



# FINAL DRAFT International Standard

## ISO/FDIS 4385

### Plain bearings — Compression testing of bearing materials

*Paliers lisses — Essai de compression des matériaux paliers*

ISO/TC 123/SC 2

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions*.

This second edition cancels and replaces the first edition (ISO 4385:1981), which has been technically revised.

The main changes compared to the previous edition are as follows:

- change of scope;
- restructure of the document;
- implementation of [Clause 2](#);
- revision of [Clause 3](#), Terms and definition;
- implementation of [Clause 4](#);
- revision of [Clause 4](#) and [5](#), and implementation of [Figures 1, 2, 3, 4, 5](#) and [6](#);
- revision of [Clause 6](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Plain bearings — Compression testing of bearing materials

## 1 Scope

This document specifies a method for compression testing of bearing materials. It is applicable for both bulk materials and coatings.

Compression testing within the meaning of this document serves for the determination of the behaviour of bearing materials under uniaxial compression loading which is uniformly distributed over the cross-section. For this purpose, a cylindrical specimen or a setup of two such specimen, with an original cross-section,  $A_0$ , is loaded at constant crosshead speed and the resulting compressive stress and compressive strain are recorded.

## 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 last edition of the referenced document (including any amendments) applies.

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 9513, *Metallic materials — Calibration of extensometer systems used in uniaxial testing*

ISO 21920-1, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 1: Indication of surface texture*

ISO 21920-2, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 2: Terms, definitions and surface texture parameters*

## 3 Terms and definitions

No terms and definition are listed in this document.

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

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

## 4 Symbols

For the purposes of this document, the symbols and definitions as listed in [Table 1](#) apply.

Table 1 — Symbols description and units

Symbol	Description	Unit
$A_0$	Original cross-sectional area of a specimen prior to loading. $A_0$ is calculated using the original diameter as $A_0 = \pi/4 \cdot d_0^2$ .	mm <sup>2</sup>
$A_u$	Final cross-sectional area of a specimen after loading. $A_u$ is calculated using the final diameter as $A_u = \pi/4 \cdot d_u^2$ .	mm <sup>2</sup>
$d_0$	Original diameter, diameter of a compression specimen prior loading, calculated as the mean of two measurements taken at the specimen centre at right angles to each other. NOTE The original cross-sectional area of the specimen prior to loading, $A_0$ , is calculated using this diameter ( $A_0 = \pi/4 \cdot d_0^2$ ).	mm
$d_u$	Final diameter, diameter of a compression specimen after loading, calculated as the mean of two measurements taken at the axial specimen centre at right angles to each other. NOTE The final cross-sectional area of the specimen, $A_u$ , is calculated using this diameter ( $A_u = \pi/4 \cdot d_u^2$ ).	mm
$d_s$	Compression plate diameter	mm
$E_b$	Elastic modulus of specimen base material	MPa
$e_c$	Compressive strain; percentage change in gauge length ( $L_e$ or $L_0$ ) as given in Formulae (1) and (2):  $e_c = \frac{\Delta L_e}{L_e} \cdot 100 \quad \text{(determined directly at the specimen using an extensometer)} \quad (1)$ or $e_c = \frac{\Delta L_0}{L_0} \cdot 100 \quad \text{(determined via displacement of the compression dies)} \quad (2)$ NOTE The compressive strain $e_c$ is the sum of elastic and plastic strain.	%
$e_{ce}$	Elastic compressive strain of the original gauge length section; reversible component of compressive strain	%
$e_{c\text{ eff}}$	Calculated change rate of strain	%
$e_{cF}$	Compressive strain at fracture, percentage change in gauge length ( $L_e$ or $L_0$ ) at fracture of the specimen, as given in Formulae (3) and (4):  $e_{cB} = \frac{\Delta L_{eF}}{L_e} \cdot 100 \quad \text{(determined directly at the specimen using an extensometer)} \quad (3)$ or $e_{cF} = \frac{\Delta L_{0F}}{L_0} \cdot 100 \quad \text{(determined via the displacement of the compression dies)} \quad (4)$	%
$e_{cp}$	Plastic compressive strain of the original gauge length section, total compressive strain minus the elastic component at any moment of the test	%
$\dot{e}_c$	Change rate of strain along gauge length $L_e$ or $L_0$	s <sup>-1</sup>
$f_m$	Sampling frequency	Hz
$F_c$	Compressive force at any moment of the test	N
$h_0$	Height of a specimen prior loading	mm
$L$	Original gauge length on which strain measurements are based	mm
$L_e$	Base gauge length for the extensometer used for continuously measuring the change in length of the specimen during the test, as measured directly at the specimen.	mm
$L_0$	Initial length of the specimen prior loading $L_0 = h_0$ , for non coated specimen $L_0 = 2 \cdot h_0$ , for coated specimen Is only applicable, if the measurement is carried out without a measurement gauge	mm
$\Delta L$	Change in gauge length due to specimen loading	mm
$\Delta L_e$	Change in extensometer gauge length, change in $L_e$ at any moment during the extensometer test, as measured directly at the specimen	mm