

Matched tapered roller bearings



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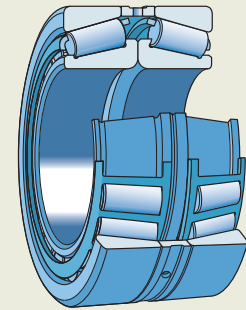
Matched tapered roller bearings

The SKF assortment of matched tapered roller bearings is based on popular sizes of single row tapered roller bearings in standard or SKF Explorer performance class. Depending on the application requirements, matched tapered roller bearings are available in different designs and variants:

- matched bearings arranged face-to-face
- matched bearings arranged back-to-back
- matched bearings arranged in tandem

The matched bearings listed in the product tables are examples and constitute the basic SKF assortment. Of course, SKF can supply other matched bearings on request. The bearings and ring spacer(s) are delivered as a ready-to-mount set.

Matched single row tapered roller bearings arranged face-to-face



Designs and variants

Matched bearings arranged face-to-face

- have load lines that converge toward the bearing axis (fig. 1)
- can accommodate axial loads in both directions
- can accommodate a limited amount of misalignment
- are supplied as a set with an intermediate ring between the outer rings

Matched bearings arranged back-to-back

- have load lines that diverge toward the bearing axis (fig. 2)
- provide a relatively stiff bearing arrangement
- can accommodate tilting moments
- can accommodate axial loads in both directions
- are supplied as a set with intermediate inner and outer ring spacers

Matched bearings arranged in tandem

- have load lines that are parallel (fig. 3)
- share radial and axial loads equally
- are used when the load carrying capacity of a single bearing is inadequate
- can accommodate axial loads in one direction only. If axial loads act in both directions, a third bearing must be added and adjusted against the tandem pair
- are supplied as a set with intermediate inner and outer ring spacers

Fig. 1

Matched bearings arranged face-to-face

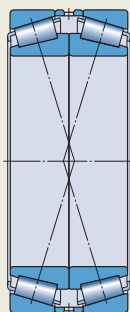


Fig. 2

Matched bearings arranged back-to-back

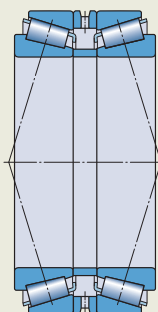
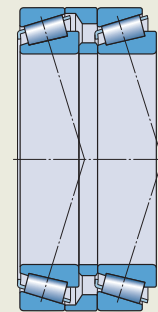


Fig. 3

Matched bearings arranged in tandem



Ring spacer designs

On request, SKF can supply matched bearings with various ring spacer designs. The available designs are listed in tables 1 and 2. Not all designs are available for all bearing arrangements. Contact SKF if you need a special ring spacer design.

Special ring spacer designs are indicated in the bearing designations by the reference numbers, see page 11. The first number denotes the inner ring spacer.

The standard ring spacer designs are:

- for bearings arranged face-to-face → 02
- for bearings arranged back-to-back → 12
- for bearings arranged in tandem → 19

The number for the standard ring spacers is not included in the bearing designation.

Cages

SKF matched tapered roller bearings are fitted with roller centred, stamped steel cages. Contact SKF if your application requires other cages.

Table 1

Ring spacers between inner rings

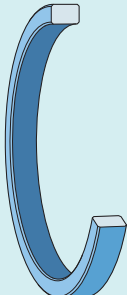
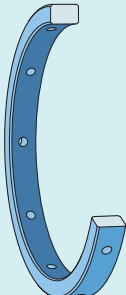
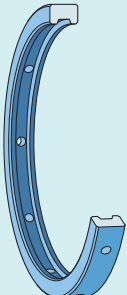
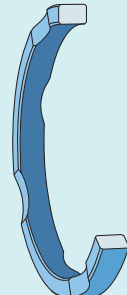
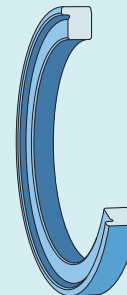
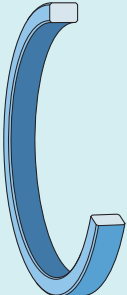
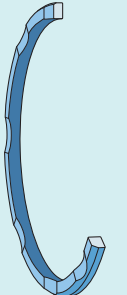
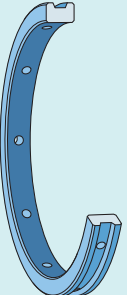
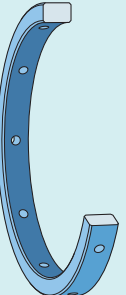
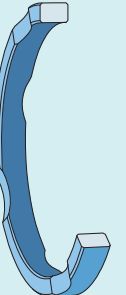
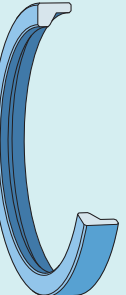
Reference number for bearing designation	1	2	3	4	5	0	
Design							No ring spacer

Table 2

Ring spacers between outer rings

Reference number for bearing designation	1	2	2	3	4	9	0	
Design								No ring spacer
		Width < 7 mm	Width ≥ 7 mm					

General bearing specifications

Dimension standards

The boundary dimensions of the individual bearings used in the matched sets are in accordance with ISO 355.

Tolerances

The individual bearings in SKF matched tapered roller bearings follow Normal tolerances. Bearings in sets with designation suffix CL7C provide tighter run-out tolerances.

The tolerance values for individual bearings are listed in table 3. They conform to ISO 492, except for tolerance

class CL7C. The total width tolerance values of matched sets are listed in table 4.

Tolerance symbols are explained in table 5, page 8.

Table 3

Normal and CL7C class tolerances for metric tapered roller bearings

Inner ring, bearing width and ring widths

d		$t_{\Delta dmp}$		t_{Vdmp}	$t_{\Delta Bs}$		t_{Kia} Tolerance classes Normal CL7C ¹⁾		$t_{\Delta Ts}$		$t_{\Delta T1s}$		$t_{\Delta T2s}$	
		U	L		U	L	U	L	U	L	U	L		
>	≤	μm		μm	μm		μm		μm		μm		μm	
10	18	0	-12	9	0	-120	15	7	200	0	100	0	100	0
18	30	0	-12	9	0	-120	18	8	200	0	100	0	100	0
30	50	0	-12	9	0	-120	20	10	200	0	100	0	100	0
50	80	0	-15	11	0	-150	25	10	200	0	100	0	100	0
80	120	0	-20	15	0	-200	30	13	200	-200	100	-100	100	-100
120	180	0	-25	19	0	-250	35	-	350	-250	150	-150	200	-100
180	250	0	-30	23	0	-300	50	-	350	-250	150	-150	200	-100
250	315	0	-35	26	0	-350	60	-	350	-250	150	-150	200	-100
315	400	0	-40	30	0	-400	70	-	400	-400	200	-200	200	-200

Outer ring

D		$t_{\Delta Dmp}$		t_{VDmp}	$t_{\Delta Cs}$		t_{Kea} Tolerance classes Normal CL7C ¹⁾	
		U	L		U	L	U	L
>	≤	μm		μm	μm		μm	
18	30	0	-12	9	Identical to $t_{\Delta Bs}$		18	9
30	50	0	-14	11	of an inner ring		20	10
50	80	0	-16	12	of the same		25	13
80	120	0	-18	14	bearing		35	18
120	150	0	-20	15			40	20
150	180	0	-25	19			45	23
180	250	0	-30	23			50	-
250	315	0	-35	26			60	-
315	400	0	-40	30			70	-
400	500	0	-45	34			80	-
500	630	0	-50	38			100	-
630	800	0	-75	55			120	-

¹⁾ Tolerances are not in accordance with any ISO tolerance class and are for high-performance design tapered roller bearings.

