

# *Tapered roller bearings*



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## Tapered roller bearings

### Definition and capabilities

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#### → Definition

Tapered roller bearings with a single row of rollers are always mounted opposing another bearing of the same type to provide rigid assemblies, particularly when preloaded.

#### ■ Cages

Tapered roller bearings are usually equipped with a pressed steel cage. In some cases with a synthetic material cage.

#### ■ Contact angle

The rings of this bearing are detachable: the outer ring (cup) is not joined to the rest of the bearing which is made up of the inner ring (cone) and rollers held on the cone by the cage. A tapered roller bearing can accept axial loads in one direction only. It must be mounted in opposition with a bearing of the same type.

ISO 355 Standard defines the different series of tapered roller bearings with contact angles of 10 to 30°. For a given radial load, the greater the angle of the cup, the greater the axial load that the bearing can withstand. SNR has adopted designations in accordance with this standard for the new "intermediate" series and has kept the former designations for the other series.

#### → Capabilities

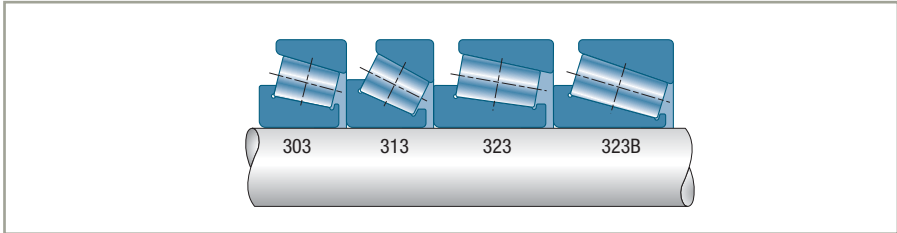
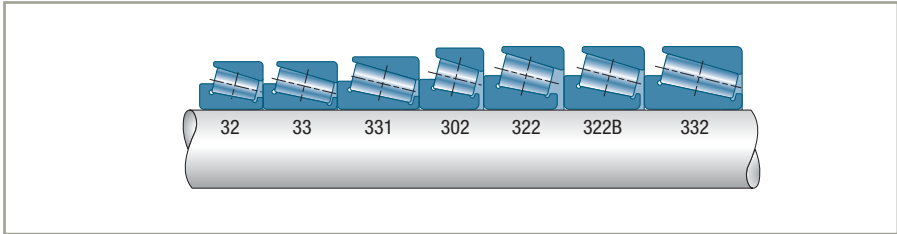
#### ■ Loads and speeds

The tapered roller bearing is an angular contact bearing that can withstand high radial and axial loads.

#### ■ Misalignment

The shape of the contacting profiles allows misalignment in the range of 0.06°.

## Series

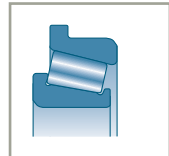


## Variants

### ■ Special chamfer

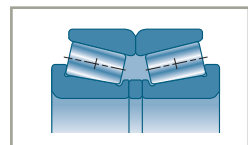
Special chamfer on the large face of the cone to adapt to the large fillet radius of the shoulders of shafts such as those of wheel axles.

### ■ Flange on cup



### ■ Matched bearings

They are made up of two bearings and usually two spacers to form a single assembly. The elements of a given matched assembly cannot be exchanged with those of another assembly.



## Tapered roller bearings *(continued)*

### Tolerances and clearance

#### → Tolerances

These bearings are supplied in standard precision with tolerances in accordance with ISO 492 Standard. They can be supplied on request with specific tolerances on one or more dimensions or characteristics.

#### → Clearances

##### ■ Axial clearance

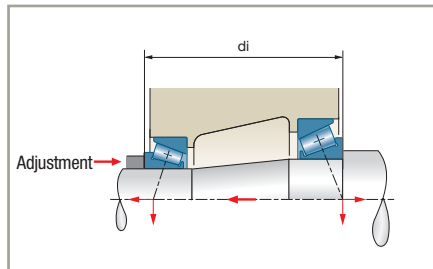
As these bearings are always mounted in opposition, the axial clearance is determined by the adjustment of the bearings at installation. That is to say by the adjustment of the relative initial position of the cones with respect to the cups. The adjustment determines a mechanical clearance (positive clearance) or a pre-load (negative clearance).

##### ■ Types of assembly

#### Face-to-face assembly (O)

This arrangement is to be used in applications involving temperature variations, or when the points of load application of the two bearings need to be as far apart as possible. It more specifically enables the creation of compact assemblies with either pre-loading or clearance.

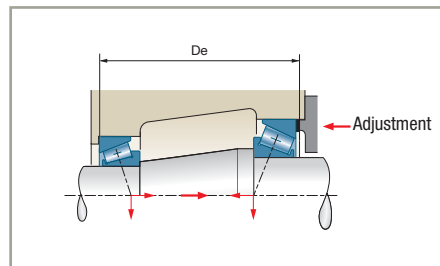
The adjustment is made on the distance **di** between the cones of the two bearings which is determined by either a spacer length or an adjustment nut.



#### Back-to-back assembly (X)

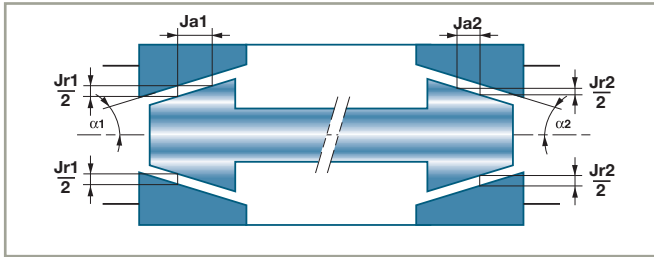
To install a shaft fully equipped with the bearings in a housing.

The adjustment is made on the distance **De** between the cups of the two bearings, and is determined by shims or an adjustment nut.



■ Relation between the axial clearance  $J_a$  and the radial clearance  $J_r$  of a bearing

$$J_a = 1.25 Y \cdot J_r$$



■ Pre-load

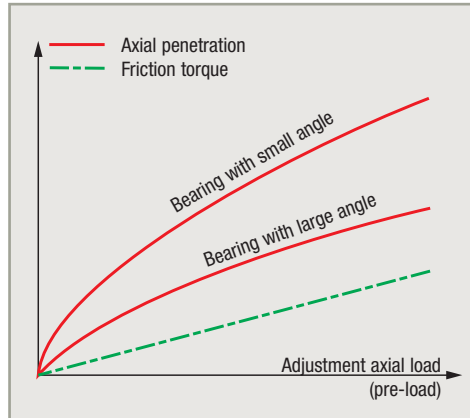
Tapered roller bearings are preloaded whenever one wants to ensure the axial stiffness of the assembly (bevel gear bearings, machine-tool spindle bearings, etc.). The nominal value of the pre-load is fixed for each application according to the loading conditions and the characteristics of the chosen bearings.

Consult SNR for the preparation of a preloaded bearing file.

SNR establishes two characteristic curves for each bearing reference:

- The axial penetration curve that characterises the bearing stiffness which depends on the contact angle, the number of rollers, and their effective length.

- The friction torque curve which enables to check that the pre-loading adjustment is correct using a torque gauge



■ Axial clearance on assembly for two separate bearings

As these bearings are always mounted in opposition, their internal clearance is determined by the adjustment on assembly that determines the axial clearance of the shaft.

For information, the relation between the axial clearance and the corresponding radial clearance is given by the formula:

$$J_r = 0.83 J_a$$

These bearings can be mounted with a pre-load if necessary to secure an axial stiffness of an assembly. The maximum speed in this case is reduced and depends on the pre-load value.

Consult SNR.



## Tapered roller bearings *(continued)*

### Design criteria

■ Bearing life

■ Shaft mounted on two single bearings

**Equivalent dynamic load**

The axial balance of the shaft depends not only on the forces applied, but also on the forces induced by the radial loads applied on each bearing.

