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**Rolling bearings — Needle roller  
bearings with drawn cup and without  
inner ring — Boundary dimensions,  
geometrical product specifications  
(GPS) and tolerance values**

*Roulements — Douilles à aiguilles sans bague intérieure —  
Dimensions d'encombrement, spécification géométrique des produits  
(GPS) et valeurs de tolérance*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 4, *Rolling bearings*, Subcommittee SC 5, *Needle, cylindrical and spherical roller bearings*.

This fourth edition cancels and replaces the third edition (ISO 3245:2007), which has been technically revised with the following changes:

- implemented geometrical product specifications (GPS);
- included an informative annex on tolerances for shaft raceway and housing bore.

## Introduction

This International Standard is a machine element geometry standard as defined in the geometrical product specification system (GPS system) as presented in matrix model of ISO 14638.[9]

The fundamental rules of ISO/GPS given in ISO 8015[6] apply to this International Standard and the default decision rules given in ISO 14253-1[7] apply to specifications made in accordance with this International Standard, unless otherwise indicated.

The connection between functional requirements, measuring technique and measuring uncertainty is always intended to be considered. The traditionally used measuring technique is described in ISO 1132-2.[4] For measurement uncertainty, it is intended that ISO 14253-2[8] be considered.

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# Rolling bearings — Needle roller bearings with drawn cup and without inner ring — Boundary dimensions, geometrical product specifications (GPS) and tolerance values

## 1 Scope

This International Standard specifies the boundary dimensions and preferred dimensions to be used for drawn cup needle roller bearings without inner ring as well as the minimum chamfer dimension limits. Also specified are the closed end thickness dimensions for bearings with one closed end.

In addition, dimensional tolerances for the needle roller complement bore diameter and tolerances for the drawn cup width are specified.

Informative values for the tolerances for shaft raceway and housing bore are given in [Annex A](#).

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1132-1, *Rolling bearings — Tolerances — Part 1: Terms and definitions*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 10579, *Geometrical product specifications (GPS) — Dimensioning and tolerancing — Non-rigid parts*

ISO 14405-1, *Geometrical product specifications (GPS) — Dimensional tolerancing — Part 1: Linear sizes*

ISO 15241, *Rolling bearings — Symbols for physical quantities*

ISO/TS 17863, *Geometrical product specification (GPS) — Tolerancing of moveable assemblies*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1132-1, ISO 5593, ISO 14405-1 and the following apply.

### 3.1 constraint diameter

$D_{1c}$

diameter of the feature used in constraint condition to establish  $\Delta F_{ws}$  characteristics

Note 1 to entry: It corresponds to the diameter of the ring gauge in ISO 1132-2.<sup>[4]</sup>

## 4 Symbols

For the purposes of this document, the symbols given in ISO 15241 and the following apply.

Descriptions for symbols are in accordance to GPS terminology. The dimensional specifications are described in [Table 1](#) and [Figure 1](#).

Figure 1 presents the dimensioning associated to a needle roller bearing, using the symbols introduced in Table 1.

Tolerance value associated to a characteristic is symbolized by  $t$  followed by the symbol of characteristic, for example,  $t_{\Delta C_s}$ .

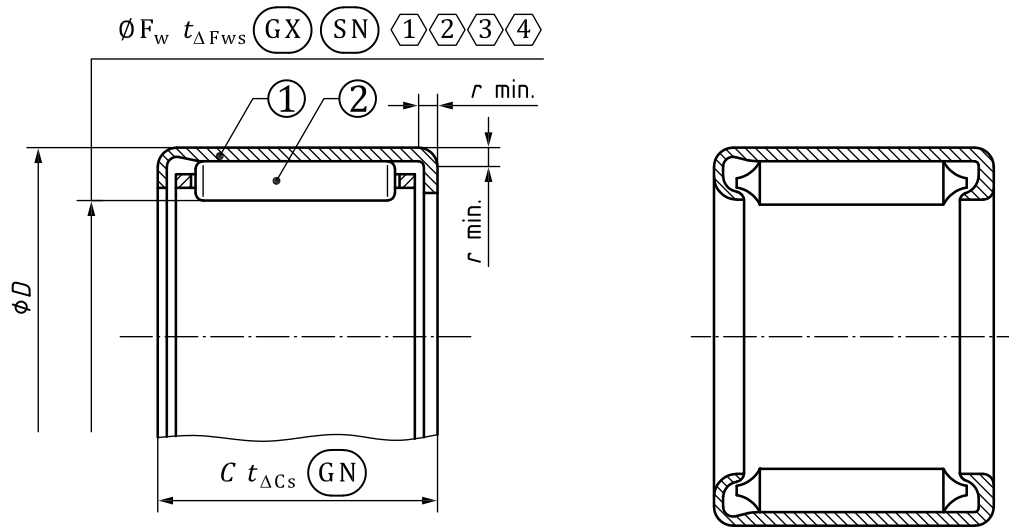
In this International Standard, the ISO default specification operator for size is according to ISO 14405-1; i.e. the two-point size is valid.

**Table 1 — Symbols for nominal dimensions, characteristics and specification modifiers**

Symbol for nominal size and distance <sup>a</sup>	Symbol for characteristic	Specification modifier <sup>b</sup>	Description
$C$			nominal drawn cup width
	$\Delta C_s$	(GN)	deviation of minimum circumscribed size of drawn cup width from its nominal size
$C_1$			nominal end thickness of profiled end drawn cup
	$C_{1s}$	(GN)	single end thickness of profiled end drawn cup (minimum circumscribed distance)
$C_2$			nominal end thickness of flat end drawn cup
	$C_{2s}$	(GN)	single end thickness of flat end drawn cup (minimum circumscribed distance)
$D$			nominal drawn cup outside diameter
$F_w$			nominal bore diameter of needle roller complement
	$\Delta F_{ws}$	(GX) (SN)	deviation of the smallest <sup>d</sup> maximum inscribed sizes of bore diameter of needle roller complement from its nominal size
$r$			nominal chamfer <sup>e</sup> dimension
	$r_s$		single chamfer dimension

<sup>a</sup> Symbols as defined in ISO 15241 except for the format used.  
<sup>b</sup> Symbols as defined in ISO 14405-1.  
<sup>c</sup> Constraint condition and specification modifiers for fixed parts and movable parts, according to ISO/TS 17863; see Figure 1.  
<sup>d</sup> Smallest value considering the influence of rotation of needle roller complement.  
<sup>e</sup> The chamfer is considered in this International standard as a round corner.





a) Bearings with open ends



b) Bearings with one closed end

- $\textcircled{1}$  = valid in constraint condition by fitting  $\textcircled{1}$  into a ring gage having a bore diameter equal to  $D_{1c}$  according to [Table 4](#) or [Table 5](#)
- $\textcircled{2}$  = FP  $\textcircled{1}$  – MP  $\textcircled{2}$
- $\textcircled{3}$  = needle rollers shall be in contact with the raceway of the drawn cup
- $\textcircled{4}$  = in any rotation, in a coaxial direction

**Key**

- $\textcircled{1}$  drawn cup
- $\textcircled{2}$  needle roller complement

**Figure 1 — Example of drawn cup needle roller bearing without inner ring design**