

FAG



Tapered Roller Bearings Matched pairs

SCHAEFFLER

Contents

	Page
Features	
X-life.....	3
Radial and axial load carrying capacity.....	4
Compensation of angular misalignments.....	5
Sealing.....	5
Lubrication.....	5
Operating temperature.....	5
Cages.....	5
Suffixes.....	5
Tapered roller bearings for special applications.....	5
Design and safety guidelines	
Equivalent dynamic bearing load.....	6
Determining the resulting internal axial force F_a for single bearings and bearing pairs in an X and O arrangement.....	7
Equivalent static bearing load.....	9
Basic load ratings and fatigue limit load for bearing pairs.....	9
Minimum radial load.....	9
Speeds.....	9
Design of bearing arrangements.....	10
Mounting and advantages of matched bearing sets.....	10
Axial adjustment.....	11
Accuracy	
Tapered roller bearings in metric sizes.....	13
Tolerance for total width tolerance of matched bearings.....	13
Chamfer dimensions.....	13
Ordering example, ordering designation	14
Dimension tables	
Tapered roller bearings, matched pairs.....	16

Tapered roller bearings, matched pairs

Features Tapered roller bearings comprise solid inner and outer rings with tapered raceways and tapered rollers in a window cage.

The classification and designation of tapered roller bearings in metric sizes is based on:

- DIN 720:2008
- ISO 355:2007
- ANSI/ABMA 19.1:2011 (prefix KJ).

The classification and designation of tapered roller bearings in inch sizes is based on:

- ANSI/ABMA 19.2:2013 (prefix K).

Tapered roller bearings in matched pairs are of an open design and are not self-retaining. As a result, the inner ring with the rollers and the cage can be mounted separately from the outer ring.

Tapered roller bearings in matched pairs are also available in the X-life design.

Metric and inch size bearings are available.

Furthermore, tapered roller bearings are also available by agreement in many other designs and sizes as well as for special applications. For advice on general availability, please consult Schaeffler.

X-life

X-life is the premium brand that identifies particularly high performance products under the INA and FAG brands. They are characterised by longer rating life and operating life, due to higher basic dynamic load ratings compared to the previous standard.

This higher performance results from the use of state of the art manufacturing techniques and improved internal constructions. They lead to better and more uniform surfaces and contact areas and thus optimised load distribution in the bearing.

The detailed technical enhancements offer a range of advantages, such as:

- up to 20% higher basic dynamic load ratings C_r
- higher running accuracy and smoothness of running
- lower-friction, more energy-efficient running (reduction in friction by up to 50%, in the case of tapered roller bearings with a steep taper up to 75%)
- lower heat generation in the bearing
- higher limiting speeds
- lower lubricant consumption and, consequently, longer maintenance intervals with relubrication
- a measurably longer operating life
- high reliability and operational security
- lower overall operating costs
- compact, environmentally-friendly bearing arrangements.

These advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

X-life tapered roller bearings include the suffix XL in the designation.

Tapered roller bearings, matched pairs

Radial and axial load carrying capacity

Single row tapered roller bearings can support axial forces in one direction and high radial forces.

If the load carrying capacity of one bearing is not sufficient or the shaft is to be guided with a certain axial clearance in both directions, ready-to-fit matched bearing sets are available.

In principle, there are three arrangements of matched tapered roller bearings, namely the X, O and tandem arrangement.

Contact angle

The contact lines extending from the outer ring at less than 90° form a cone that determines the arrangement of the bearing sets, *Figure 1*. The contact lines of the rolling element forces intersect at the contact cone apexes, so the spacing between the contact cone apexes of two tapered roller bearings is the support base of the bearing arrangement.

- ① X arrangement
- ② O arrangement
- ③ Tandem arrangement
- ④ Gauge ring

F_r = radial load
 F_a = axial load

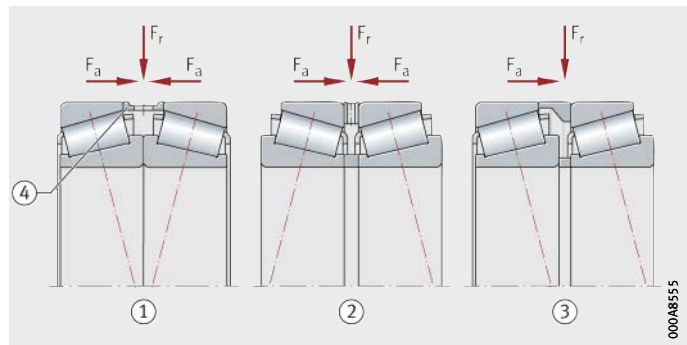


Figure 1
 Arrangement of tapered roller bearings

In the case of matched pairs of bearings, two identical bearings are matched by means of an intermediate ring to form bearing sets.

X arrangement

In the case of bearing sets in an X arrangement, the contact lines converge relative to the bearing axis, *Figure 1*. While axial forces can be supported from both directions, this is only ever by means of one bearing. The construction of the X arrangement is simple and is the most frequently used arrangement of tapered roller bearings in a matched pair.

O arrangement

In the case of bearing sets in an O arrangement, the contact lines diverge relative to the bearing axis, *Figure 1*. While axial forces can be supported from both directions, this is only ever by means of one bearing. The support base of the O arrangement is at its largest, which is beneficial if the component with small bearing spacing must be guided with the smallest possible tilting clearance or tilting forces must be supported. Bearing arrangements in an O arrangement are relatively rigid and can also support loads resulting from tilting moments.

Tandem arrangement

In the case of bearing sets of a tandem arrangement, the contact lines run parallel to each other. In contrast to an X and O arrangement, the tandem arrangement can only support axial forces in one direction. In general, this bearing pair is adjusted against another tapered roller bearing, which supports axial forces in the opposite direction.

Compensation of angular defects	<p>At a load ratio $P/C_{0r} \leq 0,2$, the tilting of the bearing rings relative to each other must not exceed 4 angular minutes. The prerequisite in this case, however, is that the position of the shaft and housing axis remains constant (no dynamic movements).</p> <p>If larger loads, misalignments or dynamic angular defects are present, please consult Schaeffler.</p>
Sealing	Tapered roller bearings in matched pairs are not sealed.
Lubrication	Tapered roller bearings in matched pairs are not greased. These bearings must be lubricated with oil or grease.
Operating temperature	<p>Tapered roller bearings in matched pairs with an outside diameter $D \leq 220$ mm can be used at operating temperatures from -30 °C to $+120$ °C. Tapered roller bearings in matched pairs with an outside diameter $D > 220$ mm can be used at operating temperatures from -30 °C to $+200$ °C.</p> <p>In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.</p>
Cages	Tapered roller bearings in matched pairs have sheet steel cages as standard. Other cages are available by agreement.
Suffixes	Suffixes for available designs: see Catalogue HR 1, Rolling Bearings and TPI 241, Tapered Roller Bearings of X-life Quality.
Tapered roller bearings for special applications	If tapered roller bearings are operated under very challenging conditions, for example at high operating temperatures or in heavily contaminated oil, special tapered roller bearings are available for such applications. In these cases, please consult Schaeffler.

Tapered roller bearings, matched pairs

Design and safety guidelines Equivalent dynamic bearing load

The rating life equation $L = (C_r/P)^P$ used in the dimensioning of bearings under dynamic load assumes a radial load P of constant magnitude. If the bearing is subjected to purely radial load, the radial load F_r is used directly in the rating life equation ($P = F_r$).

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P .

Calculation of the equivalent dynamic bearing load P is dependent on the load ratio F_a/F_r and the factor e .

For matched tapered roller bearing pairs 313 (320, 322, 329)..-DF-A under dynamic load, the following applies:

Matched bearing pairs under dynamic load

Load ratio	Equivalent dynamic bearing load
$\frac{F_a}{F_r} \leq e$	$P = F_r + Y_1 \cdot F_a$
$\frac{F_a}{F_r} > e$	$P = 0,67 \cdot F_r + Y_2 \cdot F_a$

P N
Equivalent dynamic bearing load for combined load
 F_a N
Axial dynamic bearing load of bearing pair
 F_r N
Radial dynamic bearing load of bearing pair
 e, Y_1, Y_2 -
Factors for bearing pairs, see dimension tables.

