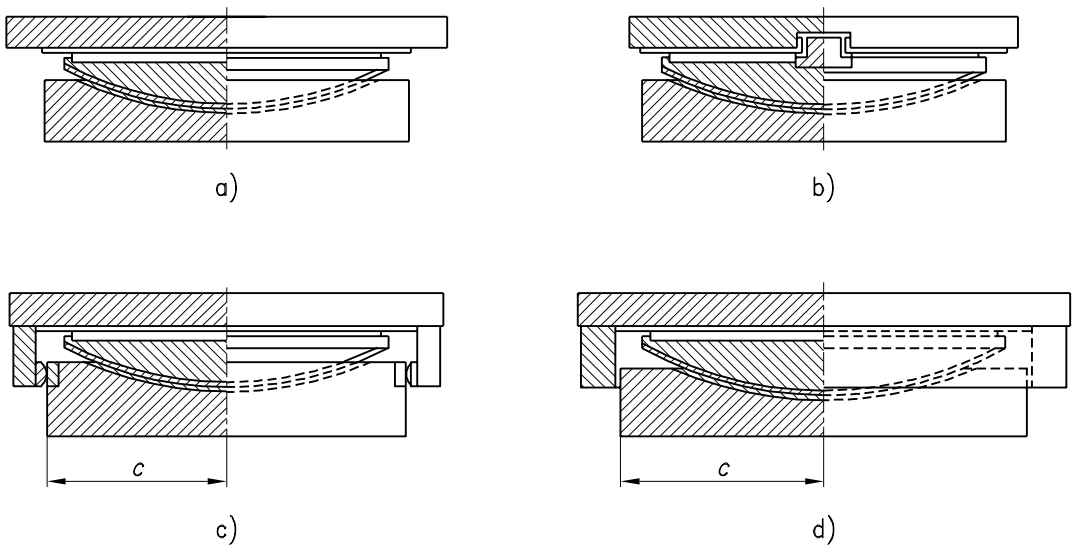
Spherical PTFE bearings are also used in combination with flat sliding elements and guides to form free and guided bearings (see Figures 4 a) to 4 c)). Spherical PTFE bearings combined with a flat sliding element can be used together with a restraining ring to form fixed bearings (see Figure 4 d))

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



NOTE 2 Fixed by sliding surface (3.2).

Figure 3 — Spherical PTFE bearing



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^2

L diameter or diagonal of the projected area of the PTFE sheet ..... mm

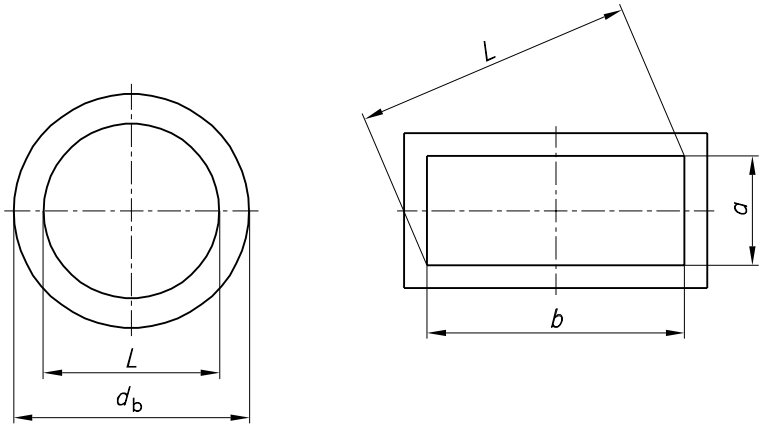


Figure 5 — Plan dimensions of spherical and cylindrical bearings

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 cyclindrical 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^2

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

α rotation angle..... radians

β	deviation angle from vertical axis of the line of action of the applied load	degrees, radians
Δz	maximum deviation of plane or curved sliding surfaces from theoretical surface	mm
θ	half included angle of PTFE curved surfaces	degrees, radians
λ	ratio, coefficient	
μ	coefficient of friction	
σ	normal pressure	N/mm^2

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

4 Requirements

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.

