BRITISH STANDARD

BS ISO
3245:2007

Rolling bearings — Needle roller bearings, drawn cup without inner ring — Boundary dimensions and tolerances

ICS 21.100.20

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
British Standards

National foreword

This British Standard is the UK implementation of ISO 3245:2007. It supersedes BS ISO 3245:1997 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/7, Rolling bearings.

A list of organizations represented on this committee 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.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2008

© BSI 2008

ISBN 978 0 580 54884 0

Amendments/corrigenda issued since publication

Date	Comments

INTERNATIONAL STANDARD

ISO 3245

Third edition
2007-12-01

Rolling bearings — Needle roller bearings, drawn cup without inner ring — Boundary dimensions and tolerances

Roulements — Douilles à aiguilles sans bague intérieure — Dimensions d'encombrement et tolérances

Reference number
ISO 3245:2007(E)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 3245 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*, Subcommittee SC 5, *Needle roller bearings*.

This third edition cancels and replaces the second edition (ISO 3245:1997), which has been technically revised.

blank

Rolling bearings — Needle roller bearings, drawn cup without inner ring — Boundary dimensions and tolerances

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 closed end drawn cups.

In addition, dimensional tolerances and methods for checking the needle roller complement bore diameter are specified.

2 Normative references

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

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

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

ISO 1132-2:2001, *Rolling bearings — Tolerances — Part 2: Measuring and gauging principles and methods*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 10579, *Technical drawing — Dimensioning and tolerancing — Non-rigid parts*

ISO 15241, *Rolling bearings — Symbols for quantities*

3 Terms and definitions

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

4 Symbols

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

The symbols (except those for tolerances) shown in Figure 1, and the values given in Tables 1 to 4 denote nominal dimensions unless otherwise specified.

C drawn cup width

C_1 end thickness of profiled end drawn cup

C_2 end thickness of flat end drawn cup

D drawn cup outside diameter

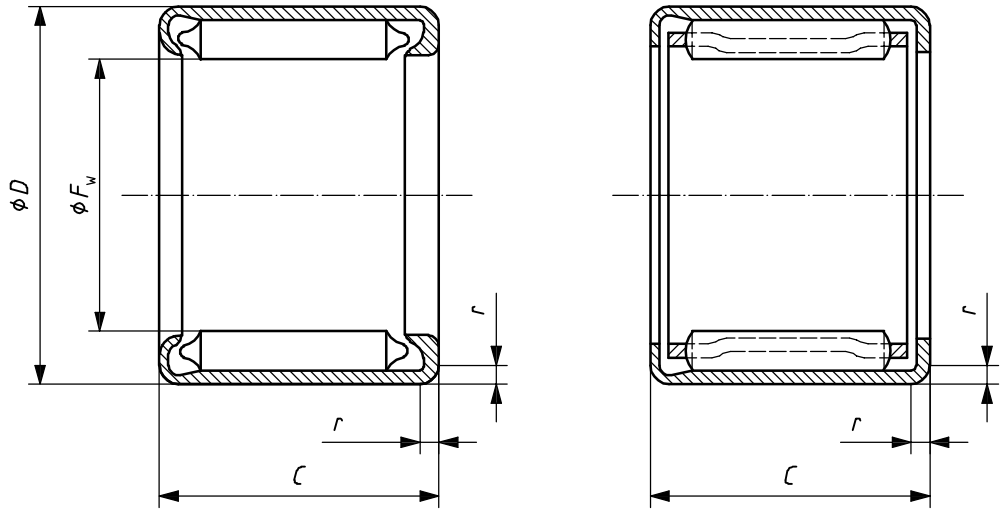
F_w bore diameter of needle roller complement

$F_{ws\ min}$ smallest single bore diameter of needle roller complement [1)]

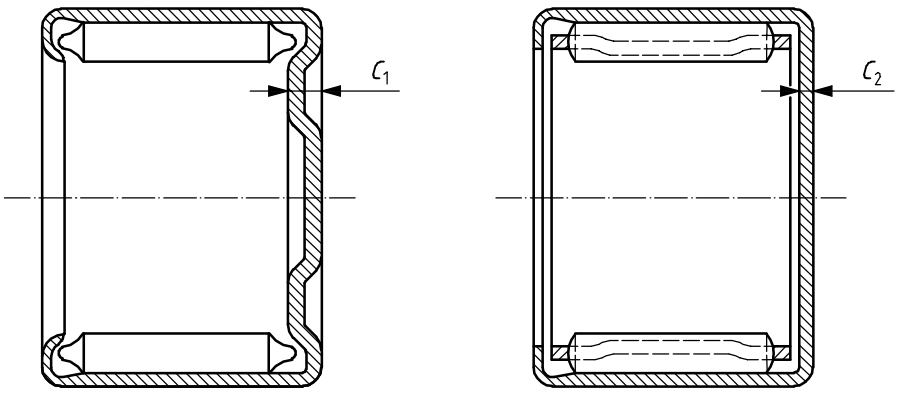
r chamfer dimension

$r_{s\ min}$ smallest single chamfer dimension

Δ_{Cs} deviation of single drawn cup width



a) With open ends



b) With closed end

Figure 1 — Needle roller bearings, drawn cup without inner ring

1) The smallest single bore diameter of the needle roller complement is the diameter of the cylinder which, when placed in the needle roller complement bore, results in zero radial clearance in at least one radial direction.