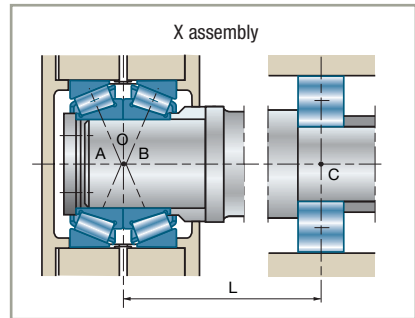
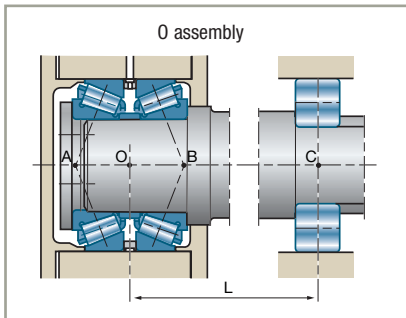
**Equivalent static load**

Its value  $P_0$  is the greater of the two values obtained using the following formula:

$$P_0 = F_r$$

$$P_0 = 0.5 F_r + Y_0 \cdot F_a$$

■ Shaft with one of its two assemblies made up by two matched non-preloaded bearings assembled in an **O** or **X** arrangement



This assembly is considered as a single double-row roller bearing which centre O is the mid-point of the distance AB between the load application points. The assembly of a shaft with this type of assembly is hyperstatic (3 seating points: A. B. C) and can only be likened approximately to an arrangement of two assemblies if the distance AB is less than L/5 and the stiffness of the assembly is satisfactory (misalignment < 0.06°). In all other cases, consult SNR.

### Equivalent dynamic load of the double pillow block (ISO 281 Standard)

$$P = F_r + 1.1 Y \cdot F_a \quad \text{if } F_a / F_r \leq e$$
$$P = 0.67 F_r + 1.68 Y \cdot F_a \quad \text{if } F_a / F_r > e$$

### Basic dynamic capacity of the double bearing

The basic dynamic capacity of an assembly of two identical bearings is:

$$C_e = 1.715 C$$

### Equivalent static capacity of the double pillow block

$$P_0 = F_r + 1.1 Y \cdot F_a$$

### Basic static capacity of the double pillow block

The static capacity of the assembly of two identical bearings is twice that of a single bearing.

$$C_{0e} = 2 C_0$$

### ■ Calculation of preloaded bearings

The values of the induced forces involved in the axial equilibrium of two bearings depend on the applied pre-load and the bearing stiffness characteristics. Consequently, the calculation of the equivalent load on each bearing is complex and must be performed by the SNR Technical Service.



## Tapered roller bearings *(continued)*

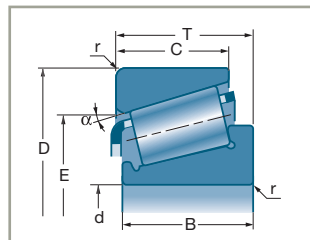
### Installation/assembly criteria

#### ■ Interchangeability of elements of the same reference

As the cones and cups of tapered roller bearings are separable, ISO has established:

- the nominal dimensions of the small diameter of the cup raceway (E)
- the contact angle ( $\alpha$ )

#### Interchangeability of SNR elements



The cones and cups of the same reference are totally interchangeable, with the total width of the bearing (dimension T) remaining within the standard tolerances (ISO 492).

#### Interchangeability of an SNR element with an element of another make

Interchangeability is possible if the non-SNR elements comply with ISO 355 Standard, particularly dimensions  $\alpha$  and E. However, as the tolerances on these dimensions, the raceway profile shapes, the quality of steel and the surface conditions are specific to each manufacturer. The performance of such assemblies risks can be significantly reduced. Such assemblies should therefore be avoided.

Some SNR references in old designs are not interchangeable with other makes. They are identified in the "List of Standard Bearings".

#### ■ Adjustment parameters

The assembly of standard bearings always requires an adjustment due to the fact that their elements can be separated.

The adjustment depends on the assembly dimensions and their tolerances, which are:

#### The functional dimensions of the bearing

- Bore d
- Outer diameter D
- The distance between the cone and cup faces of a given bearing: dimension T

#### The functional dimensions of the assembly

- The distance between the cup shoulders ( $D_e$ )
- The distance between the cone shoulders ( $d_i$ )
- The diameters of the shaft and housing seating surfaces

The generally accepted tolerance for a given clearance (positive or negative) makes it necessary to repeat the adjustment operation for each assembly, taking in consideration amplitude of standard bearing tolerances and the assembly dimensions.

One then adjusts one of the shoulder distances ( $D_e$ ) or ( $d_i$ ) at each operation to compensate for the variations in the other dimensions of the assembly.

Adjustment is a relatively long and repetitive operation that has to be performed by specialised personnel capable of ensuring its precision and reliability.



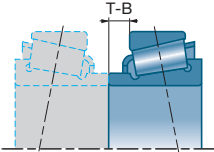
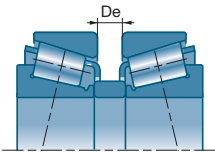
## ■ Installation without adjustment

In many high volume production assembly operations, the dimensional tolerances have a reduced normal statistical distribution. In such cases, by using bearings which also have reduced tolerances, mountings will have a 99.73% probability that no further adjustment will be required, which is suitable for most applications.

Main applications: vehicle wheels and gear boxes.

The bearings are usually fitted close to each other in an O arrangement.

## ■ The two possibilities of adjustment-free assembly are:

Type of assembly	Pre-adjusted bearings	Matched assembly
Adjustment schematic		
Bearing characteristics	<ul style="list-style-type: none"> <li>▶ Reduced tolerance on the position of the cone with respect to the large face of the cup (dimension T - B).</li> <li>▶ Interchangeable cone and cup.</li> <li>▶ Cone usually extended to avoid the need for a spacer.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Set of two pre-adjusted bearings with a reduced tolerance on the distance of the 2 cups (0.03 mm approximately).</li> <li>▶ Elements not interchangeable with those of another assembly.</li> </ul>
Assembly characteristics	<ul style="list-style-type: none"> <li>▶ Assembly of large series in O arrangement.</li> <li>▶ Tolerance of about 0.05 mm max. on the distance (De) of the cup shoulders.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Assembly of large or medium series.</li> <li>▶ Tolerance of about 0.05 mm max. on the distance (De) of the cup shoulders.</li> </ul>
Axial clearance tolerances	<ul style="list-style-type: none"> <li>▶ Tolerance of the order of 0.15 / 0.20 mm with a probability of 99.7%. The clearances outside this probability (0.3%) lie within a theoretical range of 0.4 to 0.6 mm approx.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Tolerance of the order of 0.10 / 0.15 mm with a probability of 99.7%. The clearances outside this probability (0.3 %) lie within a theoretical range of 0.25 to 0.4 mm approx.</li> </ul>

## Prefixes and suffixes

### ■ Prefixes

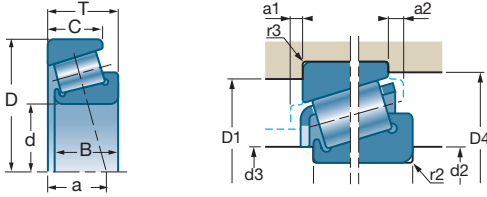
<b>R</b>	Special chamfer on the large face of the inner ring (cone)
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### ■ Suffixes

<b>B</b>	Suffix for series 322 and 323 with increased angle
<b>A. C</b>	Internal design indices
<b>T</b>	Flange on outer ring (cup)
<b>P6X</b>	Bearing whose tolerance on dimension T complies with precision class 6X



