

Metric tapered roller bearings —

Part 1: Specification for dimensions and tolerances of single row bearings

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The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Ball and Roller Bearing Manufacturers' Association
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Foreword

This British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee taking into account the relevant published and draft International Standards prepared by Technical Committee ISO/TC 4, Rolling bearings, of the International Organization for Standardization (ISO).

In particular, the new ISO symbols for dimensions and tolerances have been adopted in this revision of BS 3134 and the series designations and boundary dimensions of the bearings comply with those given in ISO 355:1977 “*Rolling bearings — Metric tapered roller bearings — Boundary dimensions and series designations*”. Addenda to ISO 355 (in course of preparation) will cover the boundary dimensions of double row bearings and of flanged cups for roller bearings. These details will be added to BS 3134 in due course.

In the light of metrication, it has been decided not to include inch series bearings in this edition. In support of industry’s recommendation that the United Kingdom should change to the metric system, users should wherever possible adopt metric bearings sizes for all new design applications.

Where ball bearings, cylindrical and spherical roller bearings, instrument precision bearings, needle roller bearings, airframe bearings and accessories for use with rolling bearings are concerned, reference should respectively be made to the following British Standards:

BS 292, *Dimensions of ball bearings and cylindrical roller bearings*¹⁾.

BS 3469, *Instrument precision rolling bearings (ball bearings)*.

BS 5773, *Metric needle roller bearings*.

BS 2SP, *89 Airframe bearings (roller bearings)*.

BS 5646, *Rolling bearings: accessories*.

NOTE To facilitate the typesetting and printing of this standard, Table 1, Table 7, Table 8, Table 9, Table 10 and Table 11 and Figure 1 are identical with Tables 1, 2, 3, 4, 5 and 6 and Figure 1 in ISO 355:1977 which have been adopted in toto. In these tables, the comma has been used throughout as a decimal marker. In British Standards, it is current practice to use the full point on the baseline as the decimal marker. However, for the sake of uniformity in this standard the layout of Table 2, Table 3, Table 4, Table 5 and Table 6 is identical with the ISO layout.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ To be revised to include spherical roller bearings.

1 Scope

1.1 This British Standard specifies boundary dimensions and tolerances for single row metric tapered roller bearings within the range 15 mm to 360 mm bore. Except for the contact angle, it does not deal with other features of internal design and dimensions, nor with materials and methods of manufacture which may affect functional interchangeability.

1.2 It includes a dimensions series designation for each bearing listed but the designation system in clause 4 is not applicable to bearings which are not included in this standard.

1.3 For information purposes, relevant documentation associated with tapered roller bearings is given in Appendix A.

2 Dimensions and tolerances

2.1 Dimensions. The dimensions of single row tapered roller bearings shall be in accordance with those given in Table 7 to Table 11 inclusive. The bearings in these tables have been grouped by contact angle series and then listed in ascending order of bore, outside diameter and bearing width. The dimensions for front face chamfers are not included in this standard. However, the front face corners shall not be sharp.

2.2 Tolerances. The tolerances for metric tapered roller bearings shall be in accordance with those given in Table 2 to Table 6 inclusive.

3 Symbols

3.1 Dimensions

d	= bearing bore diameter, nominal
D	= bearing outside diameter, nominal
T	= bearing width, nominal
B	= cone width, nominal
C	= cup width, nominal
E	= cup small inside diameter, nominal
α	= bearing contact angle, nominal
r_1	= cone back face chamfer height
r_{1smin}	= smallest single r_1
r_{1smax}	= largest single r_1
r_2	= cone back face chamfer width
r_{2smin}	= smallest single r_2
r_{2smax}	= largest single r_2
r_3	= cup back face chamfer height
r_{3smin}	= smallest single r_3
r_{3smax}	= largest single r_3
r_4	= cup back face chamfer width
r_{4smin}	= smallest single r_4
r_{4smax}	= largest single r_4

r_5 = cone and cup front face chamfer height and width

3.2 Tolerances

Δ_{dmp}	= mean bore diameter deviation
Δ_{Dmp}	= mean outside diameter deviation
V_{dp}	= bore diameter variation. Ovality
V_{Dp}	= outside diameter variation. Ovality
V_{dmp}	= mean bore diameter variation. Taper
V_{Dmp}	= mean outside diameter variation. Taper
K_{ia}	= assembled bearing cone runout
K_{ea}	= assembled bearing cup runout
Δ_{Bs}	= cone width deviation
Δ_{Cs}	= cup width deviation
Δ_{Ts}	= bearing width deviation
Δ_{Ts1}	= assembled cone effective width deviation
Δ_{Ts2}	= assembled cup effective width deviation

NOTE Δ_{Ts} is the assembled bearing width tolerance; Δ_{Ts1} is that part of Δ_{Ts} which results from the cone manufacturing tolerances; Δ_{Ts2} is that part of Δ_{Ts} which results from the cup manufacturing tolerances.

