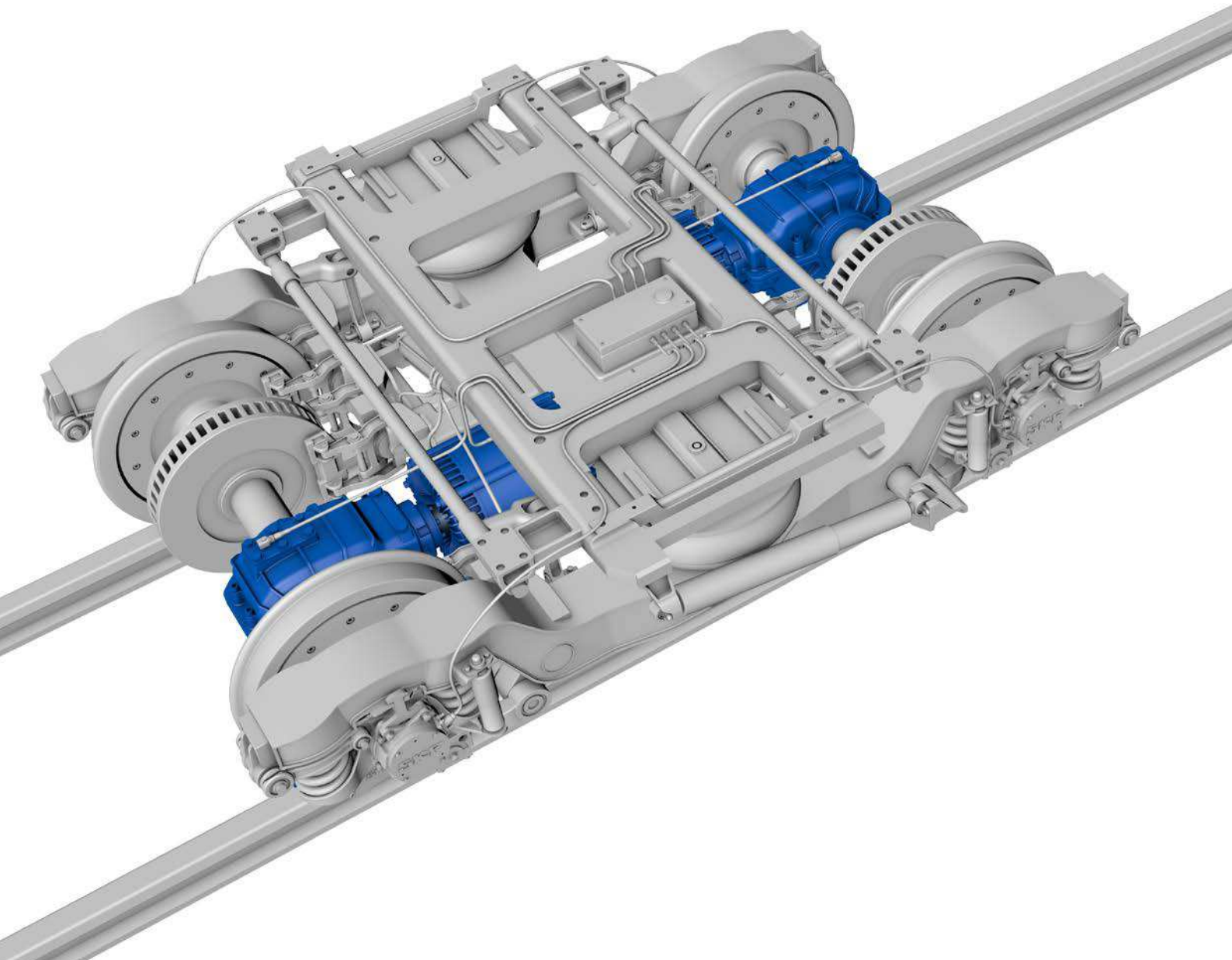
June 1, 2018

Drive system bearings

Preferred range – selected for application specific performance and availability



Drive system bearings

SKF, as a leading global supplier, offers the broadest range of products, services and customer solutions to the railway industry. SKF has developed a wide assortment of rolling bearings and services to meet the demanding needs for railway applications.

The railway industry never stands still and improvements and performance are developed daily. Together with our customers, we are always aware of the latest trends in the market place and we are committed to staying completely up-to-date to make sure that the very latest developments are integrated into new products.

Drive systems, such as gearboxes and traction motors for railway trains, have to be powerful, environmentally friendly, cost-effective and require very low needs for maintenance. These requirements are much more stringent than those in many other industries, because of the weight of railway vehicles and the long service intervals for high speed trains.

SKF has a broad and deep knowledge of the railway world and over the years we have developed a unique range of products and solutions for drive systems.

Preferred range

With worldwide presence, SKF is fully aware of customers' needs and strives to meet the latest market demand, combining innovative technology, high quality and value in terms of cost, performance and service.

A comprehensive assortment of drive system bearings is a base for our preferred product range for gearboxes and traction motors in railway applications. Proven products in drive system applications, based on field experience, are included in the list of preferred drive system bearings.

In addition, common bearing suffixes are listed in this brochure as well.

By fulfilling market demand for availability and adequate lead time we strive to meet the expectations of our customers and become the preferred choice supplier for drive system bearings.

Summary

- Proven products for drive system applications
- Based on field experience
- Combination of customer needs and new technology
- Good availability and adequate lead time
- The first choice for drive system applications

General annotations

Other executions of bearings mentioned in the tables might be available on request. This might include different clearance classes, cage executions, notches and/or other design features. Please note that limiting speeds of bearings might vary with different cage types.

Judgement of bearing feasibility and selection of the optimal bearing execution depends on individual application conditions (such as temperatures, shock level, low load operation etc.). That's why it is highly recommended to always contact SKF engineering service when selecting bearings for new or existing applications.

Deep groove ball bearings

Cylindrical roller bearings

INSOCOAT ball bearings

INSOCOAT cylindrical roller bearing

Hybrid ball bearings

Hybrid cylindrical roller bearing

Traction motor ball bearing units

Traction motor cylindrical roller bearing units

Traction Motor Applications

Modern traction motor bearings must deliver higher output shaft speeds, the ability to handle shock loads and resist smearing, while controlling component dead weight. In addition, sensitivity to electrical discharge contributes to the unique design challenges in traction motor design. Based on decades of design and application experience spanning all types of rolling stock, SKF has developed a range of bearings specifically optimised to meet these challenges. INSOCOAT and hybrid bearings offer solutions against electrical discharges, while our comprehensive range of traction motor bearings provide a range of options to meet specific application challenges.

SKF is also well placed to meet the demands for increasing sophistication in traction motor design. Unique sensorised traction motor bearing units and retrofit sensor options offer the possibility to monitor speeds, temperatures, bearing condition and other important operational conditions.