## Tapered roller bearings (continued)

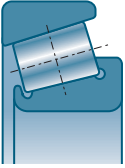


d		D	B	C	T	a			e	Y	Yo		
												rpm*	rpm*
mm	Ref.	mm	mm	mm	mm	mm	10°N	10°N				rpm*	rpm*
15	30202 A	35	11	10.0	11.75	8.40	15.40	13.50	0.32	1.88	1.03	10000	15000
17	30203 A	40	12	11.0	13.25	9.75	20.80	19.00	0.35	1.74	0.96	9600	13000
	32203 A	40	16	14.0	17.25	11.25	31.00	31.00	0.31	1.92	1.06	9200	12000
	30303 A	47	14	12.0	15.25	10.00	29.20	26.70	0.29	2.11	1.16	8500	11600
20	30204 A	47	14	12.0	15.25	11.25	30.50	31.00	0.35	1.74	0.96	8000	11000
	30304 A	52	15	13.0	16.25	11.00	35.00	32.50	0.30	2.00	1.10	7500	10000
	31304	52	15	11.0	16.25	17.25	26.00	25.50	0.83	0.72	0.40	7200	10000
	32304 A	52	21	18.0	22.25	14.45	45.00	45.00	0.30	2.00	1.10	8000	11000
25	32005 V	47	15	11.5	15.00	11.50	28.50	31.50	0.43	1.39	0.77	7600	10000
	30205 A	52	15	13.0	16.25	12.75	35.50	39.00	0.37	1.60	0.88	7100	10000
	32205 B	52	18	15.0	19.25	16.75	41.50	49.00	0.58	1.03	0.57	7200	9500
	33205 A	52	22	18.0	22.00	14.10	49.00	57.00	0.35	1.71	0.94	7500	10000
	30305 A	62	17	15.0	18.25	12.90	47.50	44.50	0.30	2.00	1.10	6300	8500
	31305 V	62	17	13.0	18.25	20.45	39.00	39.50	0.83	0.73	0.40	6000	8300
	32305 A	62	24	20.0	25.25	16.55	61.00	62.00	0.30	2.00	1.10	6200	8200
	30	32006 C	55	17	13.0	17.00	13.50	38.00	45.00	0.43	1.39	0.77	6400
30206 A		62	16	14.0	17.25	13.75	46.00	48.50	0.37	1.60	0.88	6000	8500
32206 C		62	20	17.0	21.25	14.75	50.00	55.00	0.37	1.60	0.88	5800	8100
33206 A		62	25	19.5	25.00	16.30	67.00	77.00	0.34	1.76	0.97	5800	8000
30306 A		72	19	16.0	20.75	15.10	59.50	60.00	0.31	1.90	1.05	5400	7500
31306 A		72	19	14.0	20.75	17.90	51.00	53.00	0.83	0.73	0.40	5000	6300
32306 A		72	27	23.0	28.75	18.95	83.00	89.00	0.32	1.90	1.05	5600	7500
35		32007 C	62	18	14.0	18.00	15.00	46.50	56.00	0.45	1.32	0.73	5600
	30207 A	72	17	15.0	18.25	15.25	58.00	62.00	0.37	1.60	0.88	5100	7200
	32207 C	72	23	19.0	24.25	18.25	70.00	80.00	0.37	1.60	0.88	4900	6900
	32207 B	72	23	19.0	24.25	21.75	66.00	81.00	0.58	1.03	0.57	5200	6900
	33207 A	72	28	22.0	28.00	18.40	88.00	104.00	0.35	1.70	0.94	5300	7100
	30307 A	80	21	18.0	22.75	16.00	76.00	77.00	0.31	1.90	1.05	4700	6600
	31307 A	80	21	15.0	22.75	27.00	63.00	67.00	0.83	0.73	0.40	6400	4700
	32307 A	80	31	25.0	32.75	20.00	105.00	116.00	0.31	1.90	1.05	4900	6600
	32307 B	80	31	25.0	32.75	25.25	95.00	112.00	0.55	1.10	0.60	4600	6300
	40	32008 C	68	19	14.5	19.00	15.00	53.00	65.00	0.38	1.58	0.87	5000
33108 A		75	26	20.5	26.00	18.30	83.00	105.00	0.35	1.69	0.93	4600	6500
30208 A		80	18	16.0	19.75	17.05	62.00	66.00	0.37	1.60	0.88	4800	6300
32208 C		80	23	19.0	24.75	19.75	78.00	88.00	0.37	1.60	0.88	4300	6100
33208 A		80	32	25.0	32.00	21.00	107.00	137.00	0.36	1.68	0.92	4400	6100
30308 A		90	23	20.0	25.25	19.85	90.00	96.00	0.35	1.74	0.96	4300	5600
31308 A		90	23	17.0	25.25	20.65	79.00	86.00	0.83	0.73	0.40	4000	5000

\* These are the speed limits according to the SNR concept (see pages 85 to 87).

# Characteristics

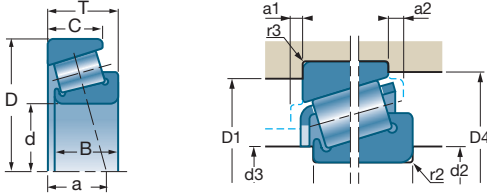
## ■ Single-row tapered roller bearings (mm)







Ref.	D1 max	D1 min	d2 max	d2 min	d3 max	d3 min	D4 min	a1 min	a2 min	r2 max	r3 max	ISO	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg
30202 A	29.0	29.0	25.2	19.0	20.6	20.0	33.0	1.1	1.5	0.6	0.6	0.053	
30203 A	35.2	34.9	24.3	23.8	22.0	22.0	38.1	0.0	1.6	1.0	1.0	0.076	2DB
32203 A	34.2	33.6	25.4	23.8	22.1	22.1	37.9	0.2	2.8	1.0	1.0	0.103	2DD
30303 A	41.0	40.0	26.4	24.0	25.0	24.0	42.0	2.0	3.0	1.0	1.0	0.121	2FB
30204 A	41.2	40.8	30.8	26.8	27.2	27.2	44.2	0.3	2.7	1.0	1.0	0.125	2DB
30304 A	45.7	42.8	29.3	29.2	28.0	27.0	48.6	2.0	4.5	1.5	1.5	0.179	2FB
31304	42.4	40.5	32.6	29.6	26.5	26.5	48.5	0.7	3.2	1.0	1.0	0.170	7FB
32304 A	43.0	43.0	35.4	33.0	28.9	26.0	48.0	0.7	4.0	1.5	1.5	0.238	2FD
32005 V	41.4	40.2	33.6	30.6	29.0	29.0	44.9	2.1	3.1	0.6	0.6	0.110	4CC
30205 A	45.8	44.6	35.3	31.8	31.2	31.2	49.0	0.3	2.8	1.0	1.0	0.154	3CC
32205 B	45.2	41.0	37.3	31.8	29.2	29.2	50.4	0.8	2.9	1.0	1.0	0.192	5CD
33205 A	46.0	44.0	40.0	34.0	30.9	29.0	49.5	1.9	3.5	1.0	1.0	0.222	2DE
30305 A	54.0	53.6	42.6	36.0	35.4	34.0	58.8	2.0	3.0	1.5	1.5	0.265	2FB
31305 V	52.4	48.6	40.8	32.4	32.0	32.0	59.2	0.7	2.8	1.0	1.0	0.262	7FB
32305 A	53.0	50.0	43.9	38.0	34.6	32.0	58.0	1.1	5.0	1.5	1.5	0.378	2FD
32006 C	48.2	47.9	39.7	36.8	34.7	34.7	51.9	2.0	3.4	1.0	1.0	0.165	4CC
30206 A	55.8	53.4	42.2	36.8	36.5	36.5	58.5	0.7	2.8	1.0	1.0	0.238	3DB
32206 C	55.2	52.4	42.0	36.8	37.0	36.0	59.0	1.4	2.9	1.0	1.0	0.282	3DC
33206 A	56.0	53.0	47.3	39.0	37.2	35.0	59.0	2.2	4.6	1.0	1.0	0.353	2DE
30306 A	63.8	62.4	44.6	38.2	42.0	42.0	67.4	3.0	4.5	1.5	1.5	0.400	2FB
31306 A	63.0	53.0	54.0	44.0	41.1	40.0	68.0	1.8	5.3	1.5	1.5	0.395	7FB
32306 A	63.0	59.0	51.1	43.0	40.4	38.0	67.0	1.4	5.5	1.5	1.5	0.579	2FD
32007 C	55.2	54.0	45.1	41.8	39.0	39.0	59.9	2.4	3.8	1.0	1.0	0.219	4CC
30207 A	63.8	63.0	48.8	43.2	43.9	43.9	67.7	1.1	2.4	1.5	1.5	0.328	3DB
32207 C	63.8	61.2	48.3	43.2	43.1	43.1	67.5	0.1	3.8	1.5	1.5	0.430	3DC
32207 B	63.8	57.2	50.6	43.2	41.4	41.4	68.7	1.7	4.5	1.5	1.5	0.436	5DC
33207 A	63.0	61.0	54.5	46.0	42.5	41.0	69.0	3.5	5.5	1.5	1.5	0.542	2DE
30307 A	71.8	70.0	49.5	45.2	45.6	45.0	75.7	3.0	5.5	2.0	1.5	0.550	2FB
31307 A	71.0	62.0	54.5	51.0	44.0	44.0	76.0	1.7	6.5	2.0	1.5	0.526	7FB
32307 A	70.8	67.5	53.2	45.2	44.3	43.0	74.6	4.0	7.5	2.0	1.5	0.827	2FE
32307 B	71.8	61.2	53.2	45.2	42.2	42.2	76.8	1.1	5.0	2.0	1.5	0.741	5FE
32008 C	61.2	60.3	50.0	46.8	44.2	44.2	65.2	2.3	4.4	1.0	1.0	0.265	3CD
33108 A	66.5	65.8	59.2	51.0	48.0	47.0	71.9	2.5	4.9	1.5	1.5	0.505	2CE
30208 A	71.8	69.9	58.9	47.0	50.5	49.6	75.3	1.1	3.5	1.5	1.5	0.422	3DB
32208 C	71.8	68.9	54.4	48.2	48.5	48.5	75.4	0.0	4.8	1.5	1.5	0.508	3DC
33208 A	73.0	67.0	57.2	47.0	47.0	46.0	76.0	5.0	7.0	1.5	1.5	0.733	2DE
30308 A	81.0	77.0	65.5	52.0	54.4	52.0	82.0	1.5	5.0	2.0	1.5	0.759	2FB
31308 A	81.0	71.0	68.5	56.0	53.2	50.0	86.0	2.4	7.2	2.0	1.5	0.747	7FB