Determining the resulting internal axial force F_a for single bearings and bearing pairs in an X and O arrangement

Single row tapered roller bearings transmit radial forces from one raceway to the other oblique to the bearing axis. In the case of a shaft supported by two single row tapered roller bearings of identical or different size, the radial load on bearing A leads, due to the inclination of the raceways ($\alpha_0 \neq 0^\circ$), to an axial load on bearing B. In addition, the radial load on bearing B acts as an axial load on bearing A; external forces on such bearing systems are shown in *Figure 2* and *Figure 3*, page 8. This resulting internal axial force F_a must be taken into consideration in the calculation of the equivalent dynamic bearing load P .

Equations for calculating for resulting axial force F_a , see table, page 8.

Bearing A is subjected to a radial load F_{rA} , bearing B is subjected to a radial load F_{rB} , *Figure 2* and *Figure 3*, page 8. F_{rA} and F_{rB} act at the central contact points of the bearings and are always regarded as positive. The bearings are clearance-free but without preload.



The equations given for determining the axial load correspond to an approximation solution assuming a load zone of 180° in bearings under radial load.

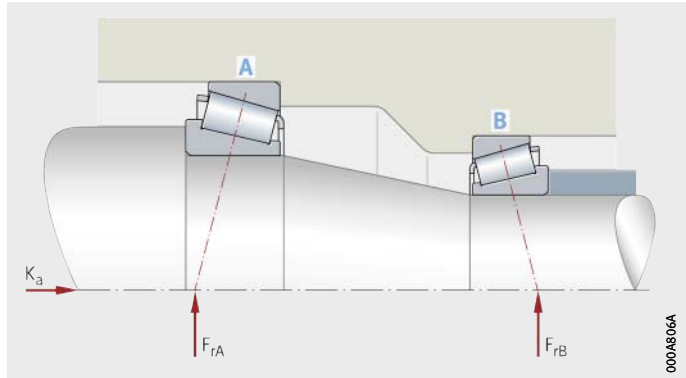
For more precise calculation, the use of BEARINX or BEARINX-online is recommended.

Tapered roller bearings, matched pairs

K_a = external axial force acting on the shaft
 F_{rA} = radial load on bearing A
 F_{rB} = radial load on bearing B

Figure 2

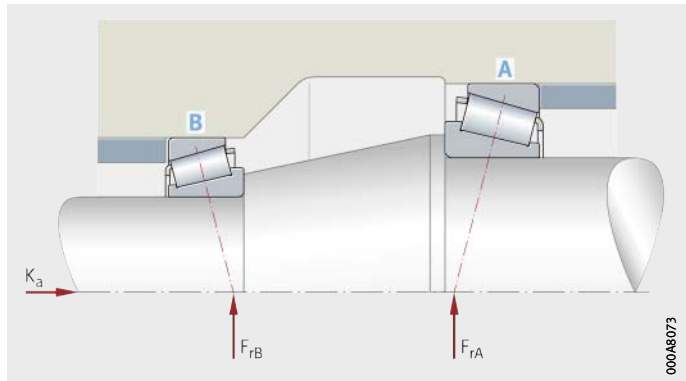
Adjusted bearing arrangement with two single row tapered roller bearings in O arrangement, external forces



K_a = external axial force acting on the shaft
 F_{rA} = radial load on bearing A
 F_{rB} = radial load on bearing B

Figure 3

Adjusted bearing arrangement with two single row tapered roller bearings in X arrangement, external forces



Equations for determining the resulting internal axial force F_a

Load ratio	External axial force
$\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$	$K_a \geq 0$
$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a > 0,47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right)$
	$K_a \leq 0,47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right)$

Equations for determining the resulting internal axial force F_a (continued)

Load ratio	Resulting axial force F_a	
	Bearing A	Bearing B
$\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$	$F_{aA} = F_a = K_a + 0,47 \cdot \frac{F_{rB}}{Y_B}$	F_a is not included in calculation
$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$F_{aA} = F_a = K_a + 0,47 \cdot \frac{F_{rB}}{Y_B}$	F_a is not included in calculation
	F_a is not included in calculation	$F_a = 0,47 \cdot \frac{F_{rA}}{Y} - K_a$

Equivalent static bearing load

The equivalent static load P_0 is a calculated value. In radial bearings, it corresponds to a radial load.

P_0 induces the same load at the centre point of the most heavily loaded contact point between the rolling element and raceway as the combined load occurring in practice.

Matched bearing pairs under static load

For matched tapered roller bearing pairs 313 (320, 322, 329)..-DF-A under static load, the following applies:

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

P_0	N
Equivalent static bearing load for combined load	
F_{0a}	N
Axial static bearing load of bearing pair	
F_{0r}	N
Radial static bearing load of bearing pair	
Y_0	-
Factor for bearing pairs, see dimension tables.	

Basic load ratings and fatigue limit load for bearing pairs

For matched bearing pairs in an X arrangement, the basic load ratings and fatigue limit loads are given in the dimension tables.

Matched bearing pairs in an O arrangement (suffix DB) or tandem arrangement (suffix DT) available by agreement.

Minimum radial load

In order that no slippage occurs between the contact partners, tapered roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is necessary. In most cases, however, the radial load due to the inherent weight of the bearing parts and the external forces is already higher than the requisite minimum load.

If the minimum radial load is lower than stated, please consult Schaeffler.

Speeds

Two speeds are indicated in the product tables:

- the kinematic limiting speed n_G
- the thermal reference speed $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler.

Reference speeds

The thermal reference speed $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_{ϑ} .

Tapered roller bearings, matched pairs

Design of bearing arrangements

The mounting dimensions of the shaft and housing shoulders, spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are defined on the basis of DIN 5418. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Cage projection



In matched pairs of tapered roller bearings, the cages project laterally to a certain extent. In order to prevent the cages grazing the adjacent construction, the lateral minimum distances C_a in the dimension tables must be taken into consideration in the design of the adjacent construction.

Mounting and advantages of matched bearing sets

Schaeffler provides ready-to-fit bearing sets that no longer require adjustment. This gives simplified mounting. Simple mounting of the bearing sets in the mounting location is achieved through precise matching of the intermediate ring to the required geometrical axial internal clearance.

This offers considerable economic and technical advantages:

- Mounting is uncomplicated and mounting defects are prevented by the intermediate ring which is supplied already matched.
- The axial deflection of the bearings is known and taken into consideration which, together with thoroughly developed measurement methods, guarantees precise implementation of the geometrical axial internal clearance. This ensures precise axial guidance of the shaft.
- Simple maintenance and high operational security are achieved by design elements, lubrication grooves and holes in the intermediate ring.



The mounting and dismantling options for tapered roller bearings by thermal, hydraulic or mechanical methods must be taken into consideration in the design of the bearing position.

Schaeffler Mounting Handbook

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH1 gives comprehensive information about the correct storage, mounting, dismantling and maintenance of rotary rolling bearings. It also provides information which should be observed by the designer, in relation to the mounting, dismantling and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

Axial adjustment

Precise guidance of a shaft requires the correct definition of axial adjustment in the operating condition. This is the basis for optimum rating life of the bearing arrangement.

Axial adjustment in the operating condition is stated for the condition when warm from operation and under load. In general, the bearings should run free from clearance.

Tapered roller bearings offer the advantage that the clearance or preload can be adjusted in accordance with the specific requirements of the bearing arrangement.

Preload

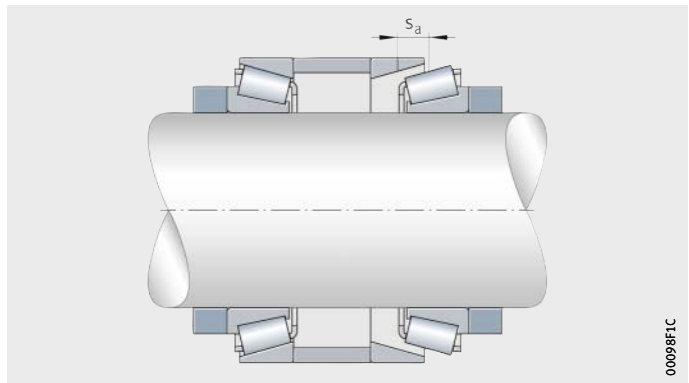
Axially preloaded tapered roller bearings allow high rigidity as well as high guidance accuracy and smooth running of the bearing arrangement. In colloquial terms, the preload can be described as negative axial clearance.