The following pages present a comprehensive selection of bearings specifically selected and proven in traction motor applications. Other executions of bearings mentioned in the tables may be available on request and our experienced team will be delighted to discuss application requirements in detail.

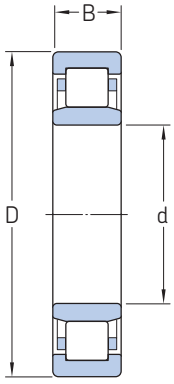
Advanced INSOCOAT layers

Beside our standard INSOCOAT assortment with VL0241 and VA3091 specification, advanced layers providing improved electrical insulation properties are available on request (VL0246 & VA3096)

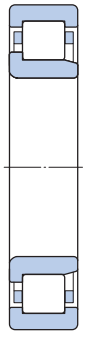
Principle bearing types for traction motor applications

- Cylindrical roller bearings
- Electrically insulated INSOCOAT cylindrical roller bearings
- Electrically insulated INSOCOAT deep groove ball bearings
- Hybrid cylindrical roller bearings with ceramic rollers
- Hybrid deep groove ball bearings with ceramic balls
- Traction motor bearing units based on cylindrical roller bearings and deep groove ball bearings
- Sensorised traction motor bearing unit
- Regreasable traction motor bearing unit

Traction motor – Cylindrical roller bearings



NU



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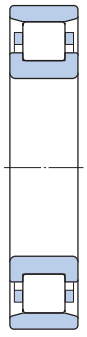

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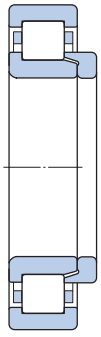
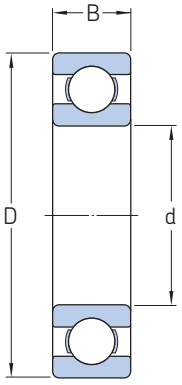


NJ+HJ

Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	HJ angle ring available	Designation
d	D	B	C	C_0				
mm			kN	kN	r/min	kg	–	–
50	110	27	127	112	8 000	1,31	–	**NU 310 ECM/C3**
60	130	31	173	160	6 700	2,18	*	**NJ 312 ECM/C4VA301**
65	120	23	122	118	6 700	1,20	–	**NU 213 ECM/C4VA301**
70	150	35	236	228	5 600	3,23	*	**NJ 314 ECM/C4VA301**
70	150	35	236	228	5 600	3,17	*	**NU 314 ECM/C4VA301**
75	160	37	280	265	5 300	3,83	*	**NJ 315 ECM/C4VA301**
80	170	39	300	290	5 000	4,51	*	**NJ 316 ECM/C4VA301**
80	140	26	160	166	5 600	1,60	*	**NU 216 ECM/P64VA301**
85	180	41	340	335	4 800	5,37	*	**NJ 317 ECM/C4VA301**
85	150	28	190	200	5 300	2,16	–	**NU 217 ECM/C4VA301**
90	160	30	208	220	5 000	2,79	*	**NJ 218 ECM/C4VA301**
90	160	40	280	315	5 000	3,64	*	**NJ 2218 ECM/C4VA301**
90	190	43	365	360	4 500	6,39	*	**NJ 318 ECM/C4VA301**
90	140	24	80,9	104	5 600	1,33	–	**NU 1018 M/C4VA301**
90	190	43	365	360	4 500	6,28	*	**NU 318 ECM/C4VA301**
95	170	32	255	265	4 800	3,38	*	**NJ 219 ECM/C3VA301**
95	200	45	390	390	4 300	7,11	*	**NU 319 ECM/C4VA301**
100	215	47	450	440	3 800	8,59	*	**NJ 320 ECM/C4VA301**
100	215	47	450	440	3 800	8,50	*	**NU 320 ECM/C4VA301**
110	240	50	530	540	3 400	11,73	*	**NJ 322 ECM/C4VA301**
110	170	28	128	166	4 500	2,31	–	**NU 1022 M/C4VA301**
110	240	50	530	540	3 400	11,54	*	**NU 322 ECM/C4VA301**
120	260	55	610	620	3 200	14,93	*	**NJ 324 ECM/C4VA301**
120	260	55	610	620	3 200	14,70	*	**NU 324 ECM/C4VA301**
130	200	33	165	224	3 800	3,75	–	**NJ 1026 M/C4VA301**
130	280	58	720	750	3 000	18,26	*	**NJ 326 ECM/C4VA301**
130	280	58	720	750	3 000	17,96	*	**NU 326 ECM/C4VA301**
140	210	33	172	245	3 600	3,92	–	**NU 1028 M/C4VA301**
140	300	62	780	830	2 800	22,46	*	**NU 328 ECM/C4VA301**
150	320	65	900	965	2 600	26,25	*	**NU 330 ECM/C4VA301**
150	320	65	900	965	2 600	26,68	*	**NU 330 ECMRD/C5VA378**
160	340	68	1 000	1 080	2 400	32,66	*	**NU 332 ECM/C4VA301**
170	260	42	275	400	2 800	8,17	–	**NU 1034 M/C4VA301**
180	280	46	336	475	2 600	10,22	–	**NU 1036 M/C4VA301**
180	320	86	1 100	1 430	2 400	30,20	–	**NU 2236 ECMRD/C4VA301**
190	400	78	1 140	1 500	2 000	48,83	–	**NU 338 ECMRD/C5HVA301**

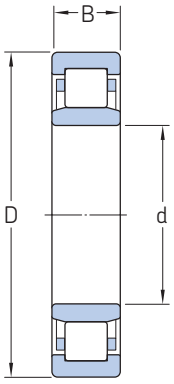
In addition to NJ series cylindrical roller bearings, appropriate HJ series angle rings with suffix VA301 can be supplied.