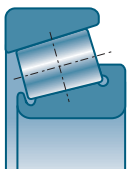
## Tapered roller bearings (continued)



d		D	B	C	T	a			e	Y	Yo		
												10°N	10°N
mm	Ref.	mm	mm	mm	mm	mm							
40	32308 A	90	33	27.0	35.25	23.00	120.00	145.00	0.35	1.74	0.96	4200	5500
	32308 B	90	33	27.0	35.25	27.75	113.00	134.00	0.55	1.10	0.60	4000	5600
45	32009 V	75	20	15.5	20.00	16.50	59.00	73.00	0.39	1.53	0.84	4500	6300
	33109 A	80	26	20.5	26.00	19.40	88.00	117.00	0.38	1.57	0.86	4500	6000
	30209 C	85	19	16.0	20.75	17.75	67.00	74.00	0.40	1.48	0.81	4200	6000
	32209 A	85	23	19.0	24.75	20.00	84.00	100.00	0.40	1.48	0.81	3100	4300
	32209 B	85	23	19.0	24.75	23.75	87.00	104.00	0.59	1.01	0.56	4300	5700
	33209 A	85	32	25.0	32.00	21.80	112.00	145.00	0.39	1.56	0.86	4000	5600
	30309 A	100	25	22.0	27.25	20.75	112.00	127.00	0.35	1.74	0.96	3800	5300
	31309 A	100	25	18.0	27.25	31.55	94.00	103.00	0.83	0.73	0.40	3600	4500
	32309 A	100	36	30.0	38.25	26.80	147.00	175.00	0.35	1.74	0.96	4000	5300
	32309 B	100	36	30.0	38.25	30.25	151.00	187.00	0.55	1.10	0.60	3700	5100
50	32010 A	80	20	15.5	20.00	18.00	69.00	95.00	0.42	1.42	0.78	4100	5800
	33110 A	85	26	20.0	26.00	20.00	89.00	126.00	0.41	1.46	0.80	3900	5400
	30210 C	90	20	17.0	21.75	19.25	76.00	89.00	0.42	1.43	0.79	3100	4500
	32210 A	90	23	19.0	24.75	20.75	91.00	111.00	0.42	1.43	0.79	4000	5400
	33210 A	90	32	24.5	32.00	23.10	121.00	163.00	0.41	1.45	0.80	4000	5400
	30310 A	110	27	23.0	29.25	22.85	136.00	146.00	0.35	1.74	0.96	3400	4800
	31310 A	110	27	19.0	29.25	23.45	116.00	130.00	0.83	0.73	0.40	3300	4600
	32310 A	110	40	33.0	42.25	29.40	179.00	217.00	0.35	1.73	0.95	3600	4800
55	32011 A	90	23	17.5	23.00	20.00	82.00	117.00	0.41	1.48	0.81	3700	5200
	33011 A	90	27	21.0	27.00	19.30	97.00	145.00	0.31	1.92	1.06	3800	5200
	33111 A	95	30	23.0	30.00	22.50	117.00	158.00	0.37	1.60	0.88	3800	5100
	30211 A	100	21	18.0	22.75	21.00	95.00	110.00	0.40	1.48	0.81	3500	5000
	32211 A	100	25	21.0	26.75	22.00	113.00	138.00	0.40	1.48	0.81	3400	4700
	33211 A	100	35	27.0	35.00	25.30	142.00	183.00	0.40	1.50	0.83	3600	5000
	30311 A	120	29	25.0	31.50	25.50	149.00	164.00	0.35	1.74	0.96	3100	4200
	31311 A	120	29	21.0	31.50	24.80	128.00	142.00	0.83	0.73	0.40	3100	4200
	32311 A	120	43	35.0	45.50	32.40	201.00	244.00	0.35	1.74	0.96	3200	4300
	32311 B	120	43	35.0	45.50	36.00	206.00	275.00	0.55	1.10	0.60	3000	4200
60	32012 A	95	23	17.5	23.00	21.00	86.00	127.00	0.83	0.73	0.40	3400	4800
	33012 A	95	27	21.0	27.00	20.10	102.00	157.00	0.33	1.83	1.00	3600	4900
	33112 A	100	30	23.0	30.00	23.70	120.00	166.00	0.40	1.51	0.83	3300	4600
	30212 A	110	22	19.0	23.75	24.00	108.00	126.00	0.40	1.48	0.81	3200	4600
	32212 A	110	28	24.0	29.75	25.05	130.00	160.00	0.40	1.48	0.81	3100	4400
	33212 A	110	38	29.0	38.00	27.20	175.00	233.00	0.40	1.48	0.81	3100	4400
	30312 A	130	31	26.0	33.50	26.90	176.00	198.00	0.35	1.74	0.96	3000	4000
	31312 A	130	31	22.0	33.50	26.20	155.00	176.00	0.83	0.73	0.40	2800	3900
	32312 A	130	46	37.0	48.50	32.30	225.00	270.00	0.35	1.74	0.96	2900	4000

\* These are the speed limits according to the SNR concept (see pages 85 to 87).

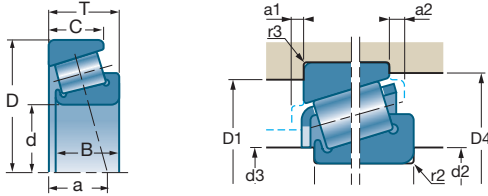
■ Single-row tapered roller bearings (mm) (continued)



