

Cylindrical roller bearings for large electric motors



Cylindrical roller bearings are typically used in belt or gear driven medium- to large-sized electric motors, where heavy radial loads prevail. These bearings are usually used as non-locating bearings at the drive end, together with a deep groove ball bearing in the locating position at the non-drive end.

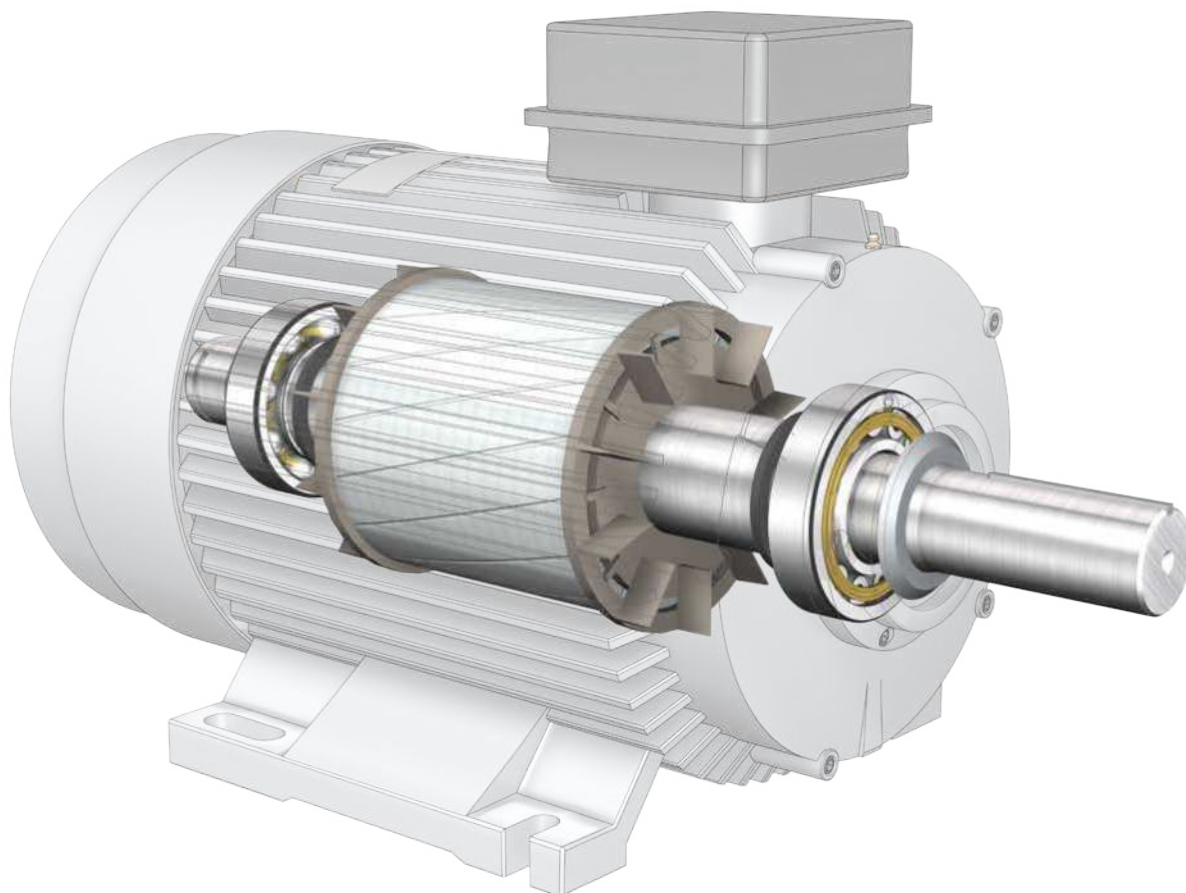
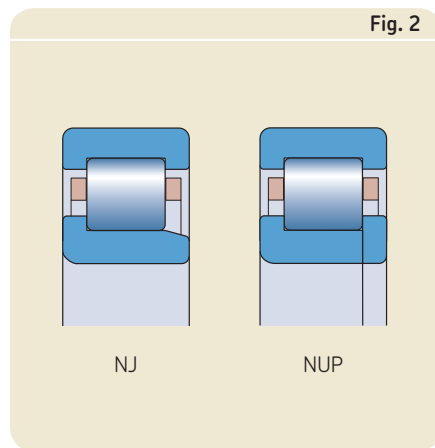
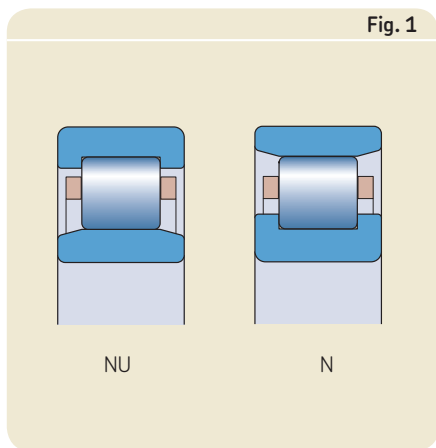
Four basic designs