4 Dimension series designation system

Each bearing, the dimensions of which are given in this standard, is referred to a dimension series. The dimension series is designated by a combination of three symbols, for example 2BC.

The first symbol is a numeric character which represents a range of contact angles, angle series.

The second symbol is an alphabetic character, which represents a range of numeric values for the outside diameter to bore relationship, diameter series.

The third symbol is an alphabetic character, which represents a range of numeric values for the width to section height relationship, width series.

The designations for the standardized bearings conform generally with the angle ranges and the numeric values for the relationships given in Table 1. In some cases an exception has been made to avoid the condition that the same designation be used for two different bearings with the same bore diameter.

A complete bearing may be designated by stating its dimension series and bore size, the bore size being given by three digits, for example 2BC022, 2CD105.

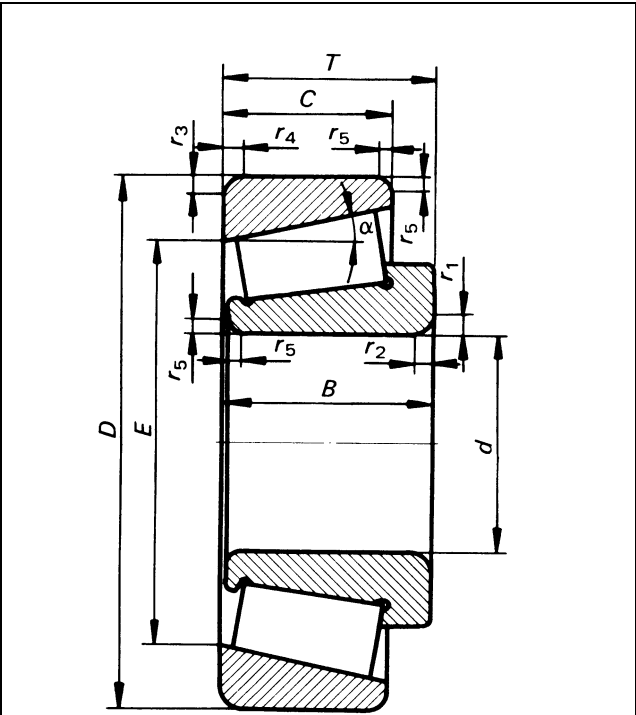


Figure 1 — Bearing dimensions

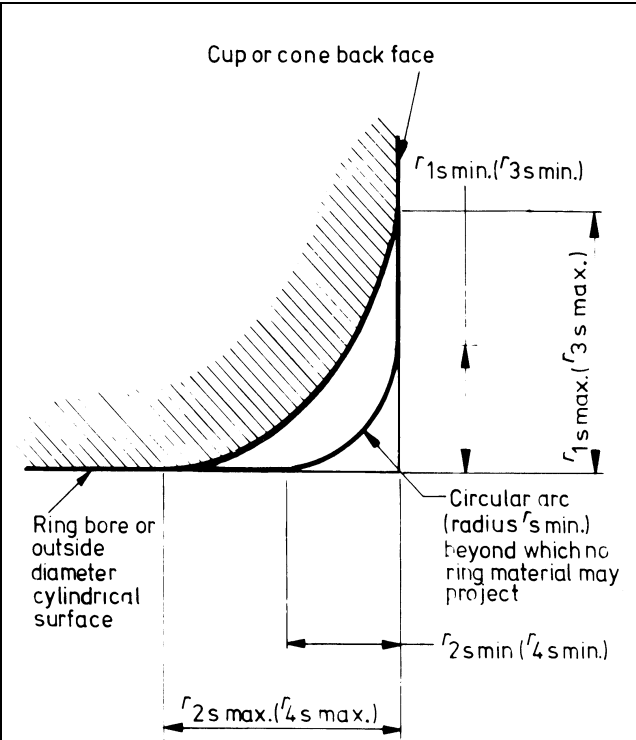


Figure 2 — Chamfer dimensions

Table 1 — Series designations

Angle series designation	α	
	Over	Incl.
1	Reserved for future use	
2	10°	13° 52'
3	13° 52'	15° 59'
4	15° 59'	18° 55'
5	18° 55'	23°
6	23°	27°
7	27°	30°