Table 4

Total width tolerances of matched metric single row tapered roller bearings

Bore diameter d		Total width tolerance Δ_{TsD} of matched bearings in the series															
		329		320		330		331		302, 322		332		303, 323		313	
>	≤	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L	Δ_{TsD} U	L
mm		μm															
–	30	–	–	+550	+50	–	–	–	–	+550	+100	+550	+100	+600	+100	+500	+50
30	40	+600	+150	+550	+100	–	–	+600	+100	+600	+100	+600	+100	+600	+100	+550	+50
40	50	+650	+150	+600	+100	+650	+150	+600	+100	+600	+100	+600	+100	+600	+150	+550	+50
50	65	+650	+200	+600	+100	+650	+200	+600	+150	+600	+150	+600	+150	+650	+150	+550	+100
65	80	+700	+200	+600	+150	+700	+250	+650	+150	+650	+150	+650	+150	+700	+200	+600	+100
80	100	+750	–150	+650	–250	+800	–50	+700	–200	+700	–200	+700	–200	+700	–200	+600	–300
100	120	+750	–150	+700	–200	+800	–100	+700	–200	+700	–200	+700	–200	+750	–150	+600	–300
120	140	+1100	–200	+1000	–300	+1100	–200	–	–	+1000	–300	–	–	+1100	–200	+950	–350
140	160	+1150	–150	+1050	–250	+1100	–200	–	–	+1050	–250	–	–	+1150	–150	+950	–350
160	180	+1150	–150	+1100	–200	–	–	–	–	+1100	–200	–	–	+1150	–150	–	–
180	190	+1150	–150	+1100	–200	–	–	–	–	+1100	–200	–	–	+1200	–100	–	–
190	200	+1150	–150	+1100	–200	–	–	–	–	+1100	–200	–	–	+1200	–100	–	–
200	225	+1200	–100	+1150	–150	–	–	–	–	+1150	–150	–	–	+1250	–50	–	–
225	250	+1200	–100	+1200	–100	–	–	–	–	+1200	–100	–	–	+1300	0	–	–
250	280	+1300	0	+1250	–50	–	–	–	–	+1250	–50	–	–	–	–	–	–
280	300	+1400	+100	+1300	0	–	–	–	–	+1300	0	–	–	–	–	–	–
300	315	+1400	+100	+1350	+50	–	–	–	–	+1350	+50	–	–	–	–	–	–
315	340	+1500	–200	+1450	–250	–	–	–	–	+1450	–250	–	–	–	–	–	–

Tolerance symbols

Tolerance symbol	Definition
Inner ring	
d	Nominal bore diameter
Δd_{mp}	Deviation of a mid-range size (out of two-point sizes) of bore diameter in any cross section from its nominal size
Vd_{mp}	Range of mid-range sizes (out of two-point sizes) of bore diameter obtained from any cross section
ΔB_s	<ol style="list-style-type: none"> 1 Upper limit: Deviation of a minimum circumscribed size of inner ring width, between two opposite lines, in any longitudinal section which includes the inner ring bore axis, from its nominal size 2 Lower limit: Deviation of a two-point size of inner ring width from its nominal size
K_{ia}	Circular radial run-out of inner ring bore surface of assembled bearing with respect to datum, i.e. axis, established from the outer ring outside surface
Outer ring	
D	Nominal outside diameter
ΔD_{mp}	Deviation of a mid-range size (out of two-point sizes) of outside diameter in any cross section from its nominal size
VD_{mp}	Range of mid-range sizes (out of two-point sizes) of outside diameter obtained from any cross section
ΔC_s	<ol style="list-style-type: none"> 1 Upper limit: Deviation of a minimum circumscribed size of outer ring width, between two opposite lines, in any longitudinal section which includes the outer ring outside surface axis, from its nominal size 2 Lower limit: Deviation of a two-point size of outer ring width from its nominal size
K_{ea}	Circular radial run-out of outer ring outside surface of assembled bearing with respect to datum, i.e. axis, established from the inner ring bore surface
Bearing width	
T	Nominal assembled bearing width
ΔT_{sD}	Deviation of minimum circumscribed size of assembled bearing width from its nominal size
T_1	Nominal effective width of cone (inner ring, with roller and cage assembly) assembled with a master cup (outer ring)
T_2	Nominal effective width of cup assembled with a master cone
ΔT_{1s}	Deviation of minimum circumscribed size of effective width (cone assembled with a master cup) from its nominal size
ΔT_{2s}	Deviation of minimum circumscribed size of effective width (cup assembled with a master cone) from its nominal size

Internal clearance

Matched bearings arranged face-to-face or back-to-back

The axial clearance is determined by the spacers inserted between the bearing rings. SKF matched tapered roller bearings are produced as standard with the internal clearance ranges listed in table 6.

Bearing sets with deviating internal clearance are identified by the designation suffix C followed by a number. The number provides the mean value of the

axial internal clearance in μm . The clearance range corresponds to that of the standard clearance.

For example, 32048 X/DFC205 has a mean axial internal clearance before mounting of 205 μm .

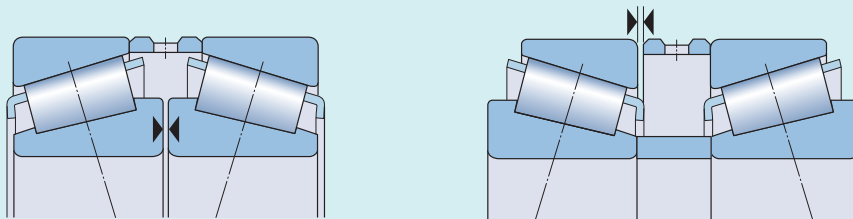
The standard clearance range of a matched set in the 320 series with 240 mm bore diameter is 60 μm (440 to 500 μm). Thus, the clearance range of the set with the designation suffix C205 is 175 to 235 μm .