6.1 Design principles

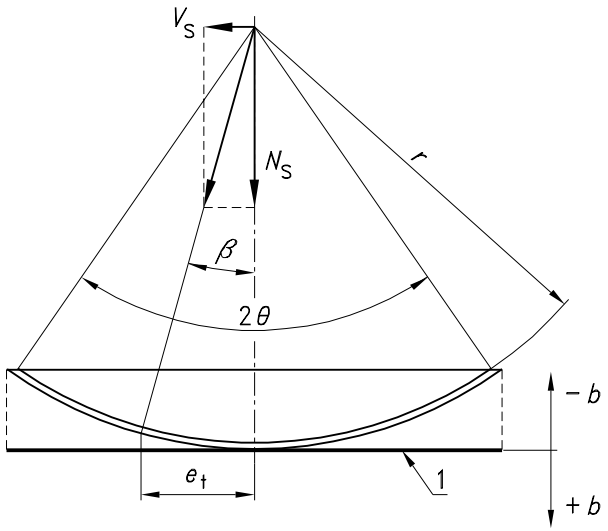
For design calculations the principles given in clause 5 of EN 1337-1:2000 shall be taken into account.

NOTE The design values of internal forces and moments as well as of movements should be available from a bearing schedule as shown in annex B of EN 1337-1:2000.

6.2 Design verification for curved sliding surfaces

6.2.1 General

For the purpose of verifications as per 6.2.2 and 6.2.3 the curved sliding surface shall be replaced by its projection on a plane surface as shown in Figure 6.



Key

1 Projected area

Figure 6 — Verification scheme for the curved sliding surface (example)

Internal forces and moments acting on the curved sliding surface due to frictional resistance, externally applied horizontal loads and the rotated condition of the bearing shall be taken into account when determining the resulting total eccentricity e_t of the axial force N_S.

Secondary effects due to the action of the restraints shall also be considered.

NOTE In annex A of this standard, formulae are given for the evaluation of the eccentricities in the most common cases.

The frictional resistance shall be determined using the coefficients of friction given in Table 11 of EN 1337-2:2004.

6.2.2 Separation of sliding surfaces

NOTE Separation of the sliding surfaces may lead to wear due to contamination and increased deformation due to lack of confinement. As this could endanger long term fitness for use, the condition $\sigma_p = 0$ is considered as serviceability limit state.

It shall be verified that $\sigma_p \geq 0$ under the characteristic combination of actions. In doing so the sliding material shall be assumed to be linear elastic and the backing plates shall be deemed to be rigid. The condition $\sigma_p \geq 0$ is satisfied when the total eccentricity e_t falls within the kernel of the projected area.

For spherical bearings this condition is satisfied when:

$$e_t \leq \frac{L}{8} \qquad (1)$$

Dimension L is shown in Figure 5.

6.2.3 Compressive stress verification

NOTE 1 Excessive pressure may cause loss of the sliding function and this may lead to structural failure or states close to structural failure. Therefore this condition is considered as ultimate limit state.

The following conditions shall be verified under a fundamental combination of actions:

$$N_{Sd} \leq \frac{f_k}{\gamma_m} \times A_r \qquad (2)$$

where

N_{Sd} is the design axial force at ultimate limit state
f_k characteristic value of compressive strength for PTFE sheets (see Table 10 of EN 1337-2:2004)
A_r is the reduced contact area of the curved sliding surface

NOTE 2 The γ_m value should be given in NDP. Recommended value is $\gamma_m = 1,4$ (see clause 6.8.3 of EN 1337-2:2004).

The reduced area A_r is given by the formula:

$A_r = \lambda \times A$

where

A is the area of the projected curved sliding surface (see Figure 6)
λ is a coefficient given in annex B

6.2.4 Rotation capability

Under the fundamental combination of actions it shall be shown that

— the metallic surfacing mating with the PTFE material is so proportioned that it completely covers the PTFE sheet,

— there is no contact between the upper and the lower part of the bearing or any other metallic component (see EN 1337-1:2000, annex A).

For the verification of the above conditions the increase of rotation, specified in clause 5.4 of EN 1337-1:2000, shall be taken into account.