Traction motor – INSOCOAT deep groove ball bearings



Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
50	110	27	65	38	8 500	1,25	**6310 M/C4VL0241**
55	120	29	74,1	45	11 000	1,58	**6311 M/C3VL0241**
60	95	18	30,7	23,2	9 500	0,50	**6012 M/C4VL0241**
60	110	22	55,3	36	8 000	0,88	**6212 M/C4VL0241**
60	130	31	85,2	52	10 000	1,70	**6312 M/C4VL0241**
65	140	33	97,5	60	6 700	2,46	**6313 M/C5S0VL0241**
70	125	24	63,7	45	7 000	1,25	**6214 M/C4VL0241**
70	150	35	111	68	6 300	2,94	**6314 M/C4VL0241**
75	130	25	68,9	49	6 700	1,35	**6215 M/C4VL0241**
75	160	37	119	76,5	5 600	3,70	**6315 M/C4HVL0241**
80	125	22	49,4	40	7 000	1,02	**6016 M/P65HS0VL0241**
80	140	26	72,8	55	6 000	1,69	**6216 M/P65HS0VL0241**
80	170	39	130	86,5	5 300	4,17	**6316 M/C4VL0241**
80	125	22	49,4	40	9 500	1,03	**BB1-7361 A**
80	140	26	72,8	55	8 500	1,74	**BB1-7362**
85	180	41	140	96,5	5 000	4,79	**6317 M/C3VL0241**
90	190	43	151	108	7 000	5,97	**6318 M/C3VL0241**
95	200	45	159	118	4 500	6,45	**6319 M/C4VL0241**
100	215	47	174	140	4 300	8,06	**6320 M/C3VL0241**
100	180	36	127	93	7 000	3,66	**6220 M/C5VL0241**
105	190	36	140	104	4 500	4,48	**6221 M/C4HVL0241**
105	225	49	182	153	4 000	8,54	**6321 M/C3VL0241**
110	200	38	151	118	4 300	5,07	**6222 M/C4VL0241**
110	240	50	203	180	5 300	11,04	**6322 M/C4VL0241**
120	260	55	208	186	3 400	14,75	**6324 M/C3VL0241**
130	280	58	229	216	3 200	16,20	**6326 M/C3VL0241**
130	280	58	225	212	4 500	17,85	**BB1-7009**
180	320	52	229	240	3 800	18,48	**6236 M/C5HS0VL0241**
240	360	56	255	315	3 000	20,19	**6048 M/C4S0VG2211**
260	400	65	291	375	2 800	30,02	**6052 M/C4S0VG2211**

Traction motor – INSOCOAT cylindrical roller bearings



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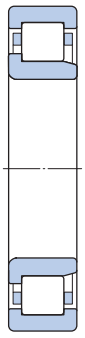
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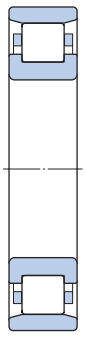
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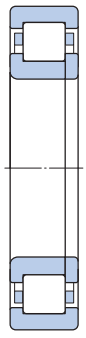
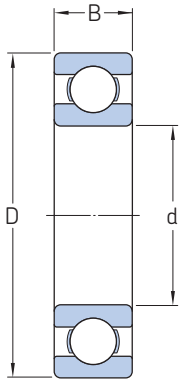

NUP

Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
50	90	20	73,5	69,5	9 000	0,48	**NU 210 ECM/C3HVA3091**
50	110	27	127	112	8 000	1,36	**NU 310 ECM/C4VA3091**
55	90	26	35,8	41,5	9 000	0,50	**BC1-7005 B**
55	100	25	114	118	8 000	0,86	**NU 2211 ECML/C4VA3091**
55	100	21	97	95	8 000	0,76	**NU 211 ECM/C4VA3091**
60	95	18	39,1	46,5	13 000	0,46	**NU 1012 MR/C4VA3091**
60	110	22	108	102	7 500	0,97	**NU 212 ECM/C4VA3091**
60	130	31	173	160	6 700	2,16	**NU 312 ECM/C4VA3091**
65	100	18	38	46,5	7 500	0,50	**NU 1013 M/C3VA3091**
65	120	23	122	118	6 700	1,23	**NU 213 ECM/C4VA3091**
70	110	20	70,4	85	7 000	0,69	**NU 1014 ECM/C4VA3091**
70	125	24	137	137	6 300	1,37	**NU 214 ECM/C4VA3091**
70	150	35	236	228	5 600	3,12	**NU 314 ECM/C4VA3091**
75	115	20	58,3	71	6 700	0,75	**NU 1015 M/C4VA3091**
75	130	25	150	156	6 000	1,48	**NU 215 ECM/C4HVA3091**
80	125	22	64,4	78	9 500	1,05	**NU 1016 MR/C4VA3091**
80	140	26	160	166	5 600	1,84	**NU 216 ECM/C4VA3091**
80	170	39	300	290	5 000	4,61	**NU 316 ECM/C4VA3091**
85	130	22	68,2	86,5	6 000	1,10	**NU 1017 M/C3VA3091**
85	150	28	190	200	5 300	2,20	**NU 217 ECM/C3VL0241**
90	140	24	80,9	104	5 600	1,35	**NU 1018 M/C4VA3091**
90	160	30	208	220	5 000	2,75	**NU 218 ECM/C3VA3091**
90	160	40	280	315	5 000	3,68	**NJ 2218 ECM/C4VA3091**
90	190	43	365	360	4 500	6,22	**NU 318 ECM/C3VL0241**
95	170	32	255	265	4 800	2,84	**NU 219 ECM/C4VA3091**
100	180	40	251	305	4 500	4,08	**BC1-7257**
100	150	24	89,7	122	5 000	1,45	**NU 1020 M/C3VA3091**
100	215	47	450	440	3 800	8,65	**NU 320 ECM/C4VA3091**
100	215	47	450	440	3 800	8,74	**NJ 320 ECM/P64VA3091**
100	180	34	285	305	4 500	3,93	**NU 220 ECM/C3VL0241**
110	170	28	128	166	4 500	2,30	**NU 1022 M/C3VA3091**
110	200	38	335	365	4 000	5,20	**NU 222 ECMR/P64VA3091**
110	240	80	682	900	3 400	18,69	**NU 2322 ECML/C5HVA3091**
110	240	50	530	540	3 400	11,99	**NU 322 ECM/C3VL0241**
110	200	38	335	365	4 000	5,33	**NUP 222 ECMRA/C4VA3091**
110	200	38	335	365	4 000	5,49	**NU 222 ECM/C3VL0241**

In addition to NJ series cylindrical roller bearings, appropriate HJ series angle rings with suffix VA301 can be supplied.

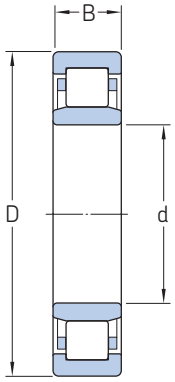
Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
120	260	55	610	620	3 200	14,94	**NU 324 ECM/C3VL0241**
120	215	40	375	405	3 600	6,63	**NUP 224 ECMRD/C4VA3091**
120	215	40	390	430	3 600	6,34	**NU 224 ECM/C3VL0241**
130	230	40	415	155	3 400	7,01	**NU 226 ECML/C4HVR6081**
130	280	58	720	750	3 000	18,30	**NU 326 ECM/P54VA3091**
140	300	62	780	830	2 800	22,4	**NU 328 ECMRA/C4VA3091**
140	250	42	450	510	3 200	9,07	**NU 228 ECMR/P64HVG2921**
150	320	65	900	965	4 000	27,02	**NU 330 ECMRD/C4VA3091**
160	340	68	880	1 080	2 400	31,90	**BC1-7088 A**
160	290	48	585	680	2 600	14,57	**NU 232 ECM/C4HVA3091**
160	340	68	1 000	1 080	3 600	31,75	**NU 332 ECM/C4VA3091**
320	480	74	880	1430	2 200	46,20	**NU 1064 MP/C3VL0241**

