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Plain bearings — Tolerances —

Part 1: Fits

Paliers lisses — Tolérances —

Partie 1: Ajustements

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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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 3, *Dimensions, tolerances and construction details*.

This second edition cancels and replaces the first edition (ISO 12129-1:1995), which has been technically revised. The main changes compared to the previous edition are as follows:

— the title has been improved;

— normative references have been updated;

— Table 1 has been corrected;

— Table 2 has been added.

A list of all parts in the ISO 12129 series can be found on the ISO website.

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.

Introduction

This document has been established because it is not possible to use the ISO deviations given in ISO 286-1 and ISO 286-2 to develop clearance fits which correspond to the requirements of plain bearing engineering for approximately uniform mean relative bearing clearances for all nominal size ranges.

Plain bearings — Tolerances —

Part 1: Fits

1 Scope

This document specifies a system of fits applicable to metallic plain bearings used in general engineering for mean relative bearing clearances, ψ_m, of 0,56 ‰ up to 3,15 ‰. Other clearance ranges can be used depending upon the requirements in specific applications.

This system of fits is not applicable to half-bearings and bushes which, due to their special characteristics, are not measured by diameter but by wall thickness, and which are dimensionally changed on assembly. It is not applicable to profile bore or tilting pad bearings, or to cases where specific tolerances have been established by consideration of the bearing performance at both extremes of clearance.

This document is applicable preferably to rotating machine parts and shafting, but it can be used similarly in other ranges of application.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 System of fits

The system of fits specified in this document is a normal system of fits, in which the fundamental deviation H of the bearing bore diameter is in accordance with ISO 286-2. The tolerance interval of the shaft is correlated to correspond to the mean relative bearing clearance, ψ_m.

5 Mean relative bearing clearance

The mean relative bearing clearance, ψ_m, in per thousand (‰), of a range of nominal dimensions is given by Formula (1):

$$\psi_m = \frac{C_{D,m}}{D_m} \tag{1}$$

where $C_{D,m}$ is the mean absolute bearing diametral clearance, in micrometres.

$$C_{D,m} = \frac{C_{D,max} + C_{D,min}}{2} \tag{2}$$

where

$C_{D,max}$ is the maximum value of the absolute bearing diametral clearance;

$C_{D,min}$ is the minimum value of the absolute bearing diametral clearance;

D_m is the arithmetic mean of the range of nominal dimensions, in millimetres.

EXAMPLE

For the nominal dimension range from 250 mm to 280 mm, the arithmetic mean of the range of nominal dimensions is given by

$$D_m = \frac{250 + 280}{2}\text{mm} = 265\text{ mm}$$

For ψ_m = 1,6 ‰, Table 1 and Formula (2) lead then to the mean bearing diametral clearance

$$C_{D,m} = \frac{0,466 + 0,382}{2}\text{mm} = 0,424\text{ mm}$$

and to the mean relative bearing clearance

$$\psi_m = \frac{0,424}{265} = 1,6\text{ ‰}$$

6 Tolerance intervals

6.1 Tolerance

The tolerance is chosen so that, for a uniform mean relative bearing clearance, ψ_m, in each case from the minimum to the maximum range of nominal dimensions, an approximately uniform maximum deviation from the relative bearing clearance within a tolerance interval is not exceeded. The lower limit is dictated by economy and methods of production.

The tolerance interval of the shaft in each case is smaller by one IT grade (basic tolerance grade in accordance with ISO 286-1) than the tolerance interval of the correlated bearing bore.

6.2 Fundamental deviation

The fundamental deviation is determined by the mean relative bearing clearance, ψ_m.

6.3 Number

Each of the following values of ψ_m, in per thousand, corresponds to one tolerance interval:

— 0,56;

— 0,8;

— 1,12;

— 1,32;

— 1,6;

— 1,9;

— 2,24;

— 3,15.

6.4 Symbol

The symbol for the mean relative bearing clearance is ψ_m. If Greek letters are not available, the symbol C^* may be used instead of the Greek letter ψ.

7 Ranges of nominal dimensions

The ranges of nominal dimensions are more closely stepped than in ISO 286-2 so that the maximum deviation from the mean relative bearing clearance, ψ_m, can be more closely adhered to.

8 Limit deviations

The limit deviations for the shafts are given in Table 1.

9 Minimum and maximum clearances

The minimum and maximum clearances between the shaft and bearing bore, together with the limit deviations for the shaft which are required for the calculation of the plain bearings, are given in Table 1.

The corresponding tolerance intervals of the relative bearing clearance are given in Table 2.

10 Example

Shaft fit dimension 200 mm for a mean bearing clearance ψ_m = 1,12 ‰.

Preferred form:

$\emptyset\mathbf{200}_{\psi\ 1{,}12}$

Alternative form where Greek letters are not available:

$\emptyset\mathbf{200}_{C^*\ 1{,}12}$

Alternative form where subscripts are not available:

$\emptyset\mathbf{200}\ (C^*\ 1{,}12)$