Matched bearings arranged in tandem

The internal clearance or preload is obtained after mounting, depending on the adjustment against another bearing or bearing set.

Table 6

Axial internal clearance in unmounted condition of matched metric single row tapered roller bearings, arranged face-to-face or back-to-back



Bore diameter d		Axial internal clearance of matched bearings in the series															
		329		320		330		331		302, 322		332		303, 323		313	
>	≤	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		μm															
–	30	–	–	80	120	–	–	–	–	100	140	110	150	130	170	60	100
30	40	160	200	100	140	–	–	120	160	120	160	130	170	140	180	70	110
40	50	180	220	120	160	180	220	140	180	140	180	130	170	160	200	80	120
50	65	210	250	140	180	200	240	160	200	160	200	150	190	180	220	100	140
65	80	230	270	160	200	250	290	180	240	180	220	180	220	200	260	110	170
80	100	270	310	190	230	350	390	210	270	210	270	200	260	240	300	110	170
100	120	270	330	220	280	340	400	240	300	220	280	240	300	280	340	130	190
120	140	310	370	240	300	340	400	–	–	240	300	–	–	330	390	160	220
140	160	370	430	270	330	340	400	–	–	270	330	–	–	370	430	180	240
160	180	370	430	310	370	–	–	–	–	310	370	–	–	390	450	–	–
180	190	370	430	340	400	–	–	–	–	340	400	–	–	440	500	–	–
190	200	390	450	340	400	–	–	–	–	340	400	–	–	440	500	–	–
200	225	440	500	390	450	–	–	–	–	390	450	–	–	490	550	–	–
225	250	440	500	440	500	–	–	–	–	440	500	–	–	540	600	–	–
250	280	540	600	490	550	–	–	–	–	490	550	–	–	–	–	–	–
280	300	640	700	540	600	–	–	–	–	540	600	–	–	–	–	–	–
300	340	640	700	590	650	–	–	–	–	590	650	–	–	–	–	–	–

Misalignment

The permissible angular misalignment between the inner and outer rings depends on the size and internal design of the bearing, the radial internal clearance in operation and the forces and moments acting on the bearing. Where misalignment cannot be avoided, SKF recommends using a face-to-face arrangement. Any misalignment increases bearing noise and reduces bearing service life.

Permissible speed

The speed ratings in the product tables indicate:

- the reference speed, which enables a quick assessment of the speed capabilities from a thermal frame of reference
- the limiting speed, which is a mechanical limit that should not be exceeded unless the bearing design and the application are adapted for higher speeds

Calculation of bearing load and life

When a radial load is applied to a single row tapered roller bearing, the load is transmitted from one raceway to the other at an angle to the bearing axis and an internal axial load is induced. This should be considered when calculating the equivalent bearing loads for bearing applications consisting of two single bearing arrangements and/or bearing pairs arranged in tandem. SKF provides several engineering programs like [SKF Product select](#) and [SKF SimPro quick](#) that allow a customer to determine the bearing loads and to perform bearing life calculations.

These tools and many more can be found under [Digital tools](#) at [skf.com](#).

Seat tolerances for standard conditions

The standard axial internal clearance of matched bearings arranged face-to-face or back-to-back (table 6) provides an appropriate operating clearance when the bearings are mounted on solid shafts machined to:

- $d \leq 50 \text{ mm}$ → m5[Ⓔ]
- $50 \text{ mm} < d \leq 140 \text{ mm}$ → m6[Ⓔ]
- $140 \text{ mm} < d \leq 200 \text{ mm}$ → n6[Ⓔ]
- $d > 200 \text{ mm}$ → p6[Ⓔ]

SKF recommends these shaft seat tolerance classes for rotating loads on the inner ring where $P \leq 0.06 C$. If tighter fits are selected, be sure that the bearings are not preloaded and are able to rotate freely. The reduction of internal clearances caused by axial locating forces should also be taken into consideration.

For stationary outer ring loads, SKF recommends housing bore tolerance classes J6[Ⓔ] or H7[Ⓔ].

Mounting

Sets of matched tapered roller bearings must be mounted without any axial space between the spacers and the inner and outer rings. During mounting, turn the shaft through several revolutions in both directions to make sure there is proper contact between the roller ends and guide flanges. If there is no proper contact, the resulting clearance or preload will be incorrect, which can lead to premature bearing failure.

Designation system

Examples:	31318 X/L4BDFC210	31318	X /	L4B	CL7C	DF	C210
	31309/CL7CDFG40	31309	/			DF	G40
	32022T84 X/DB11C700	32022	T84 X /			DB11	C700

Basic designation

The first digit identifies the bearing type (3 = tapered roller bearing).
The following two digits identify the ISO dimension series.
The last two digits of the basic designation identify the size code of the bearing bore.
The size code multiplied by 5 gives the bore diameter (d) in mm.

External design

T... A number immediately following the T identifies the total width of matched bearings, arranged back-to-back or in tandem.
X Boundary dimensions changed to conform to ISO

Materials, heat treatment

HA1 Inner and outer ring case hardened
HN3 Inner ring with special surface heat treatment
HN4 Bearing rings and rollers with special surface heat treatment
L4B Bearing rings and rollers with special surface coating

Accuracy

CL7A Pinion bearing
CL7C High-performance design

Bearing sets, matched bearings

DB.. Two bearings matched in back-to-back arrangement. A two-digit number immediately following the DB identifies the design of the inner and outer ring spacers (see *Ring spacer designs*, page 5).
DF.. Two bearings matched in face-to-face arrangement. A number immediately following the DF identifies the design of the inner and outer ring spacer (see *Ring spacer designs*, page 5).
DT.. Two bearings matched for mounting in tandem. A number immediately following the DT identifies the design of the inner and outer ring spacers (see *Ring spacer designs*, page 5).
C... Special clearance. The number immediately following the C is the mean axial internal clearance in μm . The range remains the same as specified in table 6, page 9.
G... Special preload. The number immediately following the G is the mean axial preload in μm .

Other variants

V004 CL7C + C15 + special clearance range
VS118 Reduced axial clearance or preload range

SKF Explorer bearings

SKF Explorer bearings have optimized internal designs and surfaces that typically reduce friction and heat generation, provide high wear resistance, and allow heavier loads to be accommodated.