Traction motor – Hybrid deep groove ball bearings



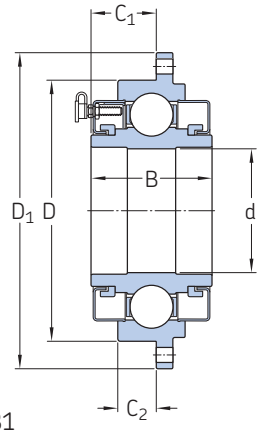
Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
40	90	23	42,3	24	18 000	0,66	**6308 M/HC5C4S0**
45	100	25	55,3	31,5	16 000	0,85	**6309 M/HC5C4S0**
50	90	20	37,1	23,2	14 000	0,47	**6210 M/HC5C4S0**
50	110	27	65	38	15 000	1,2	**6310 M/HC5C4S0**
55	120	29	74,1	45	13 000	1,43	**6311 M/HC5C4S0**
60	95	18	30,7	23,2	15 000	0,51	**6012 M/HC5C4S0**
60	130	31	85,2	52	12 000	1,76	**6312 M/HC5C4S0**
60	110	22	55,3	36	11 000	0,93	**6212 M/HC5C4S0**
65	100	18	31,9	25	12 000	0,44	**6013 M/HC5C4HS0**
65	140	33	97,5	60	9 500	2,20	**6313 M/HC5C4HS0**
70	150	35	111	68	11 000	2,86	**6314 M/HC5C4S0**
70	125	24	63,7	45	10 000	1,15	**6214 M/HC5C4S0**
75	160	37	119	76,5	10 000	3,14	**6315 M/HC5C4S0**
75	130	25	68,9	49	11 000	1,25	**6215 M/HC5C4HS0**
80	125	22	49,4	40	11 000	0,89	**6016 M/HC5P65HS0VG319**
80	140	26	72,8	55	11 000	1,48	**6216 M/HC5P65HS0VG319**
85	150	28	87,1	64	8 000	1,85	**6217 M/HC5C5S0**
90	160	30	101	73,5	7 500	2,25	**6218 M/HC5C4S0**
100	180	34	127	93	7 000	3,40	**6220 M/HC5C4HS0**
130	230	40	156	132	5 300	5,05	**6226 M/HC5C5S0**
280	350	33	138	200	2 300	5,71	**61856/HC5C3S0**

Traction motor – Hybrid cylindrical roller bearings

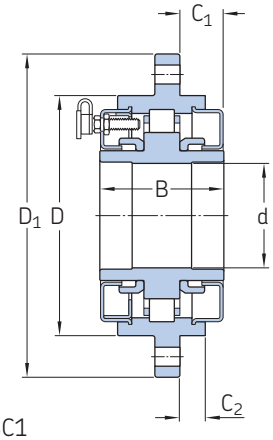


NU

Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
35	62	14	35,8	38	16 000	0,12	**NU 1007 ECPH/HC5C3**
50	90	20	66	72	9 000	0,49	**NU 210 ECM/HC5C3HVA301**
55	90	18	59,4	73,5	8 500	0,38	**NU 1011 ECMR/HC5C4**
55	90	22	59,4	73,5	10 000	0,41	**BC1-7384**
60	95	18	37,4	44	8 000	0,42	**NU 1012 MR/HC5C4H**
65	100	18	38	46,5	9 500	0,47	**NU 1013 M/HC5C3**
70	110	20	79,2	98	7 000	0,53	**NU 1014 ECMR/HC5C4**
70	125	24	119	137	7 500	0,95	**N 214 ECP/HC5C4VA301**
70	125	24	119	137	7 500	1,18	**NU 214 ECM/HC5C4VA301**
75	115	20	58,3	71	6 700	0,61	**NU 1015 M/HC5C4**
75	130	25	132	160	6 000	1,21	**NU 215 ECM/HC5C3HVA301**
80	140	26	142	173	5 600	1,50	**NU 216 ECM/HC5C3HVA301**
80	125	22	64,4	78	7 500	0,87	**NU 1016 MR/HC5C4**
90	160	30	183	220	6 000	2,24	**NU 218 ECM/HC5C4VA301**
100	180	34	251	305	5 300	3,25	**NU 220 ECM/HC5C4VA301**
110	200	38	292	365	4 800	4,62	**NU 222 ECM/HC5C3**
120	180	28	134	183	5 000	2,2	**NU 1024 M/HC5C4**