Ref.	D1 max	D1 min	d2 max	d2 min	d3 max	d3 min	D4 min	a1 min	a2 min	r2 max	r3 max	ISO	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg
32308 A	81.5	73.0	63.5	54.0	50.0	50.0	82.0	3.0	8.0	2.0	1.5	1.040	2FD
32308 B	80.8	69.7	61.1	50.2	47.6	47.6	86.3	1.2	4.5	2.0	1.5	1.040	5FD
32009 V	68.2	67.6	56.0	51.8	50.0		72.3	2.8	4.1	1.0	1.0	0.320	3CC
33109 A	71.0	67.7	64.4	56.0	52.7	51.0	76.5	2.4	4.8	1.5	1.5	0.551	3CE
30209 C	76.8	74.6	58.9	53.2	53.5	53.5	81.4	2.0	3.2	1.5	1.5	0.463	3DB
32209 A	76.8	70.3	61.9	53.2	51.0	51.0	83.5	3.5	6.5	1.5	1.5	0.641	3DC
32209 B	76.8	70.3	61.9	53.2	51.0	51.0	83.5	2.1	4.5	1.5	1.5	0.576	5DC
33209 A	76.0	72.0	66.9	56.0	52.7	51.0	82.0	3.5	5.3	1.5	1.5	0.803	3DE
30309 A	91.5	86.0	65.0	57.0	59.0	58.0	92.0	3.0	5.0	2.0	1.5	1.030	2FB
31309 A	91.0	79.0	74.9	61.0	58.2	56.0	96.5	2.8	6.3	2.0	1.5	0.951	7FB
32309 A	92.0	82.0	72.2	59.0	59.1	56.0	93.0	0.0	6.6	2.0	1.5	1.400	2FD
32309 B	91.8	75.8	68.6	55.2	53.4	53.4	95.0	1.5	4.1	2.0	1.5	1.400	5FD
32010 A	73.2	71.3	62.8	56.8	54.7	54.7	77.5	2.4	3.0	1.0	1.0	0.360	3CC
33110 A	75.8	74.9	63.8	59.2	56.0	56.0	82.2	2.9	4.4	1.5	1.5	0.574	3CE
30210 C	80.8	79.8	62.6	60.6	58.2	58.2	86.8	2.2	3.1	1.5	1.5	0.527	3DB
32210 A	80.8	78.9	64.9	59.2	57.3	57.0	85.8	3.0	5.5	1.5	1.5	0.667	3DC
33210 A	81.8	76.9	72.4	58.2	57.8	57.8	87.2	3.5	5.6	1.5	1.5	0.875	3DE
30310 A	100.0	95.8	79.8	65.0	65.6	65.0	104.2	2.8	6.0	2.5	2.0	1.290	2FB
31310 A	100.0	87.0	83.2	70.0	64.2	62.0	105.0	3.0	7.6	2.5	2.0	1.240	7FB
32310 A	100.0	90.0	76.0	68.0	62.0	62.0	102.0	0.0	6.8	2.5	2.0	1.860	2FD
32011 A	81.8	81.5	66.5	63.2	62.0	62.0	86.7	4.0	6.0	1.5	1.5	0.592	3CC
33011 A	81.0	78.0	74.7	66.0	63.8	62.0	86.0	2.7	5.3	1.5	1.5	0.667	2CE
33111 A	86.0	83.0	76.5	66.0	63.3	62.0	91.3	2.9	6.1	1.5	1.5	0.863	3CE
30211 A	91.8	88.3	69.7	60.2	64.7	64.7	96.3	4.0	4.5	2.0	1.5	0.732	3DB
32211 A	109.2	87.5	70.5	65.2	64.5	63.0	95.3	4.0	6.5	2.0	1.3	0.915	3DC
33211 A	91.0	85.0	78.9	67.0	63.0	62.0	96.0	3.4	6.5	2.0	1.5	1.160	3DE
30311 A	110.0	104.0	88.4	70.0	73.9	71.0	111.0	1.7	6.1	2.5	2.0	1.610	2FB
31311 A	110.0	93.0	89.9	75.0	69.8	68.0	114.0	2.8	7.6	2.5	2.0	1.580	7FB
32311 A	110.0	99.0	86.8	73.0	71.1	67.0	111.0	0.0	8.2	2.5	2.0	2.350	2FD
32311 B	109.8	91.4	84.0	67.2	66.1	66.1	113.3	1.9	7.0	2.5	2.0	2.320	5FD
32012 A	86.8	84.8	73.8	68.2	66.0	66.0	92.2	4.0	6.0	1.5	1.5	0.632	4CC
33012 A	104.2	81.0	78.9	69.2	67.7	64.4	90.5	2.8	4.9	1.5	1.5	0.715	2CE
33112 A	91.0	72.0	81.8	71.0	68.0	68.0	96.5	2.7	5.5	1.5	1.5	0.917	3CE
30212 A	101.8	96.0	76.2	65.2	71.2	71.2	104.5	4.0	4.5	2.0	1.5	0.967	3EB
32212 A	101.0	92.0	83.5	72.0	70.7	68.0	105.5	2.6	5.5	2.0	1.5	1.170	3EC
33212 A	101.0	90.0	86.3	72.0	69.0	68.0	106.2	4.2	6.7	2.0	1.5	1.540	3EE
30312 A	118.0	112.0	96.3	78.0	80.0	77.0	120.0	2.9	7.2	3.0	2.5	2.030	2FB
31312 A	118.0	103.0	99.8	82.0	75.5	73.0	123.0	4.1	8.5	3.0	2.5	2.000	7FB
32312 A	118.0	107.0	96.7	81.0	76.4	74.0	122.0	3.4	8.8	3.0	2.5	2.924	2FB



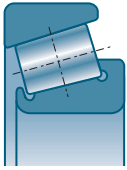
## Tapered roller bearings (continued)



d		D	B	C	T	a			e	Y	Yo		
												rpm*	rpm*
mm	Ref.	mm	mm	mm	mm	mm	10 <sup>3</sup> N	10 <sup>3</sup> N					
65	32013 A	100	23	17.5	23.00	22.50	90.00	137.00	0.46	1.31	0.72	3200	4500
	33013 A	100	27	21.0	27.00	21.10	104.00	164.00	0.35	1.72	0.95	3400	4600
	33113 A	110	34	26.5	34.00	25.90	153.00	216.00	0.39	1.55	0.85	3200	4300
	30213 A	120	23	20.0	24.75	24.00	127.00	149.00	0.40	1.48	0.81	3000	4100
	32213 A	120	31	27.0	32.75	26.65	156.00	195.00	0.40	1.48	0.82	3000	4000
	33213 A	120	41	32.0	41.00	30.00	203.00	275.00	0.39	1.54	0.85	2800	4000
	30313 A	140	33	28.0	36.00	29.30	202.00	229.00	0.35	1.74	0.96	2700	3700
	31313 A	140	33	23.0	36.00	43.00	173.00	199.00	0.83	0.73	0.40	2600	3600
	32313 A	140	48	39.0	51.00	33.00	280.00	350.00	0.35	1.74	0.96	2600	3500
	32313 B	140	48	39.0	51.00	41.50	275.00	375.00	0.55	1.10	0.60	2600	3500
70	32014 A	110	25	19.0	25.00	23.60	109.00	158.00	0.43	1.38	0.76	3000	4200
	33014 A	110	31	25.5	31.00	22.10	136.00	203.00	0.28	2.11	1.16	3100	4200
	30214 A	125	24	21.0	26.25	26.00	139.00	169.00	0.42	1.43	0.79	2800	4000
	32214 A	125	31	27.0	33.25	29.00	166.00	213.00	0.42	1.43	0.79	2700	3800
	33214 A	125	41	32.0	41.00	31.20	209.00	290.00	0.41	1.47	0.81	2800	4000
	30314 A	150	35	30.0	38.00	30.50	229.00	260.00	0.35	1.74	0.96	2400	3400
	31314 A	150	35	25.0	38.00	47.10	195.00	225.00	0.83	0.73	0.40	2500	3400
	32314 A	150	51	42.0	54.00	37.00	300.00	375.00	0.35	1.74	0.96	2400	3200
	32314 B	150	51	42.0	54.00	44.00	305.00	410.00	0.55	1.10	0.60	2400	3300
	75	32015 A	115	25	19.0	25.00	25.00	116.00	180.00	0.46	1.31	0.72	2800
33015 A		115	31	25.5	31.00	22.90	143.00	220.00	0.30	2.01	1.11	3000	4000
33115 A		125	37	29.0	37.00	29.30	188.00	275.00	0.40	1.51	0.83	2800	3800
30215 A		130	25	22.0	27.25	27.00	144.00	177.00	0.44	1.38	0.76	2600	3800
32215 A		130	31	27.0	33.25	30.15	176.00	230.00	0.44	1.38	0.76	2800	3800
33215 A		130	41	31.0	41.00	32.50	216.00	305.00	0.43	1.40	0.77	2800	3800
30315 A		160	37	31.0	40.00	32.50	253.00	300.00	0.35	1.74	0.96	2200	3000
32315 A		160	55	45.0	58.00	40.00	365.00	470.00	0.35	1.74	0.96	2300	3000
32315 B		160	55	45.0	58.00	46.50	325.00	415.00	0.55	1.10	0.60	2300	3100
80		32016 A	125	29	22.0	29.00	27.00	149.00	228.00	0.42	1.42	0.78	2600
	33016 A	125	36	29.5	36.00	25.30	177.00	285.00	0.28	2.16	1.19	2700	3700
	33116 A	130	37	29.0	37.00	31.00	190.00	295.00	0.42	1.44	0.79	2500	3500
	30216 A	140	26	22.0	28.25	28.00	160.00	194.00	0.42	1.43	0.79	2500	3500
	32216 A	140	33	28.0	35.25	31.75	203.00	260.00	0.42	1.43	0.79	2600	3500
	33216 A	140	46	35.0	46.00	35.70	250.00	360.00	0.43	1.41	0.78	2400	3400
	30316 A	170	39	33.0	42.50	34.80	295.00	345.00	0.35	1.74	0.96	2200	3000
	32316 A	170	58	48.0	61.50	42.00	385.00	500.00	0.35	1.74	0.96	2200	2800
	32316 B	170	58	48.0	61.50	49.00	365.00	470.00	0.55	1.10	0.60	2100	2900
	85	32017 A	130	29	22.0	29.00	28.00	151.00	236.00	0.44	1.36	0.75	2500
33017 A		130	36	29.5	36.00	26.00	196.00	310.00	0.29	2.06	1.13	2500	3500

\* These are the speed limits according to the SNR concept (see pages 85 to 87).