Axial clearance

At high speeds in particular, the axial clearance prevents unexpected increases in bearing temperature and friction.

Geometrical axial internal clearance

The total capacity for axial displacement from one extreme position to the other is indicated by the axial internal clearance s_a , *Figure 4*.



s_a = axial internal clearance

Figure 4
Axial internal clearance

The adjustment values defined for the operating condition must be converted for mounting in the cold, load-free condition using the design data (geometrical axial internal clearance). Conversion is carried out in several stages. In *Figure 5*, examples of the rating life curves and the individual stages are shown. Knowledge of the rating life curves is the fundamental prerequisite for calculation. Rating life curves are derived from different load zone features and must be calculated specifically for each bearing.

Tapered roller bearings, matched pairs

Starting from the optimum axial adjustment in the operating condition, the range of the geometrical axial internal clearance is calculated. The range of the geometrical axial internal clearance is dependent on the accuracy of the bearing components.

Conversion from a warm operating condition to a cold, load-free mounting condition is carried out taking account of the thermal expansion. The interaction of all components such as gears, shaft, rolling bearing and housing in operation must be taken into consideration.

The important factors for calculation are the axial and radial thermal expansions of the shaft and housing as well as the fit conditions.

Smoothing, running-in and settling effects can also be taken into consideration.

The result is a calculated axial clearance for mounting that is indicated in the product designation.

- ① Bearing A
- ② Bearing B
- ③ Axial clearance
- ④ Axial preload
- ⑤ Range of optimum axial adjustment under operating conditions
- ⑥ Range of optimum axial internal clearance taking account of thermal expansion effects
- ⑦ Taking account of smoothing, running-in and settling effects
- ⑧ Range of geometrical axial internal clearance s_a for mounting

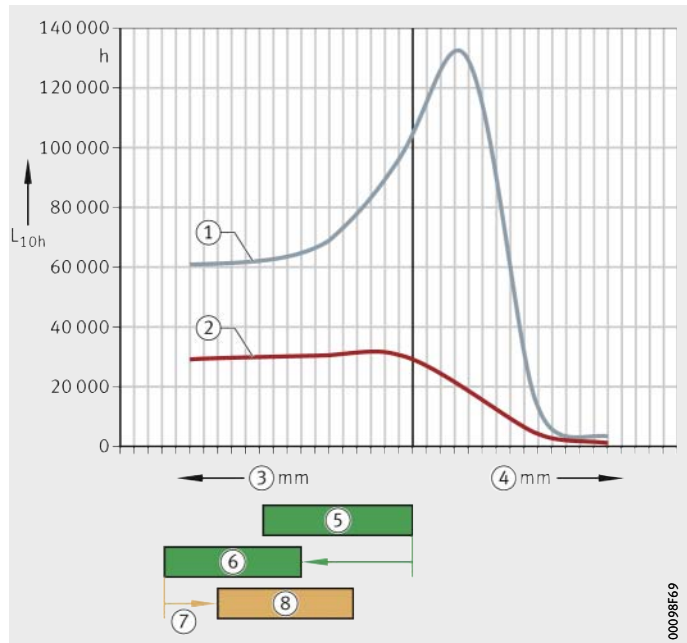


Figure 5
Geometrical axial internal clearance

Accuracy
Tapered roller bearings
in metric sizes

The main dimensions correspond to ISO 355:2007 and DIN 720:2008, the dimensional and running tolerances correspond to ISO 492:2014, see Catalogue HR 1, Rolling Bearings and TPI 241, Tapered Roller Bearings of X-life Quality.

Tolerance for total width
of matched bearings

The tolerance for the total width $2T$ of matched bearing sets of the DF design is determined from the axial internal clearance and the deviations of the width $t_{\Delta T_s}$ of the single bearings. The tolerance for the total width $2B$ is determined from the deviations of the inner ring width $t_{\Delta B_s}$ of the single bearings.

The tolerance for the total width of bearing pairs in an O arrangement and in a tandem arrangement (suffix DB and DT) is determined from the axial internal clearance, the width of the single bearings and the width of the intermediate rings.

The intermediate rings are available in different widths upon customer request.

Chamfer dimensions

The limiting dimensions of the chamfer dimensions for metric tapered roller bearings in accordance with DIN/ISO correspond to ISO 582:1995.

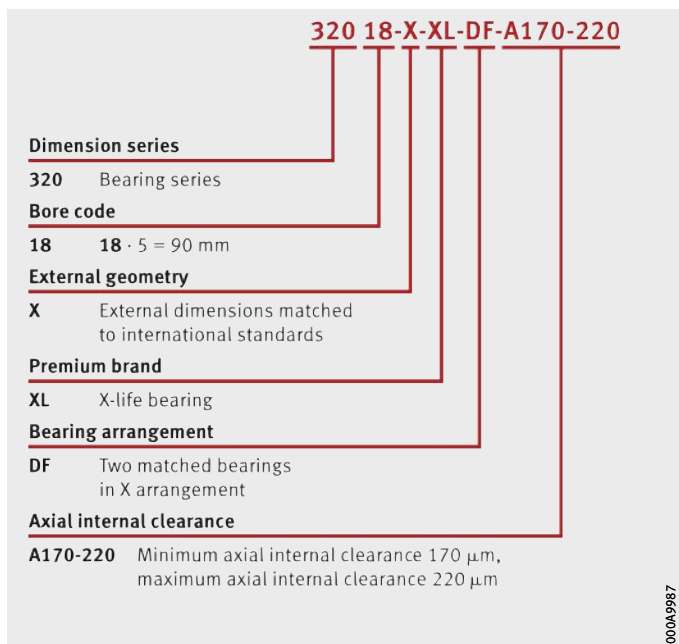
Tapered roller bearings, matched pairs

Ordering example, ordering designation

In order to simplify the ordering process, the ordering designation for matched pairs of tapered roller bearings has been changed:

- The first module letter D = 2 (Duplex) expresses the number of bearings.
- The arrangement of the bearings is represented by the second module letter:
 - B = O arrangement – Back to Back
 - F = X arrangement – Face to Face
 - T = tandem arrangement.
- Where necessary (special design), a third module letter is added as a consecutive counter for description of a variant.
Example: A, B, ... = different set width, variant of intermediate ring design.
- The geometrical axial internal clearance is written in open form in the designation. As an example, “A170-220” indicates that the geometrical axial internal clearance of the bearing pair in the unmounted condition (delivered condition) is between 170 μm and 220 μm . Ordering example, *Figure 6*, page 15.
If the designation instead contains “VA20-40”, for example, this mean that the bearing pair is axially preloaded and the negative axial clearance of the bearing pair in the unmounted condition is between 20 μm and 40 μm .

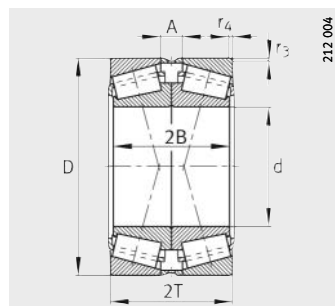
Figure 6
Matched pair
of tapered roller bearings:
designation structure



When ordering, the number of bearing pairs must be stated. In the case of tapered roller bearing pairs with the suffix N11, the ordering process will remain as before until this is superseded by new suffixes (DF, DB, DT). In this case, the number of single bearings must continue to be stated.