BB1

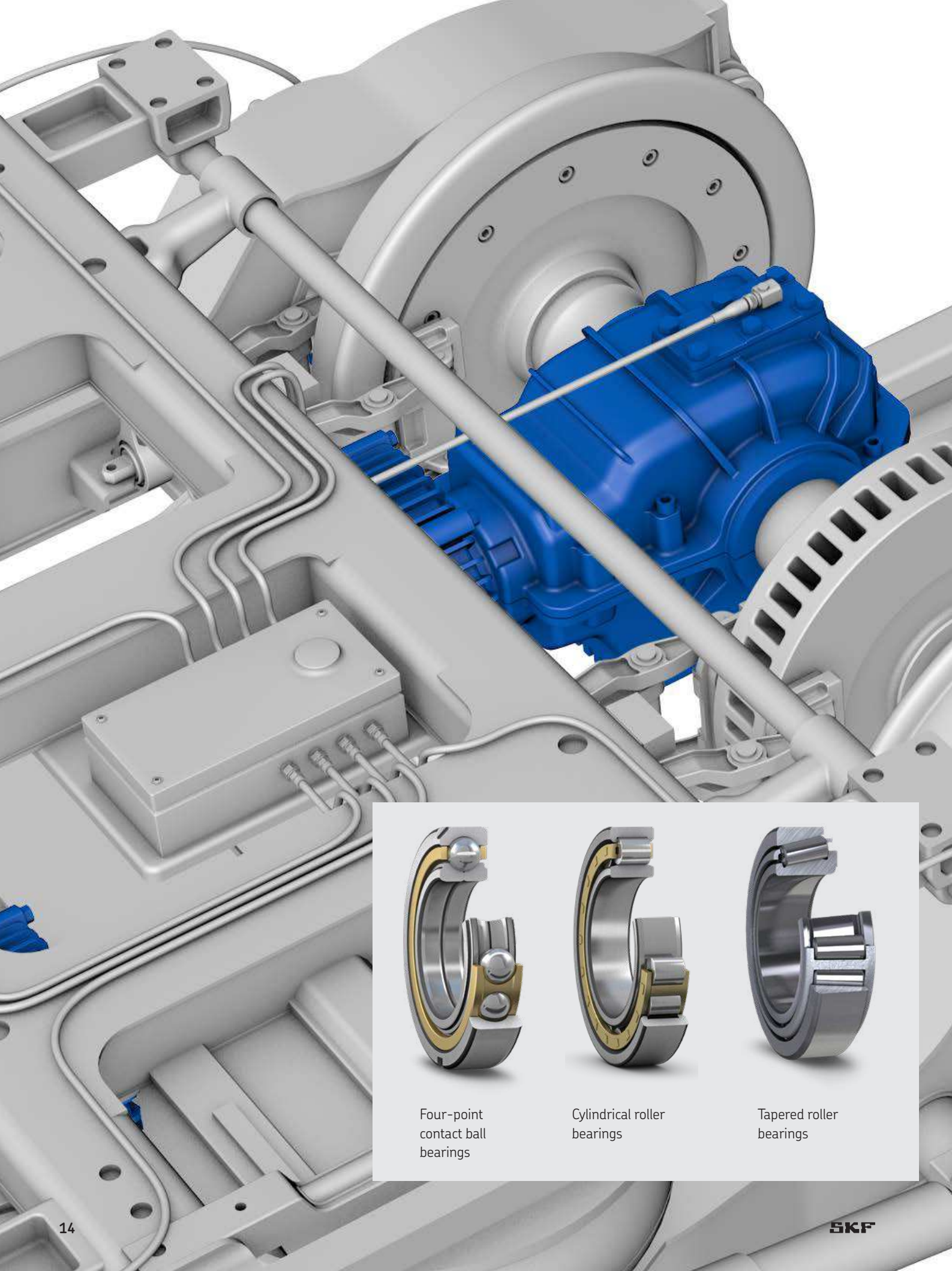


BC1

Principal dimensions							Designation
d	D	B	C_1	C_2	D_1	Re-greasable	
mm						–	–
50	115	59	21	12,5	155	N	**BC1-7229 DF**
50	115	59	21	12,5	155	Y	**BC1-7229 DC**
50	115	59	21	6	155	N	**BC1-7229 AA**
50	115	59	21	12,5	155	Y	**BC1-7229 AF**
65	170	68	38,5	22	200	N	**BB1-7024 AB**
65	170	68	38,5	22	200	Y	**BB1-7024 DD**
65	170	68	38,5	22	200	N	**BB1-7024 DC**
70	130	59	21	12,5	170	N	**BC1-7365**
80	145	59	21	6	185	N	**BC1-7273**
80	144	60	25	10	175	N	**BB1-7116**
90	190	88	47,5	28	230	N	**BB1-7141**
90	190	88	47,5	28	230	Y	**BB1-7141 B**
110	180	62	22	12,5	220	N	**BB1-7330**
120	220	56	30	30	268	N	**BC1-7292**
120	220	74	54	54	262	N	**BC1-7293**
120	182	48	17,5	7,5	230	N	**BB1-7348**
208	280	46	18	15	320	N	**BB1-7397**
209	280	65,5	18	15	320	N	**BMB 7509/ZMSTU**
210	280	50	29	26	320	N	**BC1-7308**

Design options for traction motor bearing units:

- INSOCOAT design – electrical insulation layer
- Hybrid design – equipped with ceramic rolling elements
- Integrated sensors - detection of direction of rotation, rotational speed, absolute positioning and bearing temperature
- Regreaseable design – TMBUs in operation can be retrofitted with a regreasing device



Four-point contact ball bearings

Cylindrical roller bearings

Tapered roller bearings

Gearbox Applications

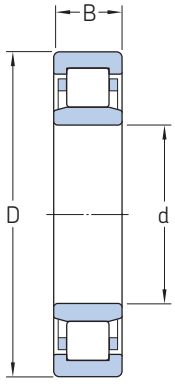
Modern gearbox requirements place high demands on gearbox bearing arrangements. Wide operating temperature ranges, high shock loads and increasing load carrying capacities, combined with the drive to reduce friction within the gearbox are some of the specific challenges of modern gearbox design.

The practicalities of modern train operation introduce further operational challenges; for example low load conditions in hybrid drives or when trains are operated without engagement of all drive units. SKF brings a combination of innovative products, sophisticated design tools and decades of design experience to bear on these challenges. By working together with SKF from the early stages of gearbox design our customers gain access to our extensive application expertise to meet the challenges of current and future gearbox designs head-on together.

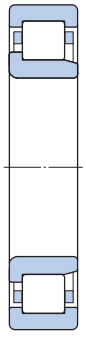
The following pages present a comprehensive range of bearings specifically selected and proven in gearbox applications. Other executions of bearings mentioned in the tables may be available on request and our experienced team will be delighted to discuss application requirements in detail.

Principle bearing types for gearbox designs

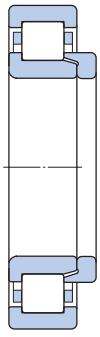
- Cylindrical roller bearings
- Four-point contact ball bearings
- Tapered roller bearings