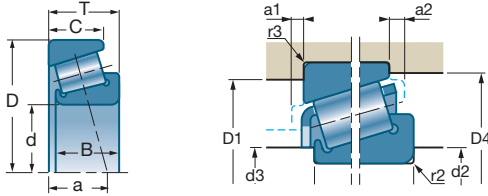
■ Single-row tapered roller bearings (mm) (continued)



Ref.	D1 max	D1 min	d2 max	d2 min	d3 max	d3 min	D4 min	a1 min	a2 min	r2 max	r3 max	ISO
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
32013 A	90.8	90.2	79.2	74.2	71.0	71.0	97.3	4.0	6.0	1.5	1.5	4CC
33013 A	91.0	87.0	84.3	76.0	72.7	71.0	96.0	2.8	5.1	1.5	1.5	2CE
33113 A	101.0	95.8	89.7	76.0	74.0	72.0	106.1	3.3	6.2	1.5	1.5	3DE
30213 A	111.8	106.0	92.0	70.2	77.0	76.5	113.0	3.2	4.5	2.0	1.5	3EB
32213 A	111.0	104.0	92.9	77.0	77.6	75.0	115.5	3.4	4.0	2.0	1.5	3EC
33213 A	111.0	101.0	92.0	77.0	74.0	74.0	115.0	3.8	7.4	2.0	1.5	2.020 3EE
30313 A	128.0	120.0	104.1	83.0	86.7	83.0	130.0	2.7	7.7	3.0	2.5	2.520 2GB
31313 A	128.0	111.0	95.6	87.0	79.0	79.0	132.0	3.9	9.0	3.0	2.5	2.500 7GB
32313 A	125.8	118.9	94.2	79.2	80.7	80.7	131.2	6.0	12.0	3.0	2.5	3.400 2GD
32313 B	126.8	109.0	98.6	79.2	78.3	78.3	132.3	1.4	7.3	3.0	2.5	3.460 5GD
32014 A	101.0	97.8	91.4	81.0	78.3	77.0	105.6	3.8	5.5	1.5	1.5	0.867 4CC
33014 A	101.0	90.0	90.8	81.0	78.9	78.0	105.5	3.3	5.1	1.5	1.5	1.080 2CE
30214 A	115.8	110.4	95.0	75.2	81.7	81.7	119.9	3.0	5.0	2.0	1.5	1.300 3EB
32214 A	115.0	108.0	90.9	80.2	80.3	80.0	120.9	4.0	6.0	2.0	1.5	1.730 3EC
33214 A	116.0	106.0	100.4	82.0	80.9	78.0	120.0	3.8	7.3	2.0	1.5	2.120 3EE
30314 A	138.0	130.0	108.8	88.0	92.4	89.0	140.0	3.9	7.7	3.0	2.5	3.050 2GB
31314 A	138.0	118.0	114.3	94.0	85.0	84.0	142.0	3.9	9.3	3.0	2.5	2.950 7GB
32314 A	135.8	126.9	101.3	84.2	86.4	86.4	141.5	6.0	12.0	3.0	2.5	4.400 2GD
32314 B	136.8	116.9	105.2	84.2	83.3	83.3	142.3	2.3	7.3	3.0	2.5	4.250 5GD
32015 A	106.8	102.5	89.5	83.2	82.0	82.0	111.5	5.0	6.5	1.5	1.5	0.858 4CC
33015 A	106.0	103.5	95.6	86.0	83.3	83.0	111.0	3.4	5.0	1.5	1.5	1.150 2CE
33115 A	116.0	109.0	102.1	87.0	84.6	83.0	120.5	4.7	7.0	2.0	1.5	1.810 3DE
30215 A	120.8	115.1	102.0	80.2	86.6	86.6	125.5	2.8	5.0	2.0	1.5	1.390 4DB
32215 A	121.0	114.0	104.2	87.0	86.8	84.0	126.0	3.3	5.7	2.0	1.5	1.760 4DC
33215 A	121.0	111.8	105.5	87.0	85.4	83.0	125.4	3.8	8.1	2.0	1.5	2.230 3EE
30315 A	148.0	139.0	114.0	92.0	95.0	95.0	149.0	5.0	9.0	3.0	2.5	3.700 2GB
32315 A	148.0	135.0	116.6	96.0	94.6	91.0	150.0	3.6	9.6	3.0	2.5	5.370 2GD
32315 B	146.8	124.1	109.5	89.2	86.9	86.9	152.6	1.2	8.3	3.0	2.5	5.200 5GD
32016 A	115.8	112.0	99.9	88.2	88.7	88.7	120.7	6.0	7.0	1.5	1.5	1.300 3CC
33016 A	116.0	112.0	103.4	91.0	90.3	88.0	119.0	4.2	6.2	1.5	1.5	1.630 2CE
33116 A	121.0	114.0	99.6	89.0	89.0	88.0	126.0	6.0	10.0	2.0	1.5	1.930 3DE
30216 A	130.0	124.0	107.0	95.0	91.0	91.0	132.0	3.3	6.0	2.5	2.0	1.690 3EB
32216 A	130.0	122.0	110.8	95.0	92.6	90.0	134.0	3.0	7.0	2.5	2.0	2.150 3EC
33216 A	130.0	118.0	113.7	95.0	90.3	89.0	135.5	4.1	9.0	2.5	2.0	2.940 3EE
30316 A	158.0	148.0	124.6	98.0	105.6	102.0	159.0	4.2	9.1	3.0	2.5	4.360 2GB
32316 A	155.8	143.7	94.2	94.2	100.8	164.3	1.6	7.7	3.0	2.5	6.303 2GD	
32316 B	155.8	136.3	118.1	94.2	96.1	96.1	164.3	1.4	8.2	3.0	2.5	6.303 5GD
32017 A	120.8	116.4	104.9	93.2	93.9	94.0	126.3	6.0	7.0	1.5	1.5	1.410 4CC
33017 A	120.8	117.5	103.4	93.2	94.1	94.1	125.9	6.0	6.5	1.5	1.5	1.700 3CE



## Tapered roller bearings (continued)

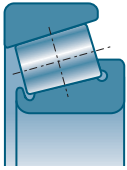


d		D	B	C	T	a			e	Y	Yo		
												rpm*	rpm*
mm	Ref.	mm	mm	mm	mm	mm	10°N	10°N				rpm*	rpm*
85	33117 A	140	41	32.0	41.00	33.20	227.00	340.00	0.41	1.48	0.81	2400	3300
	30217 A	150	28	24.0	30.50	30.00	183.00	224.00	0.42	1.43	0.79	2300	3300
	32217 A	150	36	30.0	38.50	34.20	235.00	310.00	0.42	1.43	0.79	2200	3100
	33217 A	150	49	37.0	49.00	37.10	295.00	430.00	0.42	1.43	0.79	2200	3100
	32317 A	180	60	49.0	63.50	43.80	445.00	580.00	0.35	1.74	0.96	2000	2700
	32317 B	180	60	46.0	63.50	51.00	395.00	510.00	0.55	1.10	0.60	2000	2700
90	32018 A	140	32	24.0	32.00	30.00	171.00	260.00	0.41	1.42	0.78	2300	3300
	33018 A	140	39	32.5	39.00	27.10	225.00	360.00	0.27	2.23	1.23	2400	3200
	33118 A	150	45	35.0	45.00	35.30	262.00	405.00	0.40	1.51	0.83	2300	3000
	30218 A	160	30	26.0	32.50	31.00	208.00	260.00	0.42	1.43	0.79	2200	3100
	32218 A	160	40	34.0	42.50	37.00	275.00	370.00	0.42	1.43	0.79	2100	2900
	32318 A	190	64	53.0	67.50	46.60	470.00	610.00	0.35	1.74	0.96	1900	2500
95	32019 A	145	32	24.0	32.00	31.50	179.00	280.00	0.44	1.36	0.75	2200	3100
	33019 A	145	39	32.5	39.00	27.80	230.00	375.00	0.28	2.16	1.19	2400	3200
	30219 A	170	32	27.0	34.50	34.00	225.00	280.00	0.42	1.43	0.79	2000	2900
	32219 A	170	43	37.0	45.50	40.00	305.00	415.00	0.42	1.43	0.79	2100	3000
100	32020 A	150	32	24.0	32.00	32.50	182.00	290.00	0.46	1.31	0.72	2100	3000
	33020 A	150	39	32.5	39.00	29.00	235.00	390.00	0.29	2.09	1.15	2100	3000
	30220 A	180	34	29.0	37.00	36.00	255.00	325.00	0.42	1.43	0.79	1900	2800
	32220 A	180	46	39.0	49.00	42.00	345.00	475.00	0.42	1.43	0.79	1900	2600
	32320 B	215	73	55.0	77.50	61.00	495.00	630.00	0.55	1.10	0.60	1700	2300
	105	32021 A	160	35	26.0	35.00	34.00	210.00	335.00	0.44	1.35	0.74	2000
33021 A		160	43	34.0	43.00	31.00	270.00	460.00	0.28	2.12	1.17	2100	2900
30221 A		190	36	30.0	39.00	37.00	290.00	370.00	0.42	1.43	0.79	1800	2600
32221 A		190	50	43.0	53.00	44.00	390.00	550.00	0.42	1.43	0.79	1800	2500
110		32022 A	170	38	29.0	38.00	36.50	250.00	400.00	0.43	1.39	0.77	1900
	33022 A	170	47	37.0	47.00	33.00	305.00	530.00	0.29	2.09	1.15	1900	2700
	30222 A	200	38	32.0	41.00	40.80	325.00	420.00	0.42	1.43	0.79	1800	2500
	32222 A	200	53	46.0	56.00	46.00	435.00	620.00	0.42	1.43	0.79	1700	2400
120	T4CB120	170	25	19.5	27.00	34.00	150.00	235.00	0.47	1.27	0.70	1900	2600
	32024 A	180	38	29.0	38.00	40.00	260.00	430.00	0.46	1.31	0.72	1800	2500
	33024 A	180	48	38.0	48.00	36.20	305.00	530.00	0.31	1.97	1.08	1900	2600
	30224 A	215	40	34.0	43.50	43.00	350.00	465.00	0.44	1.38	0.76	1600	2200
	32224 A	215	58	50.0	61.50	51.60	475.00	680.00	0.44	1.38	0.76	1600	2200
130	T4CB130	185	27	21.0	29.00	20.00	180.00	280.00	0.47	1.27	0.70	1700	2400
	32026 A	200	45	34.0	45.00	44.00	340.00	565.00	0.43	1.38	0.76	1600	2200