Tapered roller bearings

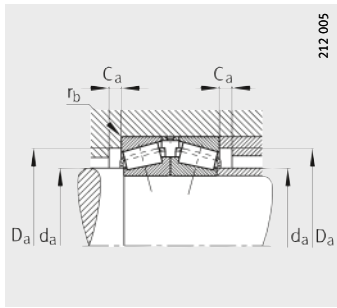
Matched pairs



X-life

Dimension table · Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄ min.	A	d _a max.	D _a min.
31308-XL-DF-A115-155	1,52	40	90	46	50,5	1,5	16,5	51	71
31308-XL-DF-A50-90	1,52	40	90	46	50,5	1,5	16,5	51	71
31308-XL-DF-A70-110	1,52	40	90	46	50,5	1,5	16,5	51	71
31308-XL-P5-DF-VA20-40	1,52	40	90	46	50,5	1,5	16,5	51	71
31309-A-DF-VA20-40	1,99	45	100	50	54,5	1,5	18,5	56	79
32011-X-XL-DF-A0-30	1,17	55	90	46	46	1,5	11	63	81
32011-X-XL-DF-A160-200	1,17	55	90	46	46	1,5	11	63	81
30212-XL-DF-A100-140	1,97	60	110	44	47,5	1,5	9,5	70	96
30212-XL-DF-A75-110	1,97	60	110	44	47,5	1,5	9,5	70	96
31313-XL-DF-A120-160	5,04	65	140	66	72	2,5	26	79	111
31313-XL-DF-A80-120	5,04	65	140	66	72	2,5	26	79	111
32014-X-XL-DF-A80-100	1,81	70	110	50	50	1,5	12	78	98
33014-DF-A170-220	2,47	70	110	62	62	1,5	11	78	99
31314-XL-DF-A100-140	6,11	70	150	70	76	2,5	26	84	118
32016-X-XL-DF-A100-140	2,66	80	125	58	58	1,5	14	89	112
32016-X-XL-DF-A140-170	2,66	80	125	58	58	1,5	14	89	112
32016-X-XL-DF-A150-200	2,66	80	125	58	58	1,5	14	89	112
32016-X-XL-DF-A25-50	2,66	80	125	58	58	1,5	14	89	112
32017-X-XL-DF-A0-35	2,8	85	130	58	58	1,5	14	94	117
32017-X-XL-DF-A170-220	2,8	85	130	58	58	1,5	14	94	117
32017-X-XL-DF-A190-230	2,8	85	130	58	58	1,5	14	94	117
32017-X-XL-P5-DF-A80-100	2,8	85	130	58	58	1,5	14	94	117
33017-DF-A170-220	3,86	85	130	72	72	1,5	13	94	118
30217-A-DF-A200-250	4,35	85	150	56	61	2	13	97	132
32018-X-XL-DF-A170-220	3,64	90	140	64	64	1,5	16	100	125
32018-X-XL-DF-A220-270	3,64	90	140	64	64	1,5	16	100	125
32218-XL-DF-A220-270	7,12	90	160	80	85	2	17	102	138
32218-XL-DF-A40-90	7,12	90	160	80	85	2	17	102	138
31318-DF-A160-200	11,7	90	190	86	93	3	33	109	151
32019-X-XL-DF-A170-220	30,1	95	145	64	64	1,5	16	105	130
32219-XL-DF-A150-180	9,46	95	170	86	91	2,5	17	108	145
32219-XL-DF-A220-270	9,46	95	170	86	91	2,5	17	108	145
31319-A-DF-A170-210	13,8	95	200	90	99	3	35	114	157

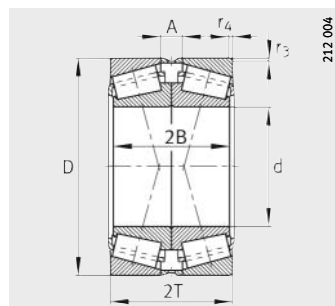


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair n_{Dr} min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{0r} N	e	Y_1	Y_2	Y_0			
81	4	1,5	153 000	165 000	0,83	0,82	1,22	0,8	24 200	8 700	5 100
81	4	1,5	153 000	165 000	0,83	0,82	1,22	0,8	24 200	8 700	5 100
81	4	1,5	153 000	165 000	0,83	0,82	1,22	0,8	24 200	8 700	5 100
81	4	1,5	153 000	165 000	0,83	0,82	1,22	0,8	23 900	8 700	5 100
91	4	1,5	165 000	217 000	0,83	0,82	1,22	0,8	25 500	7 100	4 650
83	4	1,5	164 000	237 000	0,41	1,66	2,47	1,62	37 500	8 500	4 600
83	4	1,5	164 000	237 000	0,41	1,66	2,47	1,62	37 500	8 500	4 600
101	4	1,5	210 000	246 000	0,41	1,67	2,48	1,63	36 500	7 500	4 250
101	4	1,5	210 000	246 000	0,41	1,67	2,48	1,63	36 500	7 500	4 250
128	5	2,5	330 000	375 000	0,83	0,82	1,22	0,8	57 000	5 500	3 650
128	5	2,5	330 000	375 000	0,83	0,82	1,22	0,8	57 000	5 500	3 650
103	5	1,5	210 000	315 000	0,43	1,55	2,31	1,52	51 000	6 900	3 800
103	5	1,5	233 000	445 000	0,28	2,37	3,53	2,32	57 000	6 200	3 850
138	5	2,5	380 000	435 000	0,83	0,82	1,22	0,8	66 000	5 200	3 400
117	6	1,5	280 000	425 000	0,42	1,6	2,38	1,56	68 000	6 000	3 450
117	6	1,5	280 000	425 000	0,42	1,6	2,38	1,56	68 000	6 000	3 450
117	6	1,5	280 000	425 000	0,42	1,6	2,38	1,56	68 000	6 000	3 450
117	6	1,5	280 000	425 000	0,42	1,6	2,38	1,56	68 000	6 000	3 450
122	6	1,5	285 000	450 000	0,44	1,53	2,27	1,49	71 000	5 700	3 250
122	6	1,5	285 000	450 000	0,44	1,53	2,27	1,49	71 000	5 700	3 250
122	6	1,5	285 000	450 000	0,44	1,53	2,27	1,49	71 000	5 700	3 250
122	6	1,5	285 000	450 000	0,44	1,53	2,27	1,49	70 000	5 700	3 250
122	6	1,5	315 000	630 000	0,29	2,32	3,45	2,26	79 000	5 100	3 300
140	5	2	305 000	445 000	0,42	1,61	2,39	1,57	51 000	4 850	3 250
131	6	1,5	335 000	510 000	0,42	1,6	2,38	1,56	80 000	5 400	3 200
131	6	1,5	335 000	510 000	0,42	1,6	2,38	1,56	80 000	5 400	3 200
150	5	2	530 000	720 000	0,42	1,61	2,39	1,57	109 000	4 800	2 650
150	5	2	530 000	720 000	0,42	1,61	2,39	1,57	109 000	4 800	2 650
176	6	3	470 000	650 000	0,83	0,82	1,22	0,8	71 000	3 700	2 550
136	6	1,5	345 000	550 000	0,44	1,53	2,27	1,49	85 000	5 100	3 000
158	5	2,5	610 000	840 000	0,42	1,61	2,39	1,57	126 000	4 500	2 430
158	5	2,5	610 000	840 000	0,42	1,61	2,39	1,57	126 000	4 500	2 430
186	6	3	520 000	740 000	0,83	0,82	1,22	0,8	80 000	3 500	2 420