6.3 Design details

6.3.1 General

For basic design features clause 7 of EN 1337-1:2000 applies.

The permissible material combinations of curved sliding surfaces are given in Table 9 of EN 1337-2:2004.

6.3.2 Curved PTFE sheet

The curved PTFE sheet may be attached to either the convex or the concave backing plate.

The design details of curved PTFE sheet shall be in accordance with 6.2.1 of EN 1337-2:2004.

6.3.3 Backing plates with concave surfaces

For cylindrical and spherical bearings, backing plates with concave surfaces shall be verified in accordance with 6.9 of EN 1337-2:2004.

Dimensional limitations of backing plates with concave surfaces are shown in Figure 7.

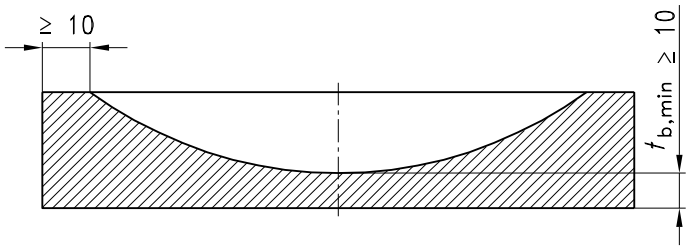


Figure 7 — Dimensional limitations of a backing plate with a concave surface.

6.3.4 Restraining ring

Free spherical bearings (see Figure 4 a)) may be fixed by a steel restraining ring as shown in Figure 4 d).

For design and verification, the design rules for pot and piston of pot bearings given in clause 6 of prEN 1337-5:1996 shall be followed.

7 Manufacturing, assembly and tolerances

Requirements for flat and curved sliding surfaces are given in clause 7 of EN 1337-2:2004.

Protrusion “h” of curved PTFE sheets shall be measured as shown in Figure 2 of EN 1337-2:2004.

8 Conformity evaluation

Conformity to this Part shall be demonstrated in accordance with relevant subclauses of clause 8 of EN 1337-2:2004. The given systems of attestation of conformity (see ZA.2) are also valid for non-serial productions.

Annex A
(informative)

Method for calculating the eccentricities in spherical and cylindrical PTFE bearings

A.1 General

Frictional forces, forces from applied horizontal loads and the rotated condition of the bearing produce eccentricity of the axial force N_S, which is used in the verification of PTFE sheets, the adjacent structural members and the anchoring devices.

This annex gives methods for calculating the significant eccentricities.

Depending on the design features of a particular bearing, additional eccentricities may exist.

When several eccentricities occur in a cross-section under consideration, they need to be added.

A.2 Friction resistance

A.2.1 Curved sliding surfaces

In the presence of rotational movements, in both cylindrical and spherical bearings, an internal moment occurs due to the frictional resistance.

Regardless of whether the bearing has one or two surfaces, the associated eccentricity e_1 is:

$$e_1 = \mu_{max} \times r \qquad (A.1)$$

The coefficient of friction μ_{max} is given in Table 11 of EN 1337-2:2004.

A.2.2 Sliding surfaces with external guides and restraining rings

For the spherical bearings of the type shown in Figures 4 c) and 4 d), rotational movements produce an eccentricity which affects only the adjacent structural members (i.e. plinth, beam etc) and the anchoring devices, where:

$$e_2 = \frac{V_s}{N_s} \times \text{ì}_{max} \times c \qquad (A.2)$$

For the bearing of the type shown in Figure 4 c), the coefficient of friction μ_{max} is given in 6.7 of EN 1337-2:2004.

For the bearing of type shown in Figure 4 d), μ_{max} should be assumed to be 1,0.

A.3 Rotation

In all the types of bearings with two sliding surfaces as in Figures 2 a), b), c) and 4 a) b), c), d), a rotation angle α produces an eccentricity e_3 of the vertical load on the curved surface equal to:

$$e_3 = \alpha \times (r + b) \qquad \text{(A.3)}$$

where

b represents the distance between the cross-section under consideration and the sliding surface (see Figure 6).

At any rate, this eccentricity acts nonetheless in the opposite direction to that given under A.2.