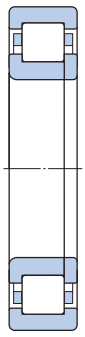
NU



NJ



NJ+HJ



NUP

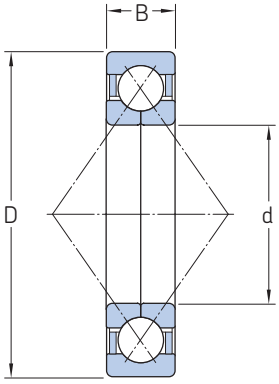
Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	HJ angle ring available	Designation
d	D	B	C	C_0				
mm			kN	kN	r/min	kg	–	–
45	100	36	160	153	13 000	1,5	–	**NJ 2309 ECML/C4**
50	90	20	64	70	14 000	0,5	*	**NU 210 ECML/C3HS1**
50	110	27	127	112	8 000	1,3	*	**NJ 310 ECML/C4H**
50	110	40	186	186	12 000	1,9	–	**NJ 2310 ECML/C3H**
55	100	21	97	95	13 000	0,7	–	**NU 211 ECML/C4**
55	100	25	114	118	13 000	0,9	*	**NJ 2211 ECML/C3**
55	120	43	232	232	11 000	2,5	*	**NJ 2311 ECML/C3**
60	110	22	108	102	11 000	0,9	*	**NU 212 ECML/C3**
60	110	28	146	153	11 000	1,2	–	**NJ 2212 ECML/C3**
60	130	46	260	265	10 000	3,1	–	**NJ 2312 ECML/C3H**
65	120	23	122	118	10 000	1,1	*	**NU 213 ECML/C3**
65	140	48	285	290	9 500	3,8	*	**NJ 2313 ECML/C3**
70	125	24	137	137	6 300	1,3	*	**NJ 214 ECN1ML/L4BC4**
70	125	24	137	137	10 000	1,3	*	**NU 214 ECML/C4**
70	150	35	236	228	8 500	3,2	*	**NJ 314 ECML/C4**
70	150	35	236	228	5 600	3,1	*	**NU 314 ECN1ML/C3**
70	150	51	315	325	8 500	4,5	–	**NJ 2314 ECML/C3H**
75	130	25	150	156	9 500	1,4	*	**NU 215 ECML/C4**
75	130	31	186	208	9 500	1,7	–	**NU 2215 ECML/C4**
75	160	55	380	400	8 000	5,5	*	**NJ 2315 ECML/C3**
80	125	22	99	127	9 500	1,0	–	**NJ 1016 ECML/C3**
80	140	26	160	166	8 500	1,8	*	**NJ 216 ECML/C4HS1**
80	140	26	160	166	8 500	1,7	*	**NU 216 ECML/C4**
80	140	33	212	245	8 500	2,2	–	**NJ 2216 ECML/P63H**
80	140	33	212	245	8 500	2,2	–	**NU 2216 ECML/P63**
80	170	39	300	290	7 500	4,3	*	**NU 316 ECML/C3**
85	150	28	190	200	8 000	2,2	*	**NU 217 ECML/C4**
85	150	36	250	280	8 000	2,8	–	**NJ 2217 ECML/C3**
85	150	36	250	280	8 000	2,7	–	**NU 2217 ECML/C4H**
85	180	60	455	490	7 000	7,6	–	**NJ 2317 ECML/C4**
90	160	30	208	220	7 500	2,6	*	**NU 218 ECML/C3**
90	160	40	280	315	7 500	3,5	*	**NJ 2218 ECML/C3**
90	160	40	280	315	7 500	3,5	*	**NU 2218 ECML/C4**
90	190	43	365	360	6 700	6,0	*	**NJ 318 ECML/L4BC3**
90	190	64	500	540	6 700	8,9	*	**NJ 2318 ECML/C3**
95	170	32	255	265	4 800	3,2	*	**NJ 219 ECML/C3**
95	170	32	255	265	4 800	3,2	*	**NU 219 ECML/C3B20**
95	170	43	325	375	7 000	4,3	–	**NJ 2219 ECML/L4BC4HS1**
95	170	43	325	375	7 000	4,3	–	**NJ 2219 ECN1ML/L4BC4H**

In addition to NJ series cylindrical roller bearings, appropriate HJ series angle rings can be supplied.

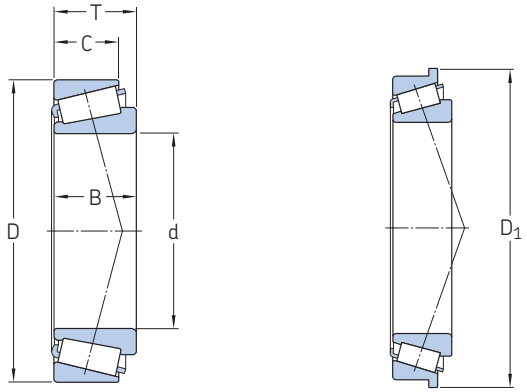
Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	HJ angle ring available	Designation
d	D	B	C	C_0				
mm			kN	kN	r/min	kg	–	–
100	180	34	285	305	6 700	3,9	*	**NJ 220 ECML/C3H**
100	180	46	380	450	6 700	5,1	*	**NU 2220 ECML/C4**
100	215	47	450	440	6 000	8,7	*	**NJ 320 ECML/C3**
100	215	73	670	735	6 000	13,3	*	**NJ 2320 ECML/C4**
110	200	38	335	365	6 000	5,4	*	**NJ 222 ECML/C4**
110	200	38	335	365	6 000	5,3	*	**NU 222 ECML/C3**
110	200	53	440	520	6 000	7,4	–	**NU 2222 ECML/C4**
120	260	55	610	620	5 000	14,8	*	**NU 324 ECML/C5H**
130	200	33	165	224	5 600	3,8	–	**NU 1026 ML/C3**
130	230	64	610	735	5 300	11,3	*	**NU 2226 ECML/C3**
140	250	42	450	510	4 800	9,2	*	**NU 228 ECML/C3**
150	225	35	198	290	5 000	5,1	–	**NJ 1030 ML/C3**
150	225	35	198	290	5 000	4,9	–	**NU 1030 ML/C4**
150	270	45	510	600	4 500	11,4	*	**NU 230 ECML/C4H**
160	240	38	229	325	4 800	6,0	*	**NU 1032 ML/C4**
170	260	42	275	400	4 300	8,2	*	**NJ 1034 N1ML/C3PEX**
170	310	52	695	815	3 800	17,6	*	**NU 234 ECML/C3**
180	320	52	720	850	3 600	18,2	*	**NU 236 ECML/C3**
190	340	55	800	965	3 400	21,8	*	**NU 238 ECML/C3**
220	340	56	495	735	3 200	18,4	*	**NJ 1044 MP/C4VA327**
240	360	56	523	800	3 000	19,3	–	**NU 1048 ML/C3**
260	400	65	627	965	2 800	29,3	*	**NU 1052 ML/C3**
320	400	38	369	710	2 400	10,9	–	**NU 1864 ECMP/C3**[1)]
320	440	56	671	1 160	2 000	26,0	–	**NU 1964 MA/C4VA327**[1)]
360	480	56	781	1 460	2 000	29,0	–	**NU 1972 ECMP/C3VQ015**[1)]
380	480	46	561	1 120	2 000	20,0	–	**NU 1876 ECMP/P63HVQ551**[1)]
380	480	46	561	1 120	2 000	21,5	–	**NUP 1876 ECMP/P63HVE478**[1)]
400	500	46	572	1 180	1 900	21,5	*	**NU 1880 MP/C4VQ077**[1)]
400	500	46	572	1 180	1 900	22,5	–	**NUP 1880 MP/C4VQ077**[1)]

In addition to NJ series cylindrical roller bearings, appropriate HJ series angle rings can be supplied.
[1)] Suspension Tube Bearings