Tapered roller bearings

Matched pairs

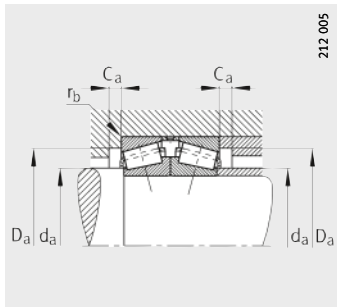


212 004

X-life

Dimension table (continued) - Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄	A	d _a	D _a
						min.		max.	min.
32020-X-XL-DF-A220-270	4,02	100	150	64	64	1,5	16	109	134
32020-X-XL-DF-A80-120	4,02	100	150	64	64	1,5	16	109	134
32020-X-XL-P5-DF-A120-150	4,02	100	150	64	64	1,5	16	109	134
32020-X-XL-P5-DF-A190-220	4,02	100	150	64	64	1,5	16	109	134
32020-X-XL-P5-DF-A200-230	4,02	100	150	64	64	1,5	16	109	134
30220-A-DF-A180-220	7,82	100	180	68	74	2,5	16	116	157
30220-A-DF-A220-270	7,82	100	180	68	74	2,5	16	116	157
30220-A-DF-A250-280	7,82	100	180	68	74	2,5	16	116	157
30220-A-DF-A80-120	7,82	100	180	68	74	2,5	16	116	157
32220-XL-DF-A230-280	12,3	100	180	92	98	2,5	20	114	154
31320-X-DF-A0-30	19	100	215	102	113	3	43	121	168
31320-X-DF-A120-160	19	100	215	102	113	3	43	121	168
31320-X-DF-A170-220	19	100	215	102	113	3	43	121	168
32021-X-XL-DF-A280-330	5,11	105	160	70	70	2	18	116	143
32221-XL-DF-A230-280	13	105	190	100	106	2,5	20	120	161
32321-A-DF-A300-350	32,9	105	225	154	163	3	37	128	185
32022-X-XL-DF-A170-230	6,31	110	170	76	76	2	18	122	152
32022-X-XL-DF-A220-270	6,31	110	170	76	76	2	18	122	152
32022-X-XL-DF-A90-130	6,31	110	170	76	76	2	18	122	152
30222-A-DF-A220-280	11,8	110	200	76	82	2,5	18	129	174
32222-XL-DF-A230-280	14,8	110	200	106	112	2,5	20	126	170
32222-XL-DF-A300-350	14,8	110	200	106	112	2,5	20	126	170
32222-XL-P5-DF-A250-280	14,8	110	200	106	112	2,5	20	126	170
30322-XL-DF-A350-400	23,1	110	240	100	109	3	25	141	206
31322-X-XL-DF-A200-250	26,2	110	240	114	126	3	50	135	188
31322-X-XL-P5-DF-A120-160	26,2	110	240	114	126	3	50	135	188
31322-X-XL-P5-DF-A140-180	26,2	110	240	114	126	3	50	135	188
31322-X-XL-P5-DF-A60-100	26,2	110	240	114	126	3	50	135	188
31322-X-XL-P5-DF-A70-90	26,2	110	240	114	126	3	50	135	188

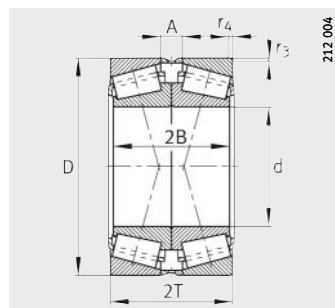


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair n_{Dr} min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
141	6	1,5	350 000	570 000	0,46	1,47	2,19	1,44	87 000	4 950	2 900
141	6	1,5	350 000	570 000	0,46	1,47	2,19	1,44	87 000	4 950	2 900
141	6	1,5	350 000	570 000	0,46	1,47	2,19	1,44	87 000	4 950	2 900
141	6	1,5	350 000	570 000	0,46	1,47	2,19	1,44	87 000	4 950	2 900
141	6	1,5	350 000	570 000	0,46	1,47	2,19	1,44	87 000	4 950	2 900
168	5	2,5	430 000	650 000	0,42	1,61	2,39	1,57	71 000	4 000	2 650
168	5	2,5	430 000	650 000	0,42	1,61	2,39	1,57	71 000	4 000	2 650
168	5	2,5	430 000	650 000	0,42	1,61	2,39	1,57	71 000	4 000	2 650
168	5	2,5	430 000	650 000	0,42	1,61	2,39	1,57	71 000	4 000	2 650
168	5	2,5	680 000	950 000	0,42	1,61	2,39	1,57	141 000	4 250	2 260
201	7	3	660 000	960 000	0,83	0,82	1,22	0,8	102 000	3 200	2 160
201	7	3	660 000	960 000	0,83	0,82	1,22	0,8	102 000	3 200	2 160
201	7	3	660 000	960 000	0,83	0,82	1,22	0,8	102 000	3 200	2 160
150	6	2	410 000	660 000	0,44	1,52	2,26	1,49	99 000	4 650	2 650
178	5	2,5	780 000	1 110 000	0,42	1,61	2,39	1,57	163 000	4 000	2 110
211	9	3	1 150 000	1 860 000	0,35	1,96	2,91	1,91	205 000	3 100	1 830
160	7	2	490 000	790 000	0,43	1,57	2,34	1,53	117 000	4 350	2 440
160	7	2	490 000	790 000	0,43	1,57	2,34	1,53	117 000	4 350	2 440
160	7	2	490 000	790 000	0,43	1,57	2,34	1,53	117 000	4 350	2 440
188	6	2,5	540 000	830 000	0,42	1,61	2,39	1,57	91 000	3 550	2 270
188	6	2,5	840 000	1 190 000	0,42	1,61	2,39	1,57	172 000	3 800	2 000
188	6	2,5	840 000	1 190 000	0,42	1,61	2,39	1,57	172 000	3 800	2 000
188	6	2,5	840 000	1 190 000	0,42	1,61	2,39	1,57	172 000	3 800	2 000
226	8	3	980 000	1 190 000	0,35	1,96	2,91	1,91	159 000	3 350	1 950
226	7	3	940 000	1 170 000	0,83	0,82	1,22	0,8	157 000	3 100	1 890
226	7	3	940 000	1 170 000	0,83	0,82	1,22	0,8	157 000	3 100	1 890
226	7	3	940 000	1 170 000	0,83	0,82	1,22	0,8	157 000	3 100	1 890
226	7	3	940 000	1 170 000	0,83	0,82	1,22	0,8	157 000	3 100	1 890
226	7	3	940 000	1 170 000	0,83	0,82	1,22	0,8	157 000	3 100	1 890

Tapered roller bearings

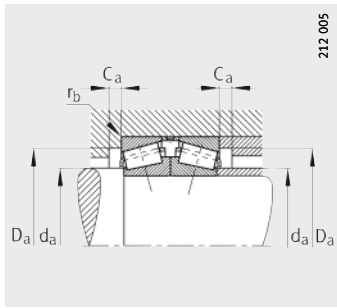
Matched pairs



X-life

Dimension table (continued) - Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄	A	d _a	D _a
						min.		max.	min.
32024-X-XL-DF-A230-280	6,76	120	180	76	76	2	18	131	161
30224-XL-DF-A230-280	13	120	215	80	87	2,5	19	140	187
32224-A-DF-A230-280	19,1	120	215	116	123	2,5	23	136	181
32224-A-DF-VA200-300	19,1	120	215	116	123	2,5	23	136	181
32224-A-P5-DF-A70-100	19,1	120	215	116	123	2,5	23	136	181
32026-X-XL-DF-A125-175	9,94	130	200	90	90	2	22	144	178
32026-X-XL-DF-A200-250	9,94	130	200	90	90	2	22	144	178
32026-X-XL-DF-A250-300	9,94	130	200	90	90	2	22	144	178
32226-XL-DF-A250-300	25,6	130	230	128	135,5	3	27,5	146	193
32226-XL-DF-A350-400	25,6	130	230	128	135,5	3	27,5	146	193
32226-XL-DF-A420-470	25,6	130	230	128	135,5	3	27,5	146	193
31326-X-DF-A220-270	41	130	280	132	144	4	56	157	218
31326-X-DF-A370-430	41	130	280	132	144	4	56	157	218
32028-X-XL-DF-A250-300	11,1	140	210	90	90	2	22	153	187
30228-XL-DF-A250-300	18,4	140	250	84	91,5	3	19,5	163	219
30228-XL-DF-A420-470	18,4	140	250	84	91,5	3	19,5	163	219
32228-XL-DF-A300-350	29,8	140	250	136	143,5	3	27,5	159	210
32030-X-XL-DF-A0-60	13,5	150	225	96	96	2,5	24	164	200
32030-X-XL-DF-A120-170	13,5	150	225	96	96	2,5	24	164	200
32030-X-XL-DF-A280-330	13,5	150	225	96	96	2,5	24	164	200
33030-XL-DF-A0-35	16,7	150	225	118	118	2,5	26	164	200
32230-XL-DF-A120-180	37,9	150	270	146	154	3	34	171	226
32230-XL-DF-A250-300	37,9	150	270	146	154	3	34	171	226
32230-XL-DF-A280-330	37,9	150	270	146	154	3	34	171	226
32230-XL-DF-A340-390	37,9	150	270	146	154	3	34	171	226
32230-XL-DF-A480-530	37,9	150	270	146	154	3	34	171	226
31330-X-DF-A280-330	59,3	150	320	150	164	4	64	181	251