5 Boundary dimensions

The boundary dimensions of drawn cup needle roller bearings, without inner ring, closed end and open ends, of diameter series 1D are given in Table 1, those of diameter series 2D are given in Table 2.

The maximum limits of C_1 and C_2 are given to enable the user to avoid contact between the end face of the shaft and the internal end face of the drawn cup. If contact between these faces is required, the user should consult the bearing manufacturer.

Table 1 — Boundary dimensions of needle roller bearings without inner ring, with open ends or closed end — Diameter series 1D

Dimensions in millimetres

F_w	D	C								C_1[a]	C_2[a]	$r_{s\,min}$[b]
		Dimension series										
		21D	31D	41D	51D	61D	71D	81D	91D	max.	max.	
4	8	7	8	9	—	—	—	—	—	1,9	1	0,3
5	9	7	8	9	—	—	—	—	—	1,9	1	0,4
6	10	7	8	9	10	—	—	—	—	1,9	1	0,4
7	11	7	8	9	10	12	—	—	—	1,9	1	0,4
8	12	7	8	9	10	12	—	—	—	1,9	1	0,4
9	13	7	8	9	10	12	14	—	—	1,9	1	0,4
10	14	7	8	9	10	12	14	—	—	1,9	1	0,4
12	16	7	8	9	10	12	14	—	—	1,9	1	0,4
14	20	10	12	14	16	18	20	—	—	2,8	1,3	0,4
15	21	10	12	14	16	18	20	—	—	2,8	1,3	0,4
16	22	10	12	14	16	18	20	—	—	2,8	1,3	0,4
17	23	10	12	14	16	18	20	—	—	2,8	1,3	0,4
18	24	10	12	14	16	18	20	—	—	2,8	1,3	0,4
20	26	10	12	14	16	18	20	—	—	2,8	1,3	0,4
22	28	10	12	14	16	18	20	—	—	2,8	1,3	0,4
25	32	12	14	16	18	20	24	28	32	2,8	1,3	0,8
28	35	12	14	16	18	20	24	28	32	2,8	1,3	0,8
30	37	12	14	16	18	20	24	28	32	2,8	1,3	0,8
32	39	12	14	16	18	20	24	28	32	2,8	1,3	0,8
35	42	12	14	16	18	20	24	28	32	2,8	1,3	0,8
38	45	12	14	16	18	20	24	28	32	2,8	1,3	0,8
40	47	12	14	16	18	20	24	28	32	2,8	1,3	0,8
42	49	12	14	16	18	20	24	28	32	2,8	1,3	0,8
45	52	12	14	16	18	20	24	28	32	2,8	1,3	0,8
50	58	14	16	18	20	24	28	32	36	2,8	1,6	0,8
55	63	14	16	18	20	24	28	32	36	2,8	1,6	0,8
60	68	14	16	18	20	24	28	32	36	2,8	1,6	0,8
65	73	14	16	18	20	24	28	32	36	2,8	1,6	0,8
70	78	14	16	18	20	24	28	32	36	2,8	1,6	0,8

NOTE Underlined values are the preferred dimensions.

[a] No minimum limit is specified for thickness of the closed end.

[b] No maximum limit is specified for chamfer dimensions.

Table 2 — Boundary dimensions of needle roller bearings without inner ring, with open ends or closed end — Diameter series 2D

Dimensions in millimetres

F_w	D	C							C_1[a]	C_2[a]	$r_{s\,min}$[b]
		Dimension series									
		22D	32D	42D	52D	62D	72D	82D	max.	max.	
8	14	10	12	14	—	—	—	—	2,8	1,3	0,4
9	15	10	12	14	16	—	—	—	2,8	1,3	0,4
10	16	10	12	14	16	—	—	—	2,8	1,3	0,4
12	18	10	12	14	16	18	—	—	2,8	1,3	0,4
14	22	12	14	16	18	20	24	—	2,8	1,3	0,4
15	23	12	14	16	18	20	24	—	2,8	1,3	0,4
16	24	12	14	16	18	20	24	—	2,8	1,3	0,8
17	25	12	14	16	18	20	24	—	2,8	1,3	0,8
18	26	12	14	16	18	20	24	—	2,8	1,3	0,8
20	28	12	14	16	18	20	24	—	2,8	1,3	0,8
22	30	12	14	16	18	20	24	—	2,8	1,3	0,8
25	35	14	16	18	20	24	28	32	3,4	1,6	0,8
28	38	14	16	18	20	24	28	32	3,4	1,6	0,8
30	40	14	16	18	20	24	28	32	3,4	1,6	0,8
32	42	14	16	18	20	24	28	32	3,4	1,6	0,8
35	45	14	16	18	20	24	28	32	3,4	1,6	0,8
38	48	14	16	18	20	24	28	32	3,4	1,6	0,8
40	50	14	16	18	20	24	28	32	3,4	1,6	0,8
42	52	14	16	18	20	24	28	32	3,4	1,6	0,8
45	55	14	16	18	20	24	28	32	3,4	1,6	0,8

[a] No minimum limit is specified for thickness of the closed end.