The occurrence of e_3 depends on whether the curved PTFE sheet is either attached to the convex or concave backing plate and whether the value α is greater or lesser than μ as well as on whether the bearing clearance is performing its function effectively in the case of guided bearings.

Because of the uncertainty concerning the actual values of α and μ as well as the effect bearing clearance can entail, it is suggested that e_3 should in any case be taken into account since a precise analysis cannot be carried out.

In the type of bearings equipped with only one sliding surface as the ones shown in Figures 1 and 3, e_3 occurs only in the curved PTFE sheet and, furthermore, only when said sheet is attached to the convex backing plate.

A.4 Lateral forces

Lateral forces result from horizontal actions and the friction resistance of the other bearings in the structure.

In bearings where lateral forces are transmitted by guides or restraining rings, the eccentricity in the curved sliding surface is equal to zero.

In bearings of the fixed type with only one sliding surface as in Figures 1 and 3 and in the guided spherical bearing as in Figure 4 b), the horizontal load V_s produces an eccentricity given by (see Figure 6):

$$e_4 = \frac{V_S}{N_S} \times (r + b) \qquad \text{(A.4)}$$

In all cases where the lines of application of lateral action and reaction are not coincident (see e.g. Figure 2 b)) the resulting couple causes an eccentricity that shall be additionally taken into account.

Annex B
(informative)

Reduced area for curved sliding surfaces

B.1 General

This annex gives the values of the coefficient λ used in 6.2.3 for the calculation of the reduced area A_r of curved sliding surfaces.

B.2 Modelling assumptions

The values of the coefficient λ have been calculated by means of a mathematical model made with the following assumptions:

1) only compressive stresses are transmitted;

2) the stresses in the compressed area are constant and equal to the design value f_d of compressive resistance of PTFE sheets (i.e. the stress block theory is adopted);

3) stresses are always normal to the contact surface: a conservative hypothesis justified by the low coefficient of friction of PTFE in contact with polished metal surfaces;

4) both concave and convex backing plates are perfectly rigid; a conservative hypothesis justified by the fact that steel's elastic modulus is at least 5 000 times greater than that of PTFE.

Table B.1 - Coefficient λ for spherical bearings

θ / e/L	30°	25°	20°	10°
0,00	1,000	1,000	1,000	1,000
0,01	0,982	0,981	0,980	0,979
0,02	0,962	0,961	0,960	0,958
0,03	0,942	0,940	0,938	0,936
0,04	0,922	0,919	0,916	0,913
0,05	0,901	0,898	0,894	0,890
0,06	0,880	0,876	0,872	0,867
0,07	0,858	0,853	0,849	0,844
0,08	0,836	0,831	0,826	0,820
0,09	0,814	0,808	0,803	0,796
0,10	0,792	0,786	0,780	0,773
0,11	0,770	0,763	0,757	0,749
0,12	0,747	0,740	0,733	0,724
0,13	0,725	0,717	0,710	0,700
0,14	0,702	0,693	0,686	0,676
0,15	0,680	0,670	0,663	0,653
0,16	0,657	0,647	0,639	0,628
0,17	0,635	0,624	0,616	0,604
0,18	0,612	0,601	0,592	0,581
0,19	0,590	0,578	0,569	0,557
0,20	0,567	0,556	0,546	0,533
0,21	0,545	0,533	0,523	0,510
0,22	0,523	0,511	0,500	
0,23	0,501			
0,24				
0,25				

NOTE Intermediate values may be obtained by linear interpolation.