Gearbox – Four-point contact ball bearings



Principal dimensions			Dynamic load rating	Static load rating	Limiting speed	Mass	Designation
d	D	B	C	C_0			
mm			kN	kN	r/min	kg	–
50	90	20	61,8	53	13 000	0,59	**QJ 210 N2MA/C4S1**
55	100	21	85	83	11 000	0,77	**QJ 211 N2MA/C4H**
60	110	22	96,5	93	10 000	0,99	**QJ 212 N2MA/C4B20**
65	120	23	110	112	9 500	1,20	**QJ 213 N2MA/C4**
70	125	24	90,4	88	5 600	1,30	**BAQ-7134**
70	125	24	90,4	88	5 600	1,30	**BAQ-7134 A**
70	125	24	120	122	9 000	1,30	**QJ 214 N2MA/C4B20**
70	150	35	186	166	8 000	3,15	**QJ 314 N2MA/C3**
75	130	25	125	132	8 500	1,45	**QJ 215 N2MA/C4B20**
80	140	26	146	156	8 000	1,85	**QJ 216 N2MA/C4B20**
85	130	22	99,5	114	8 000	1,10	**QJ 1017 N2MA/C4B20**
85	150	28	156	173	7 500	2,25	**QJ 217 N2MA/C4**
90	160	30	186	200	7 000	2,75	**QJ 218 N2MA/C4B20**
95	170	32	212	232	6 700	3,35	**QJ 219 N2MA/C3B20**
100	180	34	236	265	6 300	4,05	**QJ 220 N2MA/C4B20**
110	200	38	280	325	5 600	5,60	**QJ 222 N2MA/C4B20**
120	215	40	300	365	5 000	6,95	**QJ 224 N2MA/C4B20**
130	230	40	310	400	4 800	7,75	**QJ 226 N2MA/C4B20**
140	250	42	345	475	4 300	9,85	**QJ 228 N2MA/C4B20**
160	290	48	450	670	3 800	15,50	**QJ 232 N2MA**
180	320	52	475	765	3 400	20,50	**QJ 236 N2MA/C3**



Principal dimensions						Dynamic load rating	Static load rating	Limiting speed	Mass	Calculation factor			Designation
d	D	D_1	T	B	C	C	C_0			e	Y	Y_0	
mm						kN	kN	r/min	kg	–	–	–	–
55	115	–	34	31	23,5	125	163	5 600	1,58	0,88	0,68	0,40	**T7FC 055/S1QCL7CVE141**
60	125	–	37	33,5	26	190	204	5 300	2,07	0,83	0,72	0,40	**T7FC 060/S0CL7CVE141**
69,85	146,05	–	41,275	41,275	31,75	241	275	4 800	3,25	0,40	1,50	0,80	**BT1-1101/PEX**
73,025	150,089	–	44,45	46,672	36,512	283	305	4 300	3,83	0,33	1,80	1,00	**BT1-1328/S0CL7C**
75	160	–	40	37	26	209	245	4 300	3,40	0,83	0,72	0,40	**31315 J2/QS1CL7C**
75	150	–	42	38	29	249	280	4 300	3,24	0,88	0,68	0,40	**T7FC 075/S0CL7C**
75	130	–	41	41	31	209	300	4 800	2,19	0,43	1,40	0,80	**33215/S0QCL7C**
75	160	–	40	37	26	209	245	4 300	3,39	0,83	0,72	0,40	**31315 J2/QS1CL7C**
75	160	–	58	55	45	416	440	4 300	5,19	0,35	1,70	0,90	**32315/S0VE679**
80	125	–	29	29	22	138	216	5 000	1,29	0,43	1,40	0,80	**BT1-1153/S0Q**
80	140	–	35,25	33	28	187	245	4 500	2,06	0,43	1,40	0,80	**32216 J2/QVE141**
80	170	–	42,5	39	27	224	265	4 000	4,06	0,83	0,72	0,40	**31316 J1/QCL7CS1VA3C1**
95	170	–	45,5	43	37	281	390	3 800	4,09	0,43	1,40	0,80	**32219 J2/VE141**
120	180	–	38	38	29	299	415	3 400	3,29	0,46	1,30	0,70	**32024 X**
130	200	–	45	45	34	314	540	3 000	4,93	0,43	1,40	0,80	**32026 X/VE141**
140	190	–	32	32	25	252	390	3 000	2,53	0,35	1,70	0,90	**32928**
146,05	193,675	–	28,575	28,575	23,02	176	360	3 200	2,29	0,37	1,60	0,90	**BT1-1127**
150	210	–	32	30	23	233	390	3 000	3,08	0,46	1,30	0,70	**T4DB 150/VE679**
152,4	203,2	–	41,275	41,275	34,925	205	480	3 000	3,71	0,35	1,70	0,90	**LM 330448/410/VE679**
170	230	–	32	30	23	229	390	2 800	3,33	0,46	1,30	0,70	**T4DB 170/VA812**
177,8	227,012	–	30,162	30,162	23,02	172	375	2 800	2,87	0,44	1,35	0,80	**36990/36920 N1/VA833**
177,8	227,0123	–	30,162	33,274	23,02	172	375	2 800	2,95	0,44	1,35	0,80	**BT1-0410/VA833**
180	250	–	45	50,5	34	330	655	2 600	6,71	0,48	1,25	0,70	**BT1-0005/VE141**
180	250	–	45	45	34	352	735	2 600	6,63	0,48	1,25	0,70	**32936/VE141**
180	280	–	50	47	40	473	815	2 200	10,67	0,30	2,00	1,10	**D-41251 DJ2**
189,738	282,575	–	50,8	47,7	36,56	402	695	2 200	9,66	0,43	1,40	0,80	**BT1-0729**
190	260	–	46	44	36,5	358	765	2 400	7,07	0,48	1,25	0,70	**JM 738249/210/VE141**
195	250	–	34	33	26,5	251	540	2 400	4,00	0,35	1,70	0,90	**BT1-0705 A/Q**
196,85	254	–	28,575	27,783	21,433	198	390	2 400	3,38	0,40	1,50	0,80	**BT1-1156**
198,298	282,575	300	49,212	49,212	36,512	330	695	2 200	9,67	0,50	1,20	0,70	**BT1-2111**[2), 3)]
199,949	282,575	–	46,038	49,212	36,512	330	695	2 200	9,11	0,50	1,20	0,70	**BT1-0704 A/S1VR661**
199,949	282,575	–	49,212	49,212	36,512	330	695	2 200	9,67	0,50	1,20	0,70	**BT1-2110**[2)]

[1)] Suspension Tube Bearings
[2)] INSOCOAT Suspension Tube Bearings
[3)] Flanged outer ring