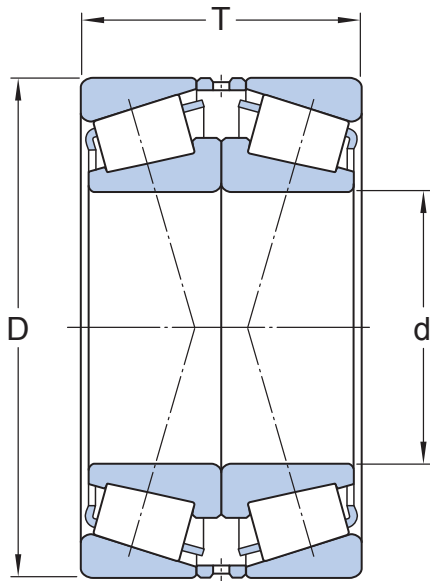
The optimized bearing features vary across the product range but in an application, SKF Explorer bearings can:

- Contribute to extended service life
- Increase uptime and productivity
- Reduce maintenance needs
- Reduce noise and vibration
- Enable downsizing of the application
- Contribute to a more sustainable solution

By using SKF's bearing selection process you will be sure to get the most out of your bearing arrangement.

SKF Explorer bearings are shown coloured blue in the product tables on pages 12–20.

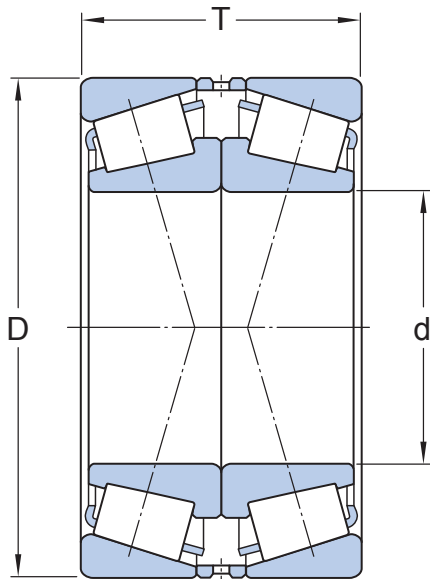
Matched tapered roller bearings arranged face-to-face
d 25–120 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Limiting speed	Mass	Designation
d	D	T	C	C ₀	P _u	Reference speed			
mm			kN		kN	r/min		kg	–
25	62	36.5	79.9	80	8.65	6 700	11 000	0.55	31305/DF
30	62	42.5	106	116	12.7	7 500	11 000	0.59	32206/DF
	72	41.5	100	100	11.4	5 600	9 500	0.82	31306/DF
35	80	45.5	129	134	15.6	5 000	8 500	1.1	31307/DF
40	90	50.5	156	163	19	4 500	7 500	1.5	31308/CL7CDF
45	100	54.5	194	204	24.5	4 000	6 700	2	31309/CL7CDF
	100	54.5	194	204	24.5	4 000	6 700	2	31309/CL7CDF03
	100	54.5	194	204	24.5	4 000	6 700	2	31309/CL7CDFC25
	100	54.5	194	204	24.5	4 000	6 700	2	31309/CL7CDFG40
50	80	40	129	176	19.3	5 300	8 000	0.78	32010 X/DF
	90	43.5	160	183	20.8	4 800	7 500	1.1	30210/DFC120
	110	58.5	224	240	28.5	3 600	6 000	2.55	31310/CL7CDF
55	90	54	191	270	30.5	4 500	7 000	1.35	33011/DF03C170
	120	63	302	325	39	3 800	5 600	3.25	30311/DF
	120	63	256	275	33.5	3 400	5 600	3.25	31311/DF
60	110	76	354	475	53	3 800	6 000	3.2	33212/DF01C200
	130	67	303	335	40.5	3 000	5 300	4.05	31312/DF
65	140	72	348	380	47.5	2 800	4 800	5	31313/CL7CDF
70	110	50	214	305	34.5	3 800	5 600	1.75	32014 X/DF
	110	50	214	305	34.5	3 800	5 600	1.75	32014 X/DFC150
	110	50	214	305	34.5	3 800	5 600	1.75	32014 X/DFC220
	110	62	273	400	45.5	3 800	5 600	2.2	33014/DF
	150	76	393	440	54	2 600	4 500	6.1	31314/CL7ADF

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Limiting speed	Mass	Designation
d	D	T	dynamic	static		Reference speed			
			C	C ₀	P _u				
mm			kN		kN	r/min		kg	–
75	115	62	286	455	52	3 600	5 300	2.4	33015/DFC150
	115	62	286	455	52	3 600	5 300	2.4	33015/DFC240
	125	74	370	530	60	3 400	5 000	3.65	33115/DFC150
	130	66.5	337	425	49	3 200	5 000	3.4	32215/DF
	160	80	438	490	58.5	2 400	4 300	7.15	31315/CL7CDF
	160	80	438	490	58.5	2 400	4 300	7.15	31315/CL7CDFC125
	160	80	438	490	58.5	2 400	4 300	7.15	31315/DF
	125	58	288	430	49	3 200	5 000	2.65	32016 X/DF
	140	70.5	391	490	57	3 000	4 500	4.25	32216/DF
	170	81.5	473	530	61	2 400	4 000	8.65	31316/DF
85	130	58	293	450	51	3 200	4 800	2.8	32017 X/DF
	130	58	293	450	51	3 200	4 800	2.8	32017 X/DFC70
	150	77	451	570	65.5	2 800	4 300	5.4	32217/DF
	180	89	510	570	64	2 200	3 800	9.9	31317/DF
	180	89	510	570	64	2 200	3 800	10	31317/DF03
	140	64	356	540	62	3 000	4 300	3.65	32018 X/DF
90	140	78	457	710	78	3 000	4 500	4.5	33018/DFC150
	160	65	411	490	57	2 800	4 000	5.2	30218/DF
	160	85	529	680	76.5	2 600	4 000	6.85	32218/DF
	190	93	486	630	71	1 900	3 400	11.5	31318/DF
	190	93	486	630	71	1 900	3 400	11.5	31318/DFC185
	190	93	486	630	71	1 900	3 400	11.5	31318/DFC70
	145	64	353	540	61	2 800	4 300	3.8	32019 X/DFC150
	170	91	597	780	86.5	2 600	3 800	8.2	32219/DF
95	200	99	539	710	78	1 800	3 400	13.5	31319/DF
	200	99	539	710	78	1 800	3 400	13.5	31319/DFC190
	150	64	359	560	62	2 600	4 000	3.9	32020 X/DF
	150	64	359	560	62	2 600	4 000	3.95	32020 X/DFC140
100	180	74	521	640	72	2 400	3 600	7.5	30220/DF
	180	98	668	880	96.5	2 400	3 600	10	32220/DF
	215	113	685	930	102	1 700	3 000	18.5	31320 X/DF
105	160	70	426	670	73.5	2 600	3 800	5.05	32021 X/DF
	160	70	426	670	73.5	2 600	3 800	5.05	32021 X/DFC150
110	170	76	494	780	80	2 400	3 600	6.3	32022 X/DF
	170	76	494	780	80	2 400	3 600	6.3	32022 X/DFC100
	170	76	494	780	80	2 400	3 600	6.3	32022 X/DFC200
	180	112	781	1 250	132	2 200	3 400	11.5	33122/DF
	180	112	781	1 250	132	2 200	3 400	11.5	33122/DFC80
	200	82	561	800	86.5	2 000	3 200	10.5	30222/DF
	200	112	842	1 140	122	2 200	3 200	14.5	32222/DF
	200	112	842	1 140	122	2 200	3 200	14.5	32222/DFC300
	240	126	841	1 160	122	1 500	2 800	26	31322 X/DF
	240	126	841	1 160	122	1 500	2 800	26	31322 X/DFC180
	240	126	841	1 160	122	1 500	2 800	26	31322 X/DFC220
	240	126	841	1 160	122	1 500	2 800	26	31322 X/DFC240
	240	126	841	1 160	122	1 500	2 800	26	31322 X/L4BDFC210