Cylindrical roller bearings are available in 4 different designs.

NU and N (→ **fig. 1**) design cylindrical roller bearings have two integral flanges on one ring and no flanges on the other. The flanged ring guides the roller and cage assembly; the ring without flanges accommodates axial displacement of the shaft relative to the housing.

NJ design bearings (→ **fig. 2**) have two integral flanges on the outer ring and one on the inner ring. These bearings are used to locate the shaft axially in one direction. They can accommodate axial displacement of the shaft relative to the housing in one direction only.

NUP design has one integral flange and a flange washer on the inner ring to locate the bearing axially in both directions.



About SKF cylindrical roller bearings

SKF Explorer cylindrical roller bearings, identified by an EC suffix and an asterisk (*) in the Rolling bearings catalogue, have been optimized to provide outstanding performance and service life. The factors that influence SKF cylindrical roller bearing performance and service life include but are not limited to the following:

Roller end / flange contact area

SKF cylindrical roller bearings have two integral flanges on either the inner or outer ring to guide the rollers. The bearings have "open" flanges, i.e. the inward face of the flange is inclined at a defined angle (→ **fig. 3**). The flange design, together with the roller end design and surface finish, promote the formation of a lubricant film to reduce heat which ultimately increases the service life of the bearing and lubricant.

Logarithmic roller profile

The roller profile determines the stress distribution in the roller/raceway contact area. As a result, the rollers in SKF cylindrical roller bearings have a logarithmic profile to distribute loads evenly along the rollers. This prevents stress peaks at the roller ends to extend bearing service life (**fig. 4**) while reducing sensitivity to misalignment and shaft deflections.

Surface finish

The surface finish on the contact surfaces of the rollers and raceways maximizes the formation of a lubricant film and optimizes the rolling motion of the rollers. When compared to competitors, SKF cylindrical roller bearings generate less frictional heat, which reduces lubricant and energy consumption while extending bearing service life.

Interchangeable components

The separable components of same-sized SKF cylindrical roller bearings are interchangeable (→ **fig. 5**). Any bearing ring with a roller and cage assembly can be assembled with any removable ring of the same bearing type and size having the same internal clearance class. This is particularly important when bearings and their components must be mounted independently of each other.

Fig. 3

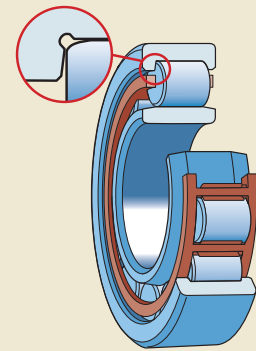


Fig. 4

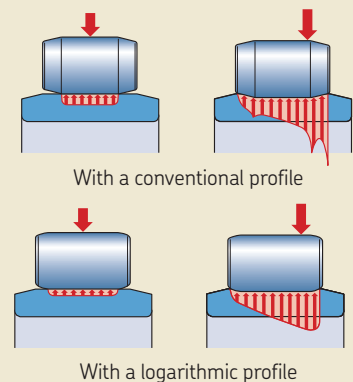
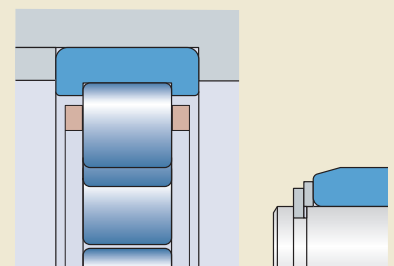