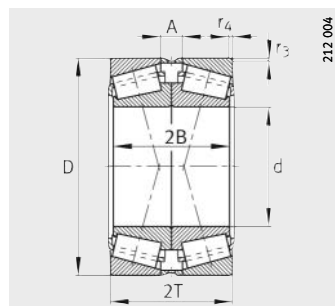


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair $n_{\partial r}$ min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
170	7	2	510 000	840 000	0,46	1,47	2,19	1,44	123 000	4 050	2 240
203	6	2,5	670 000	890 000	0,43	1,55	2,31	1,52	125 000	3 650	2 110
203	7	2,5	830 000	1 450 000	0,43	1,55	2,31	1,52	162 000	3 150	1 790
203	7	2,5	830 000	1 450 000	0,43	1,55	2,31	1,52	162 000	3 150	1 790
203	7	2,5	830 000	1 450 000	0,43	1,55	2,31	1,52	162 000	3 150	1 790
190	8	2	660 000	1 100 000	0,43	1,55	2,31	1,52	158 000	3 650	1 960
190	8	2	660 000	1 100 000	0,43	1,55	2,31	1,52	158 000	3 650	1 960
190	8	2	660 000	1 100 000	0,43	1,55	2,31	1,52	158 000	3 650	1 960
216	7	3	1 130 000	1 710 000	0,44	1,55	2,31	1,52	241 000	3 200	1 640
216	7	3	1 130 000	1 710 000	0,44	1,55	2,31	1,52	241 000	3 200	1 640
216	7	3	1 130 000	1 710 000	0,44	1,55	2,31	1,52	241 000	3 200	1 640
262	9	4	1 050 000	1 590 000	0,83	0,82	1,22	0,8	184 000	2 430	1 550
262	9	4	1 050 000	1 590 000	0,83	0,82	1,22	0,8	184 000	2 430	1 550
200	8	2	690 000	1 180 000	0,46	1,47	2,19	1,44	168 000	3 450	1 810
236	9	3	840 000	1 120 000	0,44	1,55	2,31	1,52	148 000	3 100	1 700
236	9	3	840 000	1 120 000	0,44	1,55	2,31	1,52	148 000	3 100	1 700
236	8	3	1 300 000	1 980 000	0,43	1,55	2,31	1,52	275 000	2 950	1 460
213	8	2,5	780 000	1 350 000	0,46	1,47	2,19	1,44	188 000	3 200	1 650
213	8	2,5	780 000	1 350 000	0,46	1,47	2,19	1,44	188 000	3 200	1 650
213	8	2,5	780 000	1 350 000	0,46	1,47	2,19	1,44	188 000	3 200	1 650
213	8	2,5	950 000	1 770 000	0,36	1,85	2,76	1,81	249 000	3 150	1 580
256	8	3	1 500 000	2 290 000	0,43	1,55	2,31	1,52	310 000	2 750	1 320
256	8	3	1 500 000	2 290 000	0,43	1,55	2,31	1,52	310 000	2 750	1 320
256	8	3	1 500 000	2 290 000	0,43	1,55	2,31	1,52	310 000	2 750	1 320
256	8	3	1 500 000	2 290 000	0,43	1,55	2,31	1,52	310 000	2 750	1 320
256	8	3	1 500 000	2 290 000	0,43	1,55	2,31	1,52	310 000	2 750	1 320
302	9	4	1 360 000	2 090 000	0,83	0,82	1,22	0,8	230 000	2 090	1 280

Tapered roller bearings

Matched pairs

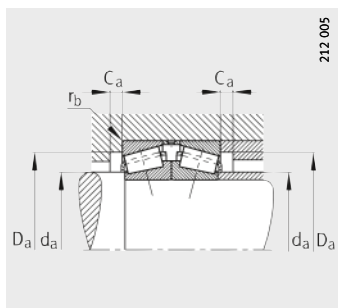


212 004

X-life

Dimension table (continued) - Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄	A	d _a	D _a
						min.		max.	min.
32932-DF-A30-70	8,52	160	220	76	76	2	16	173	204
32932-P5-DF-A30-70	8,52	160	220	76	76	2	16	173	204
32032-X-XL-DF-A280-330	16,2	160	240	102	102	2,5	26	175	213
32032-X-XL-DF-A300-350	16,2	160	240	102	102	2,5	26	175	213
32032-X-XL-DF-A300-380	16,2	160	240	102	102	2,5	26	175	213
32032-X-XL-DF-A400-450	16,2	160	240	102	102	2,5	26	175	213
32032-X-XL-DF-A630-680	16,2	160	240	102	102	2,5	26	175	213
30232-XL-DF-A280-330	29	160	290	96	104	3	24	189	252
32232-XL-DF-A280-330	48	160	290	160	168	3	34	183	242
32232-XL-DF-A470-520	48	160	290	160	168	3	34	183	242
32034-X-XL-DF-A0-40	21,7	170	260	114	114	2,5	28	187	230
32034-X-XL-DF-A200-250	21,7	170	260	114	114	2,5	28	187	230
32034-X-XL-DF-A230-270	21,7	170	260	114	114	2,5	28	187	230
32034-X-XL-DF-A330-380	21,7	170	260	114	114	2,5	28	187	230
30234-XL-DF-A280-330	35,4	170	310	104	114	4	28	203	269
30234-XL-DF-A360-410	35,4	170	310	104	114	4	28	203	269
32234-XL-DF-A0-45	59,2	170	310	172	182	4	40	196	259
32234-XL-DF-A320-370	59,2	170	310	172	182	4	40	196	259
32234-XL-DF-A330-380	59,2	170	310	172	182	4	40	196	259
32234-XL-DF-A350-410	59,2	170	310	172	182	4	40	196	259
32234-XL-DF-A400-450	59,2	170	310	172	182	4	40	196	259
32234-XL-DF-A490-540	59,2	170	310	172	182	4	40	196	259
32936-DF-A250-300	14,6	180	250	90	90	2	22	193	225
32036-X-XL-DF-A240-290	28,9	180	280	128	128	2,5	32	199	247
32036-X-XL-DF-A320-370	28,9	180	280	128	128	2,5	32	199	247
32036-X-XL-DF-A330-380	28,9	180	280	128	128	2,5	32	199	247
30236-XL-DF-A250-300	37,3	180	320	104	114	4	28	211	278
32236-XL-DF-A330-380	62,3	180	320	172	182	4	40	204	267
32236-XL-DF-A380-430	62,3	180	320	172	182	4	40	204	267
32236-XL-DF-A385-445	62,3	180	320	172	182	4	40	204	267
32236-XL-DF-A430-480	62,3	180	320	172	182	4	40	204	267