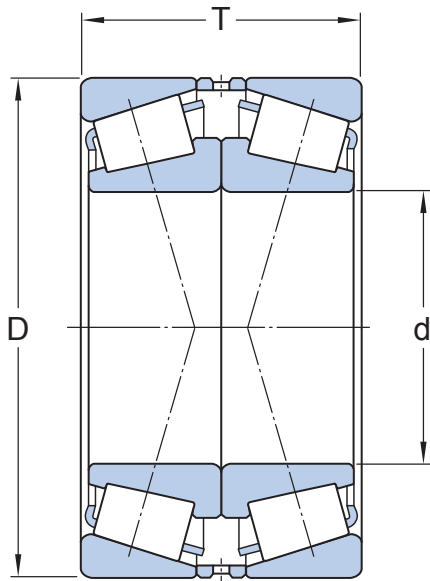
Matched tapered roller bearings arranged face-to-face
d 130–260 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Limiting speed	Mass	Designation	
d	D	T	C	C ₀	P _u	Reference speed				
mm			kN		kN	r/min	kg	–		
120	180	76	513	830	85	2 200	3 400	6.75	32024 X/DF	
	180	76	513	830	85	2 200	3 400	6.75	32024 X/DFC205	
	180	76	513	830	85	2 200	3 400	6.75	32024 X/DFC350	
	180	96	611	1 080	112	2 200	3 400	8.6	33024/DF	
	180	96	611	1 080	112	2 200	3 400	8.6	33024/DFC250	
	215	87	716	915	98	2 000	3 000	12.5	30224/DF	
	215	123	983	1 400	143	2 000	3 000	18.5	32224/DF	
	215	123	983	1 400	143	2 000	3 000	18.5	32224/DFC325	
	260	136	992	1 400	146	1 400	2 400	32.5	31324 X/DF	
	260	181	1 466	2 240	220	1 600	2 600	45	32324/DF	
130	180	64	420	735	76.5	2 200	3 200	4.95	32926/DF	
	200	90	666	1 080	110	2 000	3 000	10	32026 X/DF	
	230	87.5	774	980	102	1 800	2 800	14	30226/DF	
	230	135.5	1 012	1 660	170	1 600	2 800	23	32226/DF	
	230	135.5	1 012	1 660	170	1 600	2 800	23	32226/DFC380	
	230	135.5	1 012	1 660	170	1 600	2 800	23	32226/DFC440	
	280	144	1 110	1 560	160	1 300	2 400	39.5	31326 X/DF	
	280	144	1 110	1 560	160	1 300	2 400	39.5	31326 X/DFC30	
	140	210	90	692	1 160	116	1 900	2 800	11	32028 X/DF
		210	90	692	1 160	116	1 900	2 800	11	32028 X/DFC100
250		91.5	773	1 140	116	1 500	2 600	18	30228/DF	
250		91.5	773	1 140	116	1 500	2 600	18	30228/DFC440	
250		143.5	1 185	2 000	200	1 500	2 600	29.5	32228/DF	
250		143.5	1 185	2 000	200	1 500	2 600	29.5	32228/DFC190	
250		143.5	1 185	2 000	200	1 500	2 600	29.5	32228/DFC330	
250		143.5	1 185	2 000	200	1 500	2 600	29.5	32228/DFC350	
250		143.5	1 185	2 000	200	1 500	2 600	29.5	32228/DFC450	
300		154	1 264	1 800	180	1 200	2 200	49	31328 X/DF	
300		154	1 264	1 800	180	1 200	2 200	49	31328 X/DFC260	
300		154	1 264	1 800	180	1 200	2 200	49	31328 X/DFC330	