Diameter series designation	$\frac{D}{d^{0.77}}$	
	Over	Incl.
A	Reserved for future use	
B	3,40	3,80
C	3,80	4,40
D	4,40	4,70
E	4,70	5,00
F	5,00	5,60
G	5,60	7,00

Width series designation	$\frac{T}{(D-d)^{0.95}}$	
	Over	Incl.
A	Reserved for future use	
B	0,50	0,68
C	0,68	0,80
D	0,80	0,88
E	0,88	1,00

NOTE See foreword for reference to the use of the decimal comma in this table.

**Table 2 — Cone bore and cone runout tolerances (assembled bearing).
Normal class and special width class 6X**

Tolerance values in micrometres.

d mm		Δ_{dmp}		V_{dp}	V_{dmp}	K_{ia}
over	incl.	high	low	max.	max.	max.
10	18	0	− 12	12	9	15
18	30	0	− 12	12	9	18
30	50	0	− 12	12	9	20
50	80	0	− 15	15	11	25
80	120	0	− 20	20	15	30
120	180	0	− 25	25	19	35
180	250	0	− 30	30	23	50
250	315	0	− 35	35	26	60
315	400	0	− 40	40	30	70

**Table 3 — Cup outside diameter and cup runout tolerances (assembled bearing).
Normal class and special width class 6X**

Tolerance values in micrometres.

D mm		Δ_{Dmp}		V_{Dp}	V_{Dmp}	K_{ea}
over	incl.	high	low	max.	max.	max.
18	30	0	− 12	12	9	18
30	50	0	− 14	14	11	20
50	80	0	− 16	16	12	25
80	120	0	− 18	18	14	35
120	150	0	− 20	20	15	40
150	180	0	− 25	25	19	45
180	250	0	− 30	30	23	50
250	315	0	− 35	35	26	60
315	400	0	− 40	40	30	70
400	500	0	− 45	45	34	80
500	630	0	− 50	50	38	100

Table 4 — Bearing width and effective width of sub unit tolerances. Normal class

Tolerance values in micrometres.

d mm		Δ_{Bs}		Δ_{Cs}		Δ_{Ts}		Δ_{Ts1}		Δ_{Ts2}	
over	incl.	high	low	high	low	high	low	high	low	high	low
10	18	0	− 120	0	− 120	+ 200	0	+ 100	0	+ 100	0
18	30	0	− 120	0	− 120	+ 200	0	+ 100	0	+ 100	0
30	50	0	− 120	0	− 120	+ 200	0	+ 100	0	+ 100	0
50	80	0	− 150	0	− 150	+ 200	0	+ 100	0	+ 100	0
80	120	0	− 200	0	− 200	+ 200	− 200	+ 100	− 100	+ 100	− 100
120	180	0	− 250	0	− 250	+ 350	− 250	+ 150	− 150	+ 200	− 100
180	250	0	− 300	0	− 300	+ 350	− 250	+ 150	− 150	+ 200	− 100
250	315	0	− 350	0	− 350	+ 350	− 250	+ 150	− 150	+ 200	− 100
315	400	0	− 400	0	− 400	+ 400	− 400	+ 200	− 200	+ 200	− 200

Table 5 — Bearing width and effective width of sub unit tolerances. Special width class 6X

Tolerance values in micrometres.

d mm		Δ_{Bs}		Δ_{Cs}		Δ_{Ts}		Δ_{Ts1}		Δ_{Ts2}	
over	incl.	high	low	high	low	high	low	high	low	high	low
10	18	0	− 50	0	− 100	+ 100	0	+ 50	0	+ 50	0
18	30	0	− 50	0	− 100	+ 100	0	+ 50	0	+ 50	0
30	50	0	− 50	0	− 100	+ 100	0	+ 50	0	+ 50	0
50	80	0	− 50	0	− 100	+ 100	0	+ 50	0	+ 50	0
80	120	0	− 50	0	− 100	+ 100	0	+ 50	0	+ 50	0
120	180	0	− 50	0	− 100	+ 150	0	+ 50	0	+ 100	0
180	250	0	− 50	0	− 100	+ 150	0	+ 50	0	+ 100	0
250	315	0	− 50	0	− 100	+ 200	0	+ 100	0	+ 100	0
315	400	0	− 50	0	− 100	+ 200	0	+ 100	0	+ 100	0