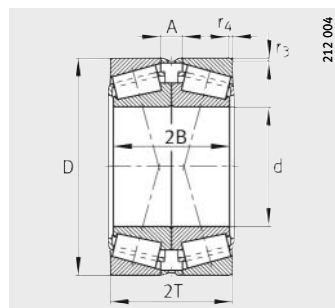


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair n_{Dr} min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
210	7	2	510 000	1 060 000	0,35	1,95	2,9	1,91	112 000	3 000	1 630
210	7	2	510 000	1 060 000	0,35	1,95	2,9	1,91	112 000	3 000	1 630
228	8	2,5	850 000	1 480 000	0,46	1,47	2,19	1,44	203 000	3 000	1 530
228	8	2,5	850 000	1 480 000	0,46	1,47	2,19	1,44	203 000	3 000	1 530
228	8	2,5	850 000	1 480 000	0,46	1,47	2,19	1,44	203 000	3 000	1 530
228	8	2,5	850 000	1 480 000	0,46	1,47	2,19	1,44	203 000	3 000	1 530
228	8	2,5	850 000	1 480 000	0,46	1,47	2,19	1,44	203 000	3 000	1 530
276	9	3	1 080 000	1 570 000	0,43	1,55	2,31	1,52	202 000	2 650	1 340
276	10	3	1 770 000	2 750 000	0,44	1,55	2,31	1,52	370 000	2 550	1 180
276	10	3	1 770 000	2 750 000	0,44	1,55	2,31	1,52	370 000	2 550	1 180
248	10	2,5	1 020 000	1 770 000	0,44	1,52	2,26	1,49	239 000	2 750	1 390
248	10	2,5	1 020 000	1 770 000	0,44	1,52	2,26	1,49	239 000	2 750	1 390
248	10	2,5	1 020 000	1 770 000	0,44	1,52	2,26	1,49	239 000	2 750	1 390
248	10	2,5	1 020 000	1 770 000	0,44	1,52	2,26	1,49	239 000	2 750	1 390
292	8	4	1 190 000	1 620 000	0,43	1,55	2,31	1,52	202 000	2 500	1 320
292	8	4	1 190 000	1 620 000	0,44	1,55	2,31	1,52	202 000	2 500	1 320
292	10	4	1 980 000	3 100 000	0,43	1,55	2,31	1,52	410 000	2 350	1 090
292	10	4	1 980 000	3 100 000	0,44	1,55	2,31	1,52	410 000	2 350	1 090
292	10	4	1 980 000	3 100 000	0,44	1,55	2,31	1,52	410 000	2 350	1 090
292	10	4	1 980 000	3 100 000	0,44	1,55	2,31	1,52	410 000	2 350	1 090
292	10	4	1 980 000	3 100 000	0,44	1,55	2,31	1,52	410 000	2 350	1 090
292	10	4	1 980 000	3 100 000	0,44	1,55	2,31	1,52	410 000	2 350	1 090
240	8	2	620 000	1 410 000	0,48	1,41	2,09	1,37	168 000	2 600	1 390
268	10	2,5	1 270 000	2 200 000	0,42	1,6	2,38	1,56	290 000	2 550	1 250
268	10	2,5	1 270 000	2 200 000	0,42	1,6	2,38	1,56	290 000	2 550	1 250
268	10	2,5	1 270 000	2 200 000	0,42	1,6	2,38	1,56	290 000	2 550	1 250
302	9	4	1 230 000	1 700 000	0,45	1,5	2,23	1,47	210 000	2 420	1 250
302	10	4	2 040 000	3 300 000	0,45	1,5	2,23	1,47	425 000	2 270	1 020
302	10	4	2 040 000	3 300 000	0,45	1,5	2,23	1,47	425 000	2 270	1 020
302	10	4	2 040 000	3 300 000	0,45	1,5	2,23	1,47	425 000	2 270	1 020
302	10	4	2 040 000	3 300 000	0,45	1,5	2,23	1,47	425 000	2 270	1 020

Tapered roller bearings

Matched pairs

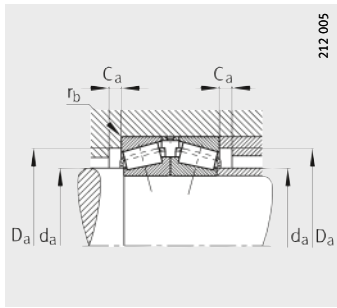


212 004

X-life

Dimension table (continued) - Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄ min.	A	d _a max.	D _a min.
32038-X-XL-DF-A120-150	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A200-250	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A300-350	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A350-400	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A370-420	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A530-580	30,1	190	290	128	128	2,5	32	209	257
32038-X-XL-DF-A580-630	30,1	190	290	128	128	2,5	32	209	257
32238-XL-DF-A340-400	80,6	190	340	184	194	4	44	216	286
32238-XL-DF-A350-400	80,6	190	340	184	194	4	44	216	286
32238-XL-DF-A380-430	80,6	190	340	184	194	4	44	216	286
32040-X-XL-DF-A250-300	38,5	200	310	140	140	2,5	34	221	273
32040-X-XL-DF-A350-400	38,5	200	310	140	140	2,5	34	221	273
30240-XL-DF-A550-600	53	200	360	116	128	4	32	237	315
32240-XL-DF-A0-50	88,2	200	360	196	208	4	44	226	302
32240-XL-DF-A350-400	88,2	200	360	196	208	4	44	226	302
32240-XL-DF-A400-450	88,2	200	360	196	208	4	44	226	302
32240-XL-DF-A500-550	88,2	200	360	196	208	4	44	226	302
32240-XL-DF-A530-590	88,2	200	360	196	208	4	44	226	302
32944-DF-A280-330	21,1	220	300	102	102	2,5	24	234	275
32044-X-XL-DF-A300-360	50	220	340	152	152	3	38	243	300
32044-X-XL-DF-A400-450	50	220	340	152	152	3	38	243	300
32044-X-XL-DF-A450-500	50	220	340	152	152	3	38	243	300
32044-X-XL-DF-A700-750	50	220	340	152	152	3	38	243	300
30244-A-DF-A350-400	73,2	220	400	130	144	4	36	255	348
32244-XL-DF-A400-450	123	220	400	216	228	4	48	258	336

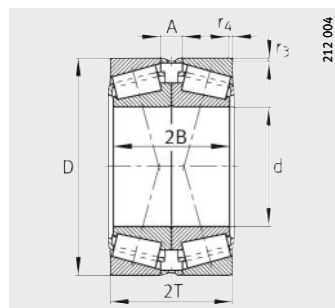


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair $n_{\partial r}$ min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
278	10	2,5	1 280 000	2 250 000	0,44	1,53	2,27	1,49	295 000	2 460	1 180
322	10	4	2 300 000	3 650 000	0,44	1,55	2,31	1,52	460 000	2 120	950
322	10	4	2 300 000	3 650 000	0,44	1,55	2,31	1,52	460 000	2 120	950
322	10	4	2 300 000	3 650 000	0,44	1,55	2,31	1,52	460 000	2 120	950
298	11	2,5	1 550 000	2 750 000	0,43	1,57	2,34	1,53	350 000	2 290	1 060
298	11	2,5	1 550 000	2 750 000	0,43	1,57	2,34	1,53	350 000	2 290	1 060
342	9	4	1 540 000	2 120 000	0,44	1,55	2,31	1,52	255 000	2 140	1 070
342	11	4	2 700 000	4 150 000	0,41	1,66	2,47	1,62	510 000	2 030	890
342	11	4	2 700 000	4 150 000	0,41	1,66	2,47	1,62	510 000	2 030	890
342	11	4	2 700 000	4 150 000	0,41	1,66	2,47	1,62	510 000	2 030	890
342	11	4	2 700 000	4 150 000	0,41	1,66	2,47	1,62	510 000	2 030	890
342	11	4	2 700 000	4 150 000	0,41	1,66	2,47	1,62	510 000	2 030	890
288	9	2,5	850 000	1 960 000	0,43	1,59	2,36	1,55	221 000	2 150	1 060
326	12	3	1 820 000	3 300 000	0,43	1,57	2,34	1,53	405 000	2 080	920
326	12	3	1 820 000	3 300 000	0,43	1,57	2,34	1,53	405 000	2 080	920
326	12	3	1 820 000	3 300 000	0,43	1,57	2,34	1,53	405 000	2 080	920
326	12	3	1 820 000	3 300 000	0,43	1,57	2,34	1,53	405 000	2 080	920
382	10	4	1 630 000	2 650 000	0,42	1,61	2,39	1,57	270 000	1 750	940
382	12	4	3 100 000	5 100 000	0,44	1,55	2,31	1,52	610 000	1 800	750