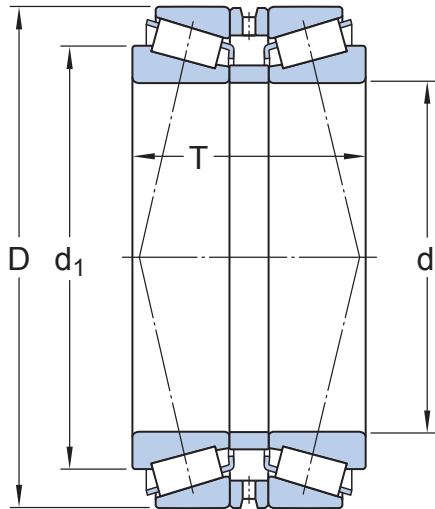
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Limiting speed	Mass	Designation
d	D	T	dynamic	static	P _u	Reference speed			
mm			kN		kN	r/min	kg	–	
150	225	96	782	1 320	132	1 800	2 600	13.5	32030 X/DF
	225	96	782	1 320	132	1 800	2 600	13.5	32030 X/DFC140
	225	96	782	1 320	132	1 800	2 600	13.5	32030 X/DFC30
	225	96	782	1 320	132	1 800	2 600	13.5	32030 X/DFC300
	225	96	782	1 320	132	1 800	2 600	13.5	32030 X/DFC500
	270	98	781	1 120	114	1 400	2 400	22	30230/DF
	270	98	737	1 120	114	1 400	2 400	22.5	30230/DFC350
	270	154	1 341	2 280	224	1 400	2 400	37.5	32230/DF
	270	154	1 341	2 280	224	1 400	2 400	37.5	32230/DFC360
	270	154	1 341	2 280	224	1 400	2 400	37.5	32230/DFC500
	270	154	1 341	2 280	224	1 400	2 400	37.5	32230/L4BDFC400
	320	164	1 427	2 040	200	1 100	2 000	58.5	31330 X/DF
	320	164	1 427	2 040	200	1 100	2 000	58.5	31330 X/DFC290
	320	164	1 427	2 040	200	1 100	2 000	58.5	31330 X/DFC305
	320	164	1 427	2 040	200	1 100	2 000	58.5	31330 X/DFC50
	160	240	102	912	1 560	153	1 600	2 400	16
240		102	912	1 560	153	1 600	2 400	16	32032 X/DFC480
290		104	971	1 460	143	1 300	2 200	27.5	30232/DF
290		168	1 602	2 800	265	1 300	2 200	48	32232/DF
170	230	76	602	1 160	110	1 700	2 400	9.25	32934/DF
	230	76	602	1 160	110	1 700	2 400	9.25	32934/DFC225
	260	114	1 071	1 830	176	1 500	2 200	21.5	32034 X/DF
	310	182	1 843	3 250	300	1 200	2 000	59.5	32234/DF
310	182	1 843	3 250	300	1 200	2 000	59.5	32234/DFC430	
180	250	90	746	1 460	137	1 500	2 200	14	32936/DF
	250	90	746	1 460	137	1 500	2 200	14	32936/DFC250
	280	128	1 360	2 320	220	1 400	2 200	29	32036 X/DF
	320	114	1 079	1 630	160	1 200	2 000	35.5	30236/DFC300
	320	182	1 833	3 250	300	1 100	1 900	61	32236/DF
	320	182	1 833	3 250	300	1 100	1 900	61	32236/DFC410
	320	182	1 833	3 250	300	1 100	1 900	61	32236/L4BDFC440
	320	182	1 833	3 250	300	1 100	1 900	61	32236/L4BDFC440
190	260	90	760	1 530	143	1 400	2 200	14.5	32938/DF
	290	128	1 381	2 400	224	1 300	2 000	30.5	32038 X/DF
	290	128	1 381	2 400	224	1 300	2 000	30.5	32038 X/DFC610
	340	120	1 308	2 000	190	1 100	1 800	42.5	30238/DFC700
200	280	102	1 008	1 900	176	1 400	2 000	19.5	32940/DF
	280	102	1 008	1 900	176	1 400	2 000	19.5	32940/DFC680
	310	140	1 372	2 750	255	1 100	1 900	39	32040 X/DF
	310	140	1 280	2 750	255	1 100	1 900	39	32040 X/DFC230
	310	140	1 372	2 750	255	1 100	1 900	39	32040 X/DFC420
	360	208	2 229	4 000	360	1 000	1 700	88	32240/DF
	360	208	2 229	4 000	360	1 000	1 700	88	32240/DFC430
	360	208	2 229	4 000	360	1 000	1 700	88	32240/DFC500
	360	208	2 229	4 000	360	1 000	1 700	88	32240/DFC500
	360	208	2 229	4 000	360	1 000	1 700	88	32240/DFC500
220	300	102	1 030	2 000	183	1 200	1 900	21	32944/DF
	300	102	842	2 000	183	1 100	2 000	21	32944/DFC300
	340	152	1 637	3 350	300	1 000	1 700	51	32044 X/DF
	340	152	1 637	3 350	300	1 000	1 700	51	32044 X/DFC190
	340	152	1 637	3 350	300	1 000	1 700	51	32044 X/DFC720
	340	152	1 540	3 350	300	1 000	1 700	51	32044 X/L4BDFC480
	400	228	2 949	5 400	465	900	1 500	124	32244/DF
	400	228	2 949	5 400	465	900	1 500	124	32244/DFC460
	400	228	2 949	5 400	465	900	1 500	124	32244/DFC480
	400	228	2 949	5 400	465	900	1 500	124	32244/DFC520
	400	228	2 949	5 400	465	900	1 500	124	32244/DFC560

Matched tapered roller bearings arranged face-to-face
d 280–360 mm



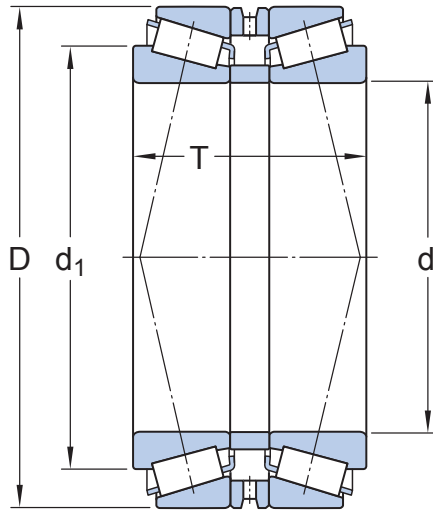
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Limiting speed	Mass	Designation
d	D	T	C	C ₀	P _u	Reference speed			
mm			kN		kN	r/min	kg	–	
240	320	102	1 069	2 160	193	1 200	1 700	22.5	32948/DF
	320	102	858	2 160	193	1 000	1 700	22.5	32948/DFC470
	360	152	1 695	3 550	315	950	1 600	54.5	32048 X/DF
	360	152	1 695	3 550	315	950	1 600	54.5	32048 X/DFC205
	360	152	1 695	3 550	315	950	1 600	54.5	32048 X/DFC720
	440	254	3 289	6 700	540	800	1 300	172	32248/DF
	440	254	3 289	6 700	540	800	1 300	172	32248/DFC520
	440	254	3 289	6 700	540	800	1 300	172	32248/DFC520
260	400	174	2 127	4 400	380	850	1 400	79	32052 X/DF
	480	274	4 013	7 350	600	750	1 200	213	32252/DF
	480	274	4 013	7 350	600	750	1 200	213	32252/DFC570
280	420	174	2 208	4 750	400	800	1 300	84	32056 X/DF
	420	174	2 208	4 750	400	800	1 300	84	32056 X/DFC310
	420	174	2 208	4 750	400	800	1 300	84	32056 X/DFC330
	420	174	2 208	4 750	400	800	1 300	84	32056 X/DFC500
	420	174	2 208	4 750	400	800	1 300	84	32056 X/DFC890
	420	174	2 208	4 750	400	800	1 300	84	32056 X/DFC890
300	420	152	1 790	4 500	375	800	1 300	65.5	32960/DF
	420	152	1 931	4 500	375	800	1 300	65.5	32960/DFC1180
	460	200	2 818	6 000	490	750	1 200	121	32060 X/DFC500
	460	200	2 640	6 000	490	750	1 200	121	32060 X/L4BDFC410
320	440	152	1 982	4 650	390	750	1 200	69	32964/DF
	440	152	1 982	4 650	390	750	1 200	69	32964/L4BDFC610
	480	200	2 852	6 200	500	700	1 100	126	32064 X/DF
	480	200	2 852	6 200	500	700	1 100	125	32064 X/DFC350
	480	200	2 852	6 200	500	700	1 100	125	32064 X/DFC575
	480	200	2 852	6 200	500	700	1 100	125	32064 X/DFC575
340	460	152	1 995	4 800	390	700	1 200	73	32968/DF
	460	152	1 995	4 800	390	700	1 200	73	32968/HA1L4BDFC1030
	460	152	1 995	4 800	390	700	1 200	73	32968/L4BDFC810
360	480	152	2 043	5 100	405	670	1 100	76.5	32972/DF
	480	152	2 043	5 100	405	670	1 100	76.5	32972/DFC530
	480	152	2 043	5 100	405	670	1 100	76.5	32972/L4BDF
	480	152	2 043	5 100	405	670	1 100	76.5	32972/L4BDFC1030