Table B.2 - Coefficient λ for cylindrical bearings

e/L \ θ	37,5°	30°	20°	10°
0,00	1,000	1,000	1,000	1,000
0,01	0,984	0,983	0,981	0,980
0,02	0,968	0,965	0,962	0,961
0,03	0,951	0,947	0,943	0,941
0,04	0,934	0,929	0,924	0,921
0,05	0,917	0,911	0,905	0,901
0,06	0,900	0,893	0,886	0,881
0,07	0,882	0,874	0,866	0,862
0,08	0,864	0,855	0,847	0,842
0,09	0,846	0,837	0,827	0,822
0,10	0,828	0,818	0,808	0,802
0,11	0,809	0,799	0,788	0,782
0,12	0,790	0,779	0,768	0,762
0,13	0,771	0,760	0,749	0,742
0,14	0,752	0,740	0,729	0,722
0,15	0,733	0,721	0,709	0,702
0,16	0,713	0,701	0,689	0,682
0,17	0,693	0,681	0,669	0,662
0,18	0,673	0,661	0,649	0,642
0,19	0,653	0,641	0,629	0,622
0,20	0,633	0,621	0,609	0,602
0,21	0,612	0,600	0,589	0,582
0,22	0,592	0,580	0,569	0,562
0,23	0,571	0,559	0,548	0,542
0,24	0,550	0,539	0,528	0,522
0,25	0,529	0,518	0,508	0,502

NOTE Intermediate values may be obtained by linear interpolation.

Annex ZA
(informative)

Provisions for the CE marking of cylindrical and spherical PTFE bearings (with or without flat sliding elements) under the EU Construction Products Directive

ZA.1 Clauses of this European Standard addressing the essential characteristics of the EU Construction products Directive

This European Standard has been prepared under a mandate[1] given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard, shown in the Table ZA.1 below, meet the requirements of the mandate given under EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this European Standard and intended uses given below.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the structural bearings within the scope of this annex.

Note:
In addition to any specific clauses relating to dangerous substances contained in this Standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply. An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (CREATE, accesses through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

Tables ZA.1 - Scope and relevant clauses

Table ZA.1.a

Construction Products:	Cylindrical and spherical PTFE bearings (Figures 1 and 3) covered by the scope of this standard
Intended uses:	In buildings and civil engineering works

Requirements	Requirement clause(s) in this and other European Standard(s):	Mandated level(s) or class(es):	Notes:
Load bearing capacity	EN 1337-7, 4.2 , 5, 6.2.1, 6.2.2, 6.2.3, 6.3.2, 6.3.3, 6.3.4, 7	None	Design value, in kN
Rotation capability	EN 1337-7, 4.3, 5, 6.2.4, 6.3.1, 7	None	Design value, in radians
Durability aspects	EN 1337-7, clause 7 EN 1337-9, clause 4	None	

[1] M/104 "Structural bearings" as amended by M/T32 (anti-seismic devices are covered by CEN/TC 340)

Table ZA.1.b

Construction Products:	Cylindrical and spherical PTFE bearings combined with flat sliding elements (Figures 2 and 4) covered by the scope of this standard
Intended uses:	In buildings and civil engineering works

Requirements	Requirement clause(s) in this and other European Standard(s):	Mandated level(s) or class(es):	Notes:
Load bearing capacity	EN 1337-7, 4.2, 5, 6.2.1, 6.2.2, 6.2.3, 6.3.2, 6.3.3, 6.3.4, 7	None	Design value, in kN
Rotation capability	EN 1337-7, 4.3, 5, 6.2.4, 6.3.1, 7	None	Design value, in radians
Durability aspects	EN 1337-7, clause 7 EN 1337-9, clause 4	None	
Load bearing capacity (of sliding element)	EN 1337-2:2004, 5, 6.2, 6.3, 6.4, 6.6, , 6.8, 6.9, 7.1, 7.2	None	Design value, in kN
Coefficient of friction (of sliding element)	EN 1337-2:2004, 4, 5, 6.1, 6.5, 6.7, 7.5	None	Tabulated value (Table 11)
Durability aspects (of sliding element)	EN 1337-2:2004, 7.3, 7.4 EN 1337-9, clause 4	None	

The requirement on a certain characteristic is not applicable to those Member States where there are no regulations for such characteristic. In this case, manufacturers willing to place their products in the market of these Member States are not obliged to determine nor to declare the performance of their products with regard to this characteristic and the option "no performance determined" in the information accompanying the CE mark (see ZA.3) may be used.

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level.