[b] No maximum limit is specified for chamfer dimensions.

6 Tolerances

6.1 Tolerances for the bore diameter of needle roller complement

Drawn cup needle roller bearings are non-rigid parts according to the definition in ISO 10579 and require the outside diameter of the drawn cup to be restrained in a ring gauge for verification of the bore diameter of the needle roller complement.

The free state condition defined in ISO 10579 is valid for the tolerances applied to dimensions C, C_1, C_2 and $r_{s\,min}$.

The tolerances given in Tables 3 and 4 for the smallest single bore diameter of needle roller complement, $F_{ws\,min}$, are valid on the condition that the drawn cup is pressed into a ring gauge having a radial cross-section as specified in ISO 1132-2:2001, 7.4 and 7.5. The bore diameter of the ring gauge shall be in accordance with Tables 3 and 4.

The ring gauge bore diameter values specified in Tables 3 and 4 are equal to the low limit of tolerance class N6 as specified in ISO 286-2:1988, when applied to the nominal outside diameter of drawn cup, D. If the actual bore diameter of the ring gauge deviates from this dimension, the limit tolerances for the smallest single bore diameter of needle roller complement, $F_{ws\ min}$, should be corrected to compensate for the variation in the bore diameter of the ring gauge. However, the maximum limit of the bore diameter of the ring gauge should be the corresponding high limit of tolerance class N6 as specified in ISO 286-2:1988.

Table 3 — Tolerances for the bore diameter of needle roller complement — Diameter series 1D

F_w	D [a]	Bore diameter of ring gauge	Tolerances for $F_{ws\ min}$ [b] μm	
mm	mm	mm	high	low
4	8	7,984	+28	+10
5	9	8,984		
6	10	9,984		
7	11	10,98	+31	+13
8	12	11,98		
9	13	12,98		
10	14	13,98		
12	16	15,98	+34	+16
14	20	19,976		
15	21	20,976		
16	22	21,976		
17	23	22,976		
18	24	23,976		
20	26	25,976	+41	+20
22	28	27,976		
25	32	31,972		
28	35	34,972		
30	37	36,972		
32	39	38,972	+50	+25
35	42	41,972		
38	45	44,972		
40	47	46,972		
42	49	48,972		
45	52	51,967		
50	58	57,967		
55	63	62,967	+60	+30
60	68	67,967		
65	73	72,967		
70	78	77,967		

[a] No deviations are specified for the outside diameter of drawn cup D. The bearing manufacturer shall ensure a fit corresponding to the function.

[b] The values in this table give the limits of the difference between $F_{ws\ min}$ and F_w.

Table 4 — Tolerances for the bore diameter of needle roller complement — Diameter series 2D

F_w	D [a]	Bore diameter of ring gauge	Tolerances for $F_{ws\ min}$ [b] μm	
mm	mm	mm	high	low
8	14	13,98	+31	+13
9	15	14,98		
10	16	15,98		
12	18	17,98	+34	+16
14	22	21,976		
15	23	22,976		
16	24	23,976		
17	25	24,976		
18	26	25,976		
20	28	27,976	+41	+20
22	30	29,976		
25	35	34,972		
28	38	37,972		
30	40	39,972		
32	42	41,972	+50	+25
35	45	44,972		
38	48	47,972		
40	50	49,972		
42	52	51,967		
45	55	54,967		

[a] No deviations are specified for the outside diameter of drawn cup D. The bearing manufacturer shall ensure a fit corresponding to the function.

[b] The values in this table give the limits of the difference between $F_{ws\ min}$ and F_w.

6.2 Tolerances for the drawn cup width

The tolerance for the drawn cup width, C, is given in Table 5.

Table 5 — Tolerances for the drawn cup width

Values in millimetres

C	Δ_{Cs}	
	high	low
All widths	0	–0,3

7 Measurement of the smallest single bore diameter of needle roller complement

For measurement of the smallest single bore diameter of needle roller complement, $F_{ws\ min}$, the methods specified in ISO 1132-2:2001, 7.4 and 7.5, shall be used.

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager. Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553. Email: copyright@bsi-global.com.

BSI
389 Chiswick High Road
London
W4 4AL