Principal dimensions						Dynamic load rating	Static load rating	Limiting speed	Mass	Calculation factor			Designation
d	D	D_1	T	B	C	C	C_0			e	Y	Y_0	
mm						kN	kN	r/min	kg	–	–	–	–
200	270	–	37	34	27	330	600	2 400	5,47	0,48	1,25	0,70	**T4DB 200/VE679**
200,025	276,225	–	42,862	46,038	34,133	391	780	2 200	7,68	0,31	1,90	1,10	**LM 241147/110/VE673**
203,987	276,225	–	42,862	46,038	34,133	391	780	2 200	7,22	0,31	1,90	1,10	**LM 241148/110/VE673**
205	282,575	–	54,826	58	36,512	330	695	2 200	9,50	0,50	1,20	0,70	**BT1-1260/S1VR661**
206,375	282,575	–	46,038	46,038	36,512	358	780	2 200	8,34	0,50	1,20	0,70	**67985/67920/4/HA4VA812**
210	285	–	41	40	33	396	830	2 200	7,50	0,31	1,90	1,10	**T2DC 220/210/VE679**
213	285	–	41	40	33	396	830	2 200	7,19	0,31	1,90	1,10	**T2DC 220/213/VE679**
215,9	285,75	–	46,038	46,038	34,925	380	850	2 200	7,85	0,48	1,25	0,70	**LM 742749/710/VE174**
215,9	290,01	–	31,75	31,75	24	246	500	2 200	5,54	0,37	1,60	0,90	**BT1-0538**
216,408	285,75	–	46,038	49,212	34,925	380	850	2 200	7,90	0,48	1,25	0,70	**LM 742747/710/VE679**
216,5	285	–	41	40	33	396	830	2 200	6,82	0,31	1,90	1,10	**BT1-0667/VE679**
220	285	–	41	40	33	396	830	2 200	6,43	0,31	1,90	1,10	**T2DC 220/VE679**
220,662	314,325	–	61,912	66,675	49,212	644	1 320	1 800	16,08	0,33	1,80	1,00	**BT1-0224**[1]
231,775	317,5	–	47,625	52,388	36,512	473	865	2 000	10,30	0,31	1,90	1,10	**LM 245848/810/VA812**
231,775	300,038	–	33,338	31,75	23,812	201	390	2 000	5,11	0,40	1,50	0,80	**544091/544118/VA812**
231,775	300,038	–	33,338	31,75	23,812	201	390	2 000	5,11	0,40	1,50	0,80	**BT1-1180/VA812**
234,848	314,325	338,138	53,975	53,975	36,512	457	900	1 800	10,64	0,40	1,50	0,80	**BT1-2114**[2), 3)]
235,331	336,55	–	65,088	65,088	50,8	750	1 250	1 700	17,48	0,33	1,80	1,00	**BT1-1209/HA1PEX**
235,331	336,55	–	65,088	65,088	50,8	644	1 250	1 700	17,27	0,33	1,80	1,00	**BT1-2113**[2)]
240	320	–	51	51	39	624	1 080	1 900	11,00	0,46	1,30	0,70	**32948**
240	320	–	42	39	30	425	815	1 900	8,48	0,46	1,30	0,70	**E2.T4EB 240/VE679**
254	358,775	384,175	76,28	76,28	53,975	737	1 460	1 600	22,67	0,35	1,70	0,90	**BT1-0675 B**[2), 3)]
255,6	342,9	–	57,15	63,5	44,45	660	1 400	1 800	14,75	0,35	1,70	0,90	**BT1-1044**
255,6	342,9	–	57,15	63,5	44,45	660	1 400	1 800	14,75	0,35	1,70	0,90	**M 349547/510/VG237**
255,6	342,9	–	57,15	57,15	44,45	660	1 400	1 800	14,84	0,35	1,70	0,90	**M 349547/510/VA8B81**[2)]
257,175	358,775	–	71,438	76,2	53,975	842	1 760	1 700	21,63	0,33	1,80	1,00	**BT1-1045**
257,175	342,928	–	57,15	57,15	44,45	660	1 400	1 800	14,09	0,35	1,70	0,90	**BT1-1135**
257,175	342,9	–	57,15	57,15	44,45	660	1 400	1 800	14,08	0,35	1,70	0,90	**M 349549/510/VE174**
257,175	358,775	–	71,438	76,2	53,975	842	1 760	1 600	21,64	0,33	1,80	1,00	**M 249747/710/VG237**
257,175	358,775	–	71,438	76,2	53,975	842	1 760	1 600	21,61	0,33	1,80	1,00	**M 249747/710/VA8B82**[2)]
263,525	325,438	–	28,575	28,575	25,4	220	550	1 700	5,28	0,37	1,60	0,90	**38880/38820/VE141**
266,56	325,438	–	29,5	33,47	25,4	220	550	1 800	5,29	0,37	1,60	0,90	**BT1-1128**
275	360	–	50	49	40	512	1 120	1 700	12,77	0,33	1,80	1,00	**BT1-1125**
292,1	374,65	–	47,625	47,625	34,925	501	1 140	1 600	12,36	0,40	1,50	0,80	**L 555249/210/VE174**
304,825	393,745	–	50,8	50,88	38,18	528	1 220	1 500	14,90	0,35	1,70	0,90	**BT1-0340**

1) Suspension Tube Bearings
2) INSOCOAT Suspension Tube Bearings
3) Flanched outer ring

Designation prefixes and suffixes

In this list, the most current prefixes and suffixes used in the preferred product range are explained. For further information, contact the nearest SKF office.

B20 Reduced width tolerance

BB1 Single row ball bearing, customized design

BC1 Single row cylindrical roller bearing, customized design

BT1 Single row tapered roller bearing, customized design

C3 Bearing internal clearance greater than Normal (CN)

C4 Bearing internal clearance greater than C3

C4H Bearing internal clearance greater than C3 (upper half of C4 clearance range)

C5 Bearing internal clearance greater than C4

C5H Bearing internal clearance greater than C4 (upper half of C5 tolerance)

EC Optimized internal design incorporating more and/or larger rollers and with modified roller end/flange contact

HC5 Rolling elements made of silicon nitride

J, J1, J2 Pressed window-type steel cage

L4B Bearing rings and rollers black oxidized

M Machined brass cage, rolling element centred

MA Machined brass cage, outer ring centred, used for oil lubrication

ML, MP Machined one-piece window-type brass cage, outer ring centred, used for oil lubrication

MR Machined one-piece window-type brass cage, rolling element centred

MR3D Machined one-piece window-type brass cage, special design

N Snap ring groove in the outer ring

N1 One locating slot (notch) in one outer ring side face

N2 Two locating slots (notches) 180° apart in one outer ring side face

N3 Snap ring groove in the outer ring, one locating slot (notch) in one outer ring side face

P4 Dimensional and running accuracy to ISO tolerance class 4

P5 Dimensional and running accuracy to ISO tolerance class 5

P54 P5 + C4

P6 Dimensional and running accuracy to ISO tolerance class 6

P63 P6 + C3

P64 P6 + C4

P65H P6 + C5H

PEX SKF Explorer bearing, used only when same-sized conventional and SKF Explorer bearings are available

Q Optimized internal geometry and surface finish

S0 Bearing rings or washers dimensionally stabilized up to +150 °C

S1 Bearing rings or washers dimensionally stabilized up to +200 °C

S2 Bearing rings or washers dimensionally stabilized up to +250 °C

VA, VE, VG and VL These suffixes followed by three or four digit numbers refer to special executions.
Examples:
VA301 Bearing for traction motors
VL0241 Aluminium oxide coated outside surface of outer ring for electrical resistance up to 3 000 V DC

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