\* These are the speed limits according to the SNR concept (see pages 85 to 87).

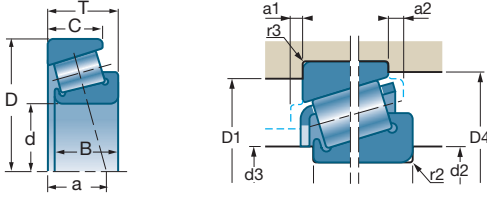


■ Single-row tapered roller bearings (mm) (continued)



Ref.	D1 max	D1 min	d2 max	d2 min	d3 max	d3 min	D4 min	a1 min	a2 min	r2 max	r3 max	ISO	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg
33117 A	130.0	123.2	114.9	100.0	95.7	94.0	136.0	4.3	7.3	2.5	2.0	2.440	3DE
30217 A	137.8	132.8	107.0	97.2	98.4	98.4	142.5	5.0	7.0	2.5	2.0	2.160	3EB
32217 A	140.0	131.1	118.8	100.0	98.6	96.0	144.7	3.8	7.8	2.5	2.0	2.750	3EC
33217 A	140.0	126.0	120.7	100.0	97.5	95.0	144.0	5.2	9.2	2.5	2.0	3.620	3EE
32317 A	166.0	147.0	133.7	110.0	107.0	104.0	168.0	4.7	10.9	4.0	3.0	7.450	2GD
32317 B	162.8	145.6	123.3	102.2	102.2	102.2	172.9	1.9	9.0	2.5	2.5	7.070	5GD
32018 A	130.8	124.6	110.1	100.2	98.6	98.6	134.6	6.0	8.0	2.0	1.5	1.691	3CC
33018 A	131.0	129.0	116.5	102.0	101.7	99.0	135.0	4.9	6.0	2.0	1.5	2.200	2CE
33118 A	137.8	131.4	114.5	103.2	99.4	99.4	144.9	7.0	10.0	2.5	2.0	3.220	3DE
30218 A	147.8	141.3	113.6	102.2	104.0	104.0	152.4	5.0	6.5	2.5	2.0	2.700	3FB
32218 A	147.8	138.8	115.8	102.2	103.2	103.2	154.6	5.0	8.5	2.5	2.0	3.500	3FC
32318 A	176.0	157.0	140.1	115.0	111.9	109.0	178.0	4.2	9.5	4.0	3.0	8.780	2GD
32019 A	135.8	129.6	116.4	105.2	104.5	104.5	140.6	6.0	8.0	2.0	1.5	1.784	4CC
33019 A	136.0	127.0	120.9	107.0	105.7	104.0	139.9	4.9	6.0	2.0	1.5	2.300	2CE
30219 A	156.8	150.0	119.9	109.2	110.3	110.3	161.5	5.0	7.5	3.0	2.5	3.160	3FB
32219 A	156.8	146.9	123.9	109.2	108.6	108.6	162.5	5.0	8.5	3.0	2.5	4.200	3FC
32020 A	140.8	133.9	121.2	110.2	108.7	108.7	145.1	6.0	8.0	2.0	1.5	1.880	4CC
33020 A	140.8	135.0	117.7	110.2	108.5	108.5	144.3	7.0	6.5	2.0	1.5	2.310	2CE
30220 A	166.8	158.0	128.8	114.2	117.1	117.1	170.5	5.0	8.0	3.0	2.5	3.700	3FB
32220 A	165.8	155.3	129.7	114.2	114.9	114.9	173.0	5.0	10.0	3.0	2.5	5.200	3FC
32320 B	197.8	172.2	149.0	117.2	116.3	116.3	206.0	1.4	10.9	2.5	2.5	12.200	5GD
32021 A	147.8	143.8	127.1	117.2	115.2	115.2	154.4	6.0	9.0	2.5	2.0	2.500	4DC
33021 A	148.0	145.9	130.0	120.0	115.0	115.0	154.4	5.1	7.9	2.5	2.0	3.060	2DE
30221 A	175.8	169.1	136.7	119.2	126.1	126.1	181.7	6.0	9.0	3.0	2.5	4.500	3FB
32221 A	175.8	163.0	136.7	119.2	121.4	121.4	182.9	5.0	10.0	3.0	2.5	6.250	3FC
32022 A	157.8	152.4	134.3	123.2	120.7	120.7	164.1	7.0	9.0	2.5	2.0	3.100	4DC
33022 A	156.8	152.9	132.4	123.2	121.5	121.5	163.2	7.0	10.0	2.0	2.0	3.800	2DE
30222 A	188.0	175.7	154.6	128.0	132.7	129.0	189.9	4.8	8.7	3.0	2.5	5.230	3FB
32222 A	214.2	172.3	145.1	124.2	131.6	131.6	193.8	6.0	10.0	3.0	2.5	7.352	3FC
T4CB120	153.8	159.6	137.7	134.2	128.4	128.4	164.8	5.0	8.0	3.0	3.0	1.540	4CB
32024 A	167.8	161.4	144.3	133.2	128.9	128.9	174.4	7.0	9.0	2.5	2.0	3.183	4DC
33024 A	170.0	160.9	150.5	135.0	132.6	130.0	172.1	3.6	7.4	2.5	2.0	4.140	2DE
30224 A	203.0	0.0	160.0	138.0	148.0	141.0	203.0	4.0	1.8	3.0	2.5	6.270	4FB
32224 A	203.0	181.0	169.0	138.0	148.0	137.0	206.0	5.5	9.0	3.0	2.5	9.270	4FD
T4CB130	171.0	168.0	157.4	140.0	140.0	140.0	178	1.9	5.9	3.0	3.0	2.300	4CB
32026 A	187.8	178.2	160.4	143.2	142.3	142.3	193.0	8.0	11.0	2.5	2.0	5.060	4EC