ZA.2 Procedures for attestation of conformity

a) For the products and intended uses listed in Table ZA.1.a) and ZA.1.b) in accordance with the European Commission Decision 95/467/EC of 24/10/1995 the systems of attestation of conformity are the following:

Table ZA.2 - Attestation of conformity systems

Product	Intended use(s)	Level(s) or class(es)	Attestation of conformity systems
Structural bearings	In buildings and civil engineering works where requirements on individual bearings are critical [a]	None	1
	In buildings and civil engineering works where requirements on individual bearings are not critical [b]		3
System 1: See annex III.2.(i), without audit testing of samples System 3: See annex III.2.(ii), second possibility			
[a] Critical in the sense that those requirements may, in case of failure of the bearing, put the works or parts thereof in states beyond those regarded as serviceability and ultimate limit states. [b] Not critical in the sense that those requirements may not, in case of failure of the bearing and under normal circumstances, put the works or parts thereof in states beyond those regarded as serviceability and ultimate limit states.			

b) The evaluation of conformity of cylindrical and spherical PTFE bearings; within the given systems of attestation of conformity shall be based on evaluation of conformity clauses of clause 8 of EN 1337-7 indicated in Tables ZA.3.a) and ZA.3.b)

Table ZA.3.a) - Assignation of tasks for the attestation of conformity of cylindrical and spherical PTFE bearings intended to be subject to critical requirements

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.3, 8.3, 8.4 of EN 1337-2:2004)
	Further testing of samples taken at factory, where relevant	All characteristics of Table ZA.1 a)	EN 1337-7, clause 8 (only 8.2.1, 8.4 of EN 1337-2:2004)
Tasks for the notified body	Initial type testing	All characteristics of Table ZA.1 a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.2, 8.4 of EN 1337-2:2004)
	Initial inspection of factory and of F.P.C	Parameters related to all characteristics of Table ZA.1 a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.3 of EN 1337-2:2004)
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all characteristics of Table ZA.1 a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.3, 8.3, 8.4 of EN 1337-2:2004)

Table ZA.3.b) - Assignation of tasks for the attestation of conformity of cylindrical and spherical PTFE bearings intended to be subject to non critical requirements

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1.a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.3, 8.3, 8.4 of EN 1337-2:2004)
Tasks for the notified body	Initial type testing	All characteristics of Table ZA.1.a)	EN 1337-7, clause 8 (only 8.2.1, 8.2.2, 8.4 of EN 1337-2:2004)

c) The evaluation of conformity of cylindrical and spherical PTFE bearings with flat sliding elements within the given systems of attestation of conformity shall be based on the evaluation of conformity clauses of chapter 8 of EN 1337-7 and EN 1337-2:2004 indicated in Tables ZA.3.c) and ZA.3.d)

Table ZA.3.c) - Assignation of tasks for the attestation of conformity of cylindrical and spherical PTFE bearings combined with flat sliding elements intended to be subject to critical requirements

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.2.3, 8.3, 8.4
	Further testing of samples taken at factory, where relevant	All characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.4
Tasks for the notified body	Initial type testing	All characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, clauses 8.2.1, 8.2.2, 8.4
	Initial inspection of factory and of F.P.C	Parameters related to all characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.2.3, 8.3, 8.4
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.2.3, 8.3, 8.4

Table ZA.3.d) - Assignation of tasks for the attestation of conformity of cylindrical and spherical PTFE bearings combined with flat sliding elements intended to be subject to non critical requirements

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.2.3, 8.3, 8.4
Tasks for the notified body	Initial type testing	All characteristics of Table ZA.1 b)	EN 1337-7, clause 8 as in/and EN 1337-2:2004, 8.2.1, 8.2.2, 8.4

d) EC Certificate and declaration of conformity

When compliance with the system of attestation of conformity is achieved:

a) for bearings under system 1, the certification body shall draw up a certificate of conformity (EC Certificate of conformity) with the information indicated below. This EC Certificate of conformity entitles the manufacturer to affix the CE marking, as described in ZA.3.

The EC Certificate of conformity shall include the following information:

- Name, address and identification number of certification body,
- Name and address of the manufacturer, or his authorised representative established in the EEA and place of production,
- Description of the product (type, identification, use,...),
- Provisions to which the product conforms (e.g. annex ZA of EN 1337-7),
- Particular conditions applicable to the use of the product (e.g. provisions for the use of a bearing under certain conditions, etc),
- The certificate's number,
- Conditions and period of validity of the certificate,
- Name of, and position held by, the person empowered to sign the certificate.