Matched tapered roller bearings arranged back-to-back
d 25–100 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	T	dynamic	static		Reference speed	Limiting speed		
			C	C ₀	P _u				
mm			kN		kN	r/min		kg	–
25	52	36.5	65.3	67	6.95	9 000	13 000	0.33	30205T36.5/DB41C30
30	62	40	85.7	88	9.65	7 500	11 000	0.51	30206T40/DBC90
35	72	64	178	212	23.6	6 300	9 500	1.1	33207T64/DB
40	68	41.5	111	143	15.3	6 300	9 500	0.58	32008T41.5 X/DB11G10
	90	72	182	190	21.6	5 300	8 000	1.9	30308T72/DB
	90	72	182	190	21.6	5 300	8 000	1.9	30308T72/DBC220
50	80	50	129	176	19.3	5 300	8 000	0.86	32010T50 X/DBVS118
	80	118	145	204	22.8	5 300	8 000	1.8	33010T118/DB11G50
60	110	53	207	228	26.5	4 000	6 000	1.9	30212T53/DB21C205
65	100	60	204	310	34.5	4 000	6 300	1.6	33013T60/DB
70	110	108.8	273	400	45.5	3 800	5 600	3.05	33014T108.8/DB11C100
75	130	70	293	355	41.5	3 400	5 000	3.2	30215T70/DB
	130	70	293	355	41.5	3 400	5 000	3.2	30215T70/DBC270
	130	80	337	425	49	3 200	5 000	3.75	32215T80/DB
80	140	78	391	490	57	3 000	4 500	4.4	32216T78/DBC110
85	130	66	293	450	51	3 200	4 800	2.85	32017T66 X/DB
	150	71	370	440	51	3 000	4 300	4.55	30217T71/DB
90	150	104	532	780	85	2 800	4 300	6.7	33118T104/DB
	160	95	529	680	76.5	2 600	4 000	7.15	32218T95/DBC50
	190	103	486	630	71	1 900	3 400	12	31318T103/DB31
95	170	105	597	780	86.5	2 600	3 800	8.95	32219T105/DB31C180
100	150	72	359	560	62	2 600	4 000	4.1	32020T72 X/DB
	180	107	668	880	96.5	2 400	3 600	10.5	32220T107/DB
	180	108	668	880	96.5	2 400	3 600	10.5	32220T108/DB
	180	108	668	880	96.5	2 400	3 600	10.5	32220T108/DB11
	180	140	668	880	96.5	2 400	3 600	12.5	32220T140/DB11
	215	125	685	930	102	1 700	3 000	19	31320T125 X/DB

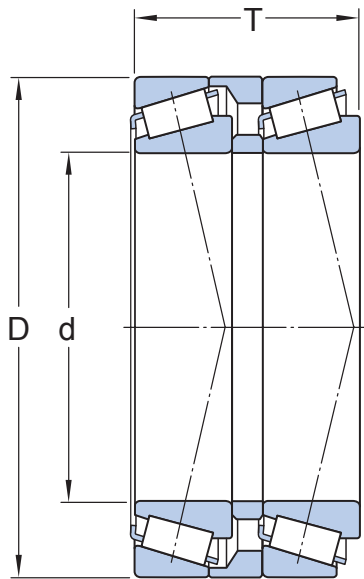
Matched tapered roller bearings arranged back-to-back
d 110–320 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	
d	D	T	C	C ₀	P _u	Reference speed	Limiting speed			
mm			kN		kN	r/min		kg	–	
110	170	84	494	780	80	2 400	3 600	6.55	32022T84 X/DB11C700 32222T122/DB	
	200	122	842	1 140	122	2 200	3 200	15		
120	180	84	513	830	85	2 200	3 400	6.9	32024T84 X/DB31C200 32024T84 X/DBC200 32024T86 X/DBC195 32024T86 X/DBC419	
	180	84	513	830	85	2 200	3 400	6.85		
	180	86	513	830	85	2 200	3 400	6.95		
	180	86	513	830	85	2 200	3 400	6.95		
	215	133	716	915	98	2 000	3 000	16	30224T133/DB 32224T133/DB 32224T137/DB 32224T137/DB11C125	
	215	133	983	1 400	143	2 000	3 000	19		
	215	137	983	1 400	143	2 000	3 000	19.5		
	215	137	983	1 400	143	2 000	3 000	19.5		
	215	146	983	1 400	143	2 000	3 000	20	32224T146/DB31C210 32224T137/DBC370	
	215	1 437	983	1 400	143	2 000	3 000	19.5		
	130	230	97.5	774	980	102	1 800	2 800	15	30226T97.5/DB 30226T108/DB 30226T108/DB32 32226T142/DB
		230	108	774	980	102	1 800	2 800	16	
230		108	774	980	102	1 800	2 800	15		
230		142	1 012	1 660	170	1 600	2 800	23		
230		149.5	1 012	1 660	170	1 600	2 800	23.5	32226T149.5/DBC305 31326T164 X/DB 31326T164 X/DBC100	
280		164	1 110	1 560	160	1 300	2 400	41		
140	250	106	773	1 140	116	1 500	2 600	19	30228T106/DB 32228T158/DB 32228T158/DB31 31328T170 X/DB	
	250	158	1 185	2 000	200	1 500	2 600	30		
	250	158	1 185	2 000	200	1 500	2 600	30		
	300	170	1 264	1 800	180	1 200	2 200	49		
150	225	132	836	1 730	170	1 600	2 600	17	33030T132/DB31 30230T168/DB 32230T168/DB	
	270	168	781	1 120	114	1 400	2 400	30.5		
	270	168	1 341	2 280	224	1 400	2 400	38		
160	290	179	1 602	2 800	265	1 300	2 200	48	32232T179/DB32C230 32232T179/DB32C410	
	290	179	1 602	2 800	265	1 300	2 200	49		
170	260	162	1 071	1 830	176	1 500	2 200	25.5	32034T162 X/DB31VS118 32234T194/DB	
	310	194	1 843	3 250	300	1 200	2 000	60		