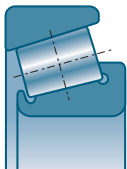


**Tapered roller bearings (continued)**


d		D	B	C	T	a			e	Y	Yo		
												10 <sup>3</sup> N	10 <sup>6</sup> N
mm	Ref.	mm	mm	mm	mm	mm	10 <sup>3</sup> N	10 <sup>6</sup> N				rpm*	rpm*
<b>130</b>	30226 A	230	40	34.0	43.75	45.70	380.00	500.00	0.44	1.38	0.76	1500	2100
	32226 A	230	64	54.0	67.75	56.00	590.00	885.00	0.44	1.38	0.76	1400	2000
<b>140</b>	T4CB140	195	27	21.0	29.00	41.00	186.00	285.00	0.50	1.19	0.66	1600	2300
	32028 A	210	45	34.0	45.00	46.50	350.00	595.00	0.46	1.31	0.72	1500	2100
	30228 A	250	42	36.0	45.75	48.25	440.00	580.00	0.44	1.38	0.76	1400	2000
	32228 A	250	68	58.0	71.75	60.05	650.00	950.00	0.44	1.38	0.76	1300	1800
<b>150</b>	32030 A	225	48	36.0	48.00	48.80	395.00	650.00	0.46	1.31	0.72	1400	2000
	30230 A	270	45	38.0	49.00	52.00	500.00	670.00	0.44	1.38	0.76	1300	1800
	32230 A	270	73	60.0	77.00	64.00	775.00	1200.00	0.44	1.38	0.76	1200	1700
<b>160</b>	T4DB160	220	30	23.0	32.00	44.00	237.00	390.00	0.49	1.23	0.68	1500	2000
	32032 A	240	51	38.0	51.00	52.10	445.00	740.00	0.46	1.31	0.72	1300	1800
	32232 A	290	80	67.0	84.00	70.30	810.00	1200.00	0.44	1.38	0.76	1200	1700
<b>170</b>	32034 A	260	57	43.0	57.00	56.10	540.00	890.00	0.44	1.35	0.74	1300	1700
	32234 A	310	86	71.0	91.00	74.30	1030.00	1700.00	0.44	1.38	0.76	1000	1400
<b>180</b>	32036 A	280	64	48.0	64.00	60.00	650.00	1115.00	0.42	1.42	0.78	1200	1600
	32236 A	320	86	71.0	91.00	77.00	1060.00	1700.00	0.45	1.33	0.73	1000	1300
<b>190</b>	32038 A	290	64	48.0	64.00	63.00	660.00	1150.00	0.44	1.36	0.75	1100	1500
<b>200</b>	32940	280	51	39.0	51.00	54.00	525.00	960.00	0.39	1.52	0.84	1100	1600
	32040 A	310	70	53.0	70.00	67.00	750.00	1350.00	0.43	1.39	0.77	1000	1400
<b>240</b>	32048 A	360	76	57.0	76.00	78.50	940.00	1700.00	0.46	1.31	0.72	900	1200
<b>280</b>	32056 A	420	87	65.0	87.00	90.50	1250.00	2350.00	0.46	1.31	0.72	700	1000
<b>320</b>	32064 A	480	100	74.0	100.00	103.00	1560.00	2800.00	0.46	1.31	0.72	600	900

\* These are the speed limits according to the SNR concept (see pages 85 to 87).

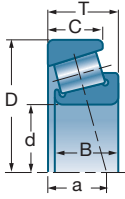
■ Single-row tapered roller bearings (mm) (continued)









Ref.	D1 max	D1 min	d2 max	d2 min	d3 max	d3 min	D4 min	a1 min	a2 min	r2 max	r3 max	ISO	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg
30226 A	216.0	203.0	176.0	151.0	155.0	151.0	219.0	6.5	9.3	4.0	3.0	7.070	4FB
32226 A	213.8	195.2	170.6	146.2	147.0	147.0	221.9	3.0	7.0	4.0	3.0	11.500	4FD
T4CB140	182.7	178.8		154.2	148.1	148.1	202.8	2.9	6.9	3.0	3.0	2.400	4CB
32028 A	197.8	186.9	170.1	153.2	151.1	151.1	202.8	8.0	11.0	2.5	2.0	5.200	4DC
30228 A	233.8	220.4	182.2	156.2	163.2	163.0	236.6	4.4	6.0	4.0	3.0	9.000	4FB
32228 A	236.0	210.0	193.0	161.0	159.0	159.0	240.0	5.5	9.8	4.0	3.0	14.200	4FD
32030 A	213.0	200.0	188.0	168.0	164.0	164.0	218.0	6.5	10.5	3.0	2.5	6.310	4EC
30230 A	256.0	234.0	200.0	164.0	175.0	175.0	254.0	9.0	11.0	4.0	3.0	11.100	4GB
32230 A	256.0	226.0	206.7	164.0	171.0	171.0	254.0	8.0	13.5	4.0	3.0	18.500	4GD
T4DB160	207.0	198.0	180.0	173.0	172.0		213.0	2.0	5.7	3.0	3.0	3.200	4DB
32032 A	228.0	213.0	200.0	172.0	175.0	175.0	233.0	6.5	11.0	3.0	2.5	7.700	4EC
32232 A	276.0	236.0	224.0	181.0	183.0	183.0	276.0	6.5	12.5	4.0	3.0	22.500	4GD
32034 A	248.0	230.0	215.0	182.0	187.0	187.0	252.0	6.0	12.0	3.0	2.5	10.300	4EC
32234 A	292.0	259.0	238.0	188.0	196.0	196.0	294.0	10.0	20.0	5.0	4.0	29.300	4GD
32036 A	268.0	247.0	230.0	192.0	199.0	199.0	267.0	10.0	16.0	3.0	2.5	14.200	3FD
32236 A	302.0	267.0	198.0	198.0	204.0	204.0	303.0	10.0	20.0	5.0	4.0	30.700	4GD
32038 A	278.0	257.0	241.0	202.0	209.0	209.0	279.0	10.0	16.0	3.0	2.5	14.800	4FD
32940	265.8	256.8	235.3	214.2	216.0	216.0	271.5	3.5	8.1	3.0	2.5	9.380	
32040 A	298.0	273.0	254.9	212.0	221.0	221.0	297.0	10.0	16.0	3.0	2.5	19.100	4FD
32048 A	344.0	315.0	298.0	254.0	262.0	262.0	348.0	9.0	15.5	4.0	3.0	26.000	4FD
32056 A	404.0	370.0	339.5	298.0	297.0	297.0	405.0	3.0	11.0	5.0	4.0	39.500	4FC
32064 A	464.0	417.0	397.0	338.0	344.0	344.0	464.0	12.0	19.0	5.0	4.0	59.100	4GD



## Tapered roller bearings (continued)



■ Single-row tapered roller bearings (inch)

d		D	B	C	T	a					
pouce	Réf.	mm	mm	mm	mm	mm	10 <sup>3</sup> N	10 <sup>3</sup> N	tr/mn*	tr/mn*	kg
<b>75,987</b>	HM215249/210	131,975	39,000	32,000	39,000	29,00	205	285	2500	3500	2,0900
<b>89,974</b>	HM218248/210	146,975	40,000	32,500	40,000	30,80	208	300	2200	3100	2,4400
<b>88,900</b>	HM518445/410	152,400	39,688	30,163	39,688	33,10	249	345	2100	3000	2,8700
<b>100,000</b>	JHM720249/210	160,000	40,000	32,000	41,000	38,30	242	375	2000	2900	3,0800
<b>50,000</b>	JLM104945N910Z	82,000	27,700	17,000	21,500	22,20	72	95	4000	5700	0,4440
<b>38,000</b>	JL69349/310A	63,000	17,000	13,500	17,000	14,00	41,5	56	5300	7500	0,1976
<b>80,000</b>	JM515649/610	130,000	34,000	28,500	35,000	29,60	170	250	2500	3500	1,7700
<b>17,462</b>	LM11749/710	39,878	14,605	10,668	13,843	8,80	22,3	21,5	9800	13000	0,0850
<b>19,050</b>	LM11949/910	45,237	16,637	12,065	15,494	10,00	29,5	29,5	8600	11000	0,1250
<b>21,986</b>	LM12749/710	45,237	16,637	12,065	15,494	10,20	29,5	33,5	8200	11000	0,1200
<b>21,986</b>	LM12749/711	45,974	16,637	12,065	15,494	10,20	29,5	33	8200	10000	0,1220
<b>38,100</b>	LM29749/710	65,088	18,288	13,970	18,034	13,70	43,5	57	5200	7300	0,2380
<b>34,925</b>	LM48548/510	65,088	18,288	13,970	18,034	14,20	48	58	5400	7600	0,2500
<b>41,275</b>	LM501349/310	73,431	19,812	14,732	19,558	16,30	58	70	4700	6600	0,3350
<b>45,987</b>	LM503349/310	74,976	18,000	14,000	18,000	15,90	53	75	4400	6200	0,3200
<b>45,987</b>	LM503349A/310	74,976	18,000	14,000	18,000	15,90	53	75	4400	6200	0,3200
<b>45,242</b>	LM603049/011	77,788	19,842	15,08	19,842	17,60	58	74	4400	6100	0,3650
<b>31,750</b>	LM67048/010	59,131	16,764	11,811	15,875	12,80	35,5	42	5900	8400	0,1770
<b>26,988</b>	L44649/610	50,292	14,732	10,668	14,224	11,10	27,6	32	6900	9800	0,1190
<b>29,000</b>	L45449/410	50,292	14,732	10,668	14,224	10,90	30	36	7100	9600	0,1090
<b>196,850</b>	L540049/010	254,000	27,783	21,433	28,575	42,60	198	415	1200	1600	3,5000
<b>34,988</b>	L68149/110	59,131	16,764	11,938	15,875	13,30	35	47	5900	8000	0,1700

\* These are the speed limits according to the SNR concept (see pages 85 to 87).