In addition, for each product covered by an EC Certificate of conformity, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following information:

- Name and address of the manufacturer, or his authorised representative established in the EEA,
- Number of the attached Certificate of factory production control,
- Name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

Both documents shall be presented in the official language or languages of the Member State of the EU in which the product is to be used.

b) For bearings under system 3, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following information:

- Name and address of the manufacturer, or his authorised representative established in the EEA and place of production,
- Description of the product (type, identification, use,...),
- Provisions to which the product conforms (e.g. annex ZA of EN 1337-7),
- Particular conditions applicable to the use of the product (e.g. provisions for the use of a bearing under certain conditions, etc),
- Name and address of the approved laboratory that carried out the initial type tests,
- Name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

This EC Declaration of conformity entitles the manufacturer to affix the CE marking, as described in ZA.3.

This document shall be presented in the official language or languages of the Member State of the EEA in which the product is to be used.

ZA.3 CE marking

Regardless of the requirements stated in 7.3 of EN 1337-1:2000, the CE mark, the identification number of the certification body and the name or identifying mark and registered address of the manufacturer should be affixed on the bearing so that it will be visible throughout the life of the bearing. The full information given below should be in the relevant accompanying documents.

The CE conformity mark, consists exclusively of the letters “CE” in the specified form of the Directive 93/68/EC and the identification number of the notified body, where relevant.

CE marking for structural bearing products shall be accompanied by the information shown below:

- Identification number of the certification body (only for products under system 1);

- Name or identifying mark of the producer;

- Registered address of the producer;

- The last two digits of the year in which the marking is affixed;

- Number of the EC Certificate of conformity (only for products under system 1);

- Reference to this European Standard;

- Description of the product: generic name, material, dimensions,.. and intended use;

- Declaration of characteristics related to the mandated requirements;

- Values and, where relevant, level or class to declare for each mandated characteristic as indicated in "Notes" in Table ZA.1.

As an alternative, where possible, standard designation may be given. This designation should give information on all the characteristics, if all are not covered, then values for those not covered shall be additionally given.

As example, for cylindrical and spherical PTFE bearings combined with flat sliding elements under system 1, the following information shall accompany the CE marking symbol:

CE **0123-CPD-0001**	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.* *Identification number of the certification body*
Any Co Ltd, PO Box 21, B-1050 **00** **0123-CPD-0456** **EN 1337-7:2004** Cylindrical PTFE bearing combined with flat sliding element / Spherical PTFE bearing combined with flat sliding element, for minimum operating temperature of -35^{O}C, for uses in buildings and civil engineering works where requirements on individual bearings are critical BEARING Characteristic load bearing capacity, in kN Characteristic rotation capability, in radians Durability, conforming SLIDING ELEMENT Characteristic load bearing capacity, in kN Coefficient of friction, conforming Durability, conforming	*Name or identifying mark and registered address of the manufacturer* *The last two digits of the year in which the marking was affixed* *Number of the EC certificate of conformity* *No. of European Standard* *Identification of product and intended use* *And* *Information on mandated characteristics*

As example, for cylindrical and spherical PTFE bearings under system 3, the following information shall accompany the CE marking symbol:

CE	*CE conformity marking, consisting of the "CE"-symbol given in directive 93/68/EEC.*
Any Co Ltd, PO Box 21, B-1050	*Name or identifying mark and registered address of the manufacturer*
00	*The last two digits of the year in which the marking was affixed*
EN 1337-7:2004	*No. of European Standard*
Cylindrical PTFE bearing / Spherical PTFE bearing, for minimum operating temperature of -35°C, for uses in buildings and civil engineering works where requirements on individual bearings are not critical BEARING Characteristic load bearing capacity, in kN Characteristic rotation capability, in radians Durability, conforming	*Identification of product and intended use* *And* *Information on mandated characteristics*

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation. Note: European legislation without national derogations need not be mentioned.

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