Principal dimensions			Basic load ratings		Fatigue load limit P _u	Speed ratings		Mass	Designation
d	D	T	dynamic C	static C ₀		Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
180	280	138	1 360	2 320	220	1 400	2 200	29.5	32036T138 X/DB
	280	150	1 360	2 320	220	1 400	2 200	30.5	32036T150 X/DB
	280	150	1 360	2 320	220	1 400	2 200	31	32036T150 X/DB11C150
	320	192	1 833	3 250	300	1 100	1 900	61.5	32236T192/DB
	320	196	1 833	3 250	300	1 100	1 900	61.5	32236T196/DB32
	190	260	102	760	1 530	143	1 400	2 200	15
	260	102	616	1 530	143	1 300	2 200	15	32938T102/DB31
	290	146	1 381	2 400	224	1 300	2 000	32	32038T146 X/DBC120
	290	146	1 381	2 400	224	1 300	2 000	31.5	32038T146 X/DBC340
200	310	152	1 372	2 750	255	1 100	1 900	39.5	32040T152 X/DB31C356
	310	154.5	1 372	2 750	255	1 100	1 900	39.5	32040T154.5 X/DB11C170
	310	155	1 372	2 750	255	1 100	1 900	39.5	32040T155 X/DBC560
	360	228	2 229	4 000	360	1 000	1 700	90	32240T228/DB
220	340	165	1 637	3 350	300	1 000	1 700	51.5	32044T165 X/DB11C170
	340	165	1 637	3 350	300	1 000	1 700	51.5	32044T165 X/DB33
	340	165	1 637	3 350	300	1 000	1 700	51.5	32044T165 X/DBC125
	340	165	1 637	3 350	300	1 000	1 700	51.5	32044T165 X/DBC340
	340	168	1 540	3 350	300	1 000	1 700	52	32044T168 X/DB
	400	170	1 816	2 800	255	950	1 600	77.5	30244T170/DB11C170
240	360	164	1 695	3 550	315	950	1 600	54.5	32048T164 X/DB
	360	164	1 695	3 550	315	950	1 600	55	32048T164 X/DBC406
	360	172	1 570	3 550	315	950	1 600	56	32048T172 X/DB
260	400	189	2 127	4 400	380	850	1 400	79.5	32052T189 X/DB
	400	189	2 127	4 400	380	850	1 400	79.5	32052T189 X/DBC280
	400	194	2 127	4 400	380	850	1 400	81	32052T194 X/DB
280	420	196	2 050	4 750	400	800	1 300	85	32056T196 X/DB
	420	199	2 208	4 750	400	800	1 300	86	32056T199 X/DB
320	480	220	2 852	6 200	500	700	1 100	128	32064T220 X/DB

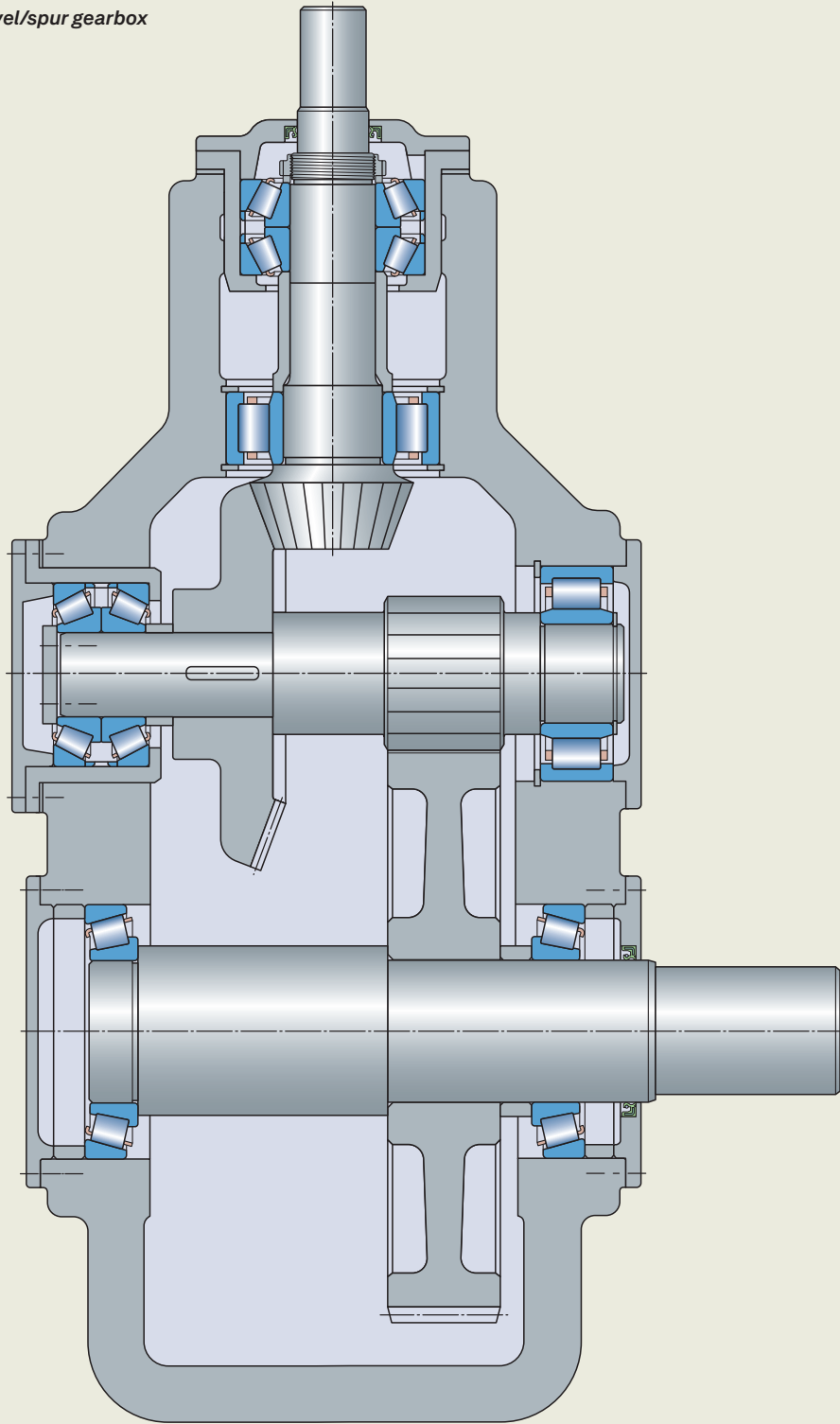
Matched tapered roller bearings arranged in tandem
d 45–65 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	T	dynamic	static	P_u	Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
45	95	62	189	224	25.5	4 000	7 000	2.05	T7FC 045T62/CL7CDTC10
50	105	69	229	275	31.5	3 600	6 300	2.75	T7FC 050T69/CL7CDTC10
55	115	73	266	325	39	3 400	5 600	3.5	T7FC 055T73/CL7CDTC10
60	125	80	325	405	49	3 000	5 300	4.55	T7FC 060T80/CL7CDTC10
	125	80	325	405	49	3 000	5 300	4.55	T7FC 060T80/HN3DTV004
	125	80	325	405	49	3 000	5 300	4.55	T7FC 060T80/HN4DTV004
65	130	80	332	430	51	3 000	5 000	4.8	T7FC 065T80/CL7CDTC30

Application example

*Heavy duty two-stage bevel/spur gearbox
for general engineering*



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