Tapered roller bearings

Matched pairs

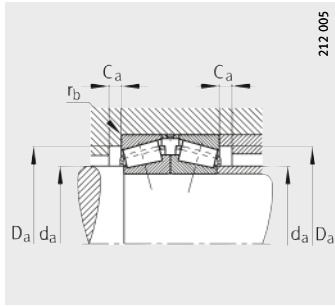


X-life

212 004

Dimension table (continued) - Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄	A	d _a	D _a
						min.		max.	min.
32048-X-XL-DF-A300-350	53,5	240	360	152	152	3	38	261	318
32048-X-XL-DF-A400-450	53,5	240	360	152	152	3	38	261	318
32048-X-XL-DF-A450-500	53,5	240	360	152	152	3	38	261	318
32048-X-XL-DF-A700-750	53,5	240	360	152	152	3	38	261	318
32048-X-XL-DF-A700-800	53,5	240	360	152	152	3	38	261	318
32248-XL-DF-A0-50	166	240	440	240	254	4	54	286	372
32248-XL-DF-A350-400	166	240	440	240	254	4	54	286	372
32248-XL-DF-A450-500	166	240	440	240	254	4	54	286	372
32248-XL-DF-A610-670	166	240	440	240	254	4	54	286	372
32052-X-XL-DF-A300-360	84,8	260	400	174	174	4	44	287	352
32052-X-XL-DF-A500-550	84,8	260	400	174	174	4	44	287	352
32052-X-XL-DF-A700-750	84,8	260	400	174	174	4	44	287	352
32252-XL-DF-A450-500	215	260	480	260	274	5	62	306	401
32252-XL-DF-A500-550	215	260	480	260	274	5	62	306	401
32252-XL-DF-A550-600	215	260	480	260	274	5	62	306	401
32056-X-XL-DF-A300-360	84,1	280	420	174	174	4	44	305	370
32056-X-XL-DF-A500-550	84,1	280	420	174	174	4	44	305	370
32056-X-XL-DF-A570-620	84,1	280	420	174	174	4	44	305	370
32960-XL-DF-A500-550	64,8	300	420	152	152	3	38	324	383
32960-XL-DF-A550-600	64,8	300	420	152	152	3	38	324	383
32960-XL-DF-A650-700	64,8	300	420	152	152	3	38	324	383
32060-X-XL-DF-A550-600	120	300	460	200	200	4	52	329	404
32964-XL-DF-A200-250	69,1	320	440	152	152	3	38	343	402
32964-XL-DF-A580-630	69,1	320	440	152	152	3	38	343	402
32964-XL-DF-A600-650	69,1	320	440	152	152	3	38	343	402
32064-X-XL-DF-A400-450	126	320	480	200	200	4	52	350	424
32064-X-XL-DF-A550-600	126	320	480	200	200	4	52	350	424
32064-X-XL-DF-A600-650	126	320	480	200	200	4	52	350	424

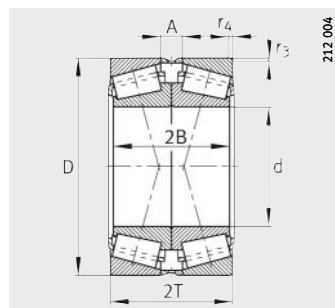


Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair $n_{\partial r}$ min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
346	12	3	1 820 000	3 350 000	0,46	1,47	2,19	1,44	415 000	1 950	870
346	12	3	1 820 000	3 350 000	0,46	1,47	2,19	1,44	415 000	1 950	870
346	12	3	1 820 000	3 350 000	0,46	1,47	2,19	1,44	415 000	1 950	870
346	12	3	1 820 000	3 350 000	0,46	1,47	2,19	1,44	415 000	1 950	870
346	12	3	1 820 000	3 350 000	0,46	1,47	2,19	1,44	415 000	1 950	870
422	14	4	3 750 000	6 200 000	0,43	1,55	2,31	1,52	730 000	1 630	660
422	14	4	3 750 000	6 200 000	0,43	1,55	2,31	1,52	730 000	1 630	660
422	14	4	3 750 000	6 200 000	0,43	1,55	2,31	1,52	730 000	1 630	660
422	14	4	3 750 000	6 200 000	0,43	1,55	2,31	1,52	730 000	1 630	660
382	14	4	2 330 000	4 300 000	0,43	1,55	2,31	1,52	510 000	1 760	750
382	14	4	2 330 000	4 300 000	0,43	1,55	2,31	1,52	510 000	1 760	750
382	14	4	2 330 000	4 300 000	0,43	1,55	2,31	1,52	510 000	1 760	750
458	14	5	4 550 000	7 600 000	0,43	1,57	2,34	1,53	860 000	1 480	560
458	14	5	4 550 000	7 600 000	0,43	1,57	2,34	1,53	860 000	1 480	560
458	14	5	4 550 000	7 600 000	0,43	1,57	2,34	1,53	860 000	1 480	560
402	14	4	2 430 000	4 600 000	0,46	1,47	2,19	1,44	540 000	1 670	690
402	14	4	2 430 000	4 600 000	0,46	1,47	2,19	1,44	540 000	1 670	690
402	14	4	2 430 000	4 600 000	0,46	1,47	2,19	1,44	540 000	1 670	690
406	12	3	2 010 000	4 100 000	0,39	1,71	2,54	1,67	475 000	1 660	660
406	12	3	2 010 000	4 100 000	0,39	1,71	2,54	1,67	475 000	1 660	660
406	12	3	2 010 000	4 100 000	0,39	1,71	2,54	1,67	475 000	1 660	660
442	15	4	3 050 000	5 700 000	0,43	1,55	2,31	1,52	660 000	1 520	610
426	13	3	2 150 000	4 550 000	0,42	1,62	2,42	1,59	520 000	1 580	600
426	13	3	2 150 000	4 550 000	0,42	1,62	2,42	1,59	520 000	1 580	600
426	13	3	2 150 000	4 550 000	0,42	1,62	2,42	1,59	520 000	1 580	600
462	15	4	3 150 000	6 100 000	0,46	1,47	2,19	1,44	700 000	1 440	560
462	15	4	3 150 000	6 100 000	0,46	1,47	2,19	1,44	700 000	1 440	560
462	15	4	3 150 000	6 100 000	0,46	1,47	2,19	1,44	700 000	1 440	560

Tapered roller bearings

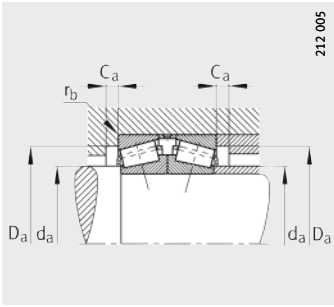
Matched pairs



X-life

Dimension table (continued) · Dimensions in mm

Designation	Mass of bearing pair m ≈ kg	Dimensions						Mounting dimensions	
		d	D	2B	2T	r ₃ , r ₄	A	d _a	D _a
						min.		max.	min.
32968-XL-DF-A0-60	73,1	340	460	152	152	3	38	361	421
32968-XL-DF-A200-250	73,1	340	460	152	152	3	38	361	421
32968-XL-DF-A550-600	73,1	340	460	152	152	3	38	361	421
32968-XL-DF-VA240-300	73,1	340	460	152	152	3	38	361	421
32972-XL-DF-A0-60	76,3	360	480	152	152	3	38	380	439
32972-XL-DF-A200-250	76,3	360	480	152	152	3	38	380	439
32972-XL-DF-A400-450	76,3	360	480	152	152	3	38	380	439
32972-XL-DF-A470-520	76,3	360	480	152	152	3	38	380	439
32972-XL-DF-A500-550	76,3	360	480	152	152	3	38	380	439
32972-XL-DF-A650-700	76,3	360	480	152	152	3	38	380	439



Mounting dimensions

			Basic load ratings of bearing pair		Calculation factors				Fatigue limit load Bearing pair C_{ur} N	Limiting speed Bearing pair n_G min^{-1}	Reference speed Bearing pair $n_{\partial r}$ min^{-1}
D_a max.	C_a min.	r_b max.	dyn. C_r N	stat. C_{Or} N	e	Y_1	Y_2	Y_0			
446	12	3	2 180 000	4 750 000	0,44	1,54	2,3	1,51	600 000	1 500	560
446	12	3	2 180 000	4 750 000	0,44	1,54	2,3	1,51	600 000	1 500	560
446	12	3	2 180 000	4 750 000	0,44	1,54	2,3	1,51	600 000	1 500	560
446	12	3	2 180 000	4 750 000	0,44	1,54	2,3	1,51	600 000	1 500	560
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540
466	14	3	2 150 000	4 750 000	0,46	1,47	2,19	1,44	530 000	1 430	540

**Schaeffler Technologies
AG & Co. KG**

Georg-Schäfer-Straße 30
97421 Schweinfurt
Germany
Internet www.schaeffler.de/en
E-mail faginfo@schaeffler.com

In Germany:

Phone 0180 5003872
Fax 0180 5003873

From other countries:

Phone +49 9721 91-0
Fax +49 9721 91-3435

Every care has been taken to ensure the correctness of the information contained in this publication but no liability can be accepted for any errors or omissions. We reserve the right to make technical changes.

© Schaeffler Technologies AG & Co. KG

Issued: 2017, June

This publication or parts thereof may not be reproduced without our permission.

TPI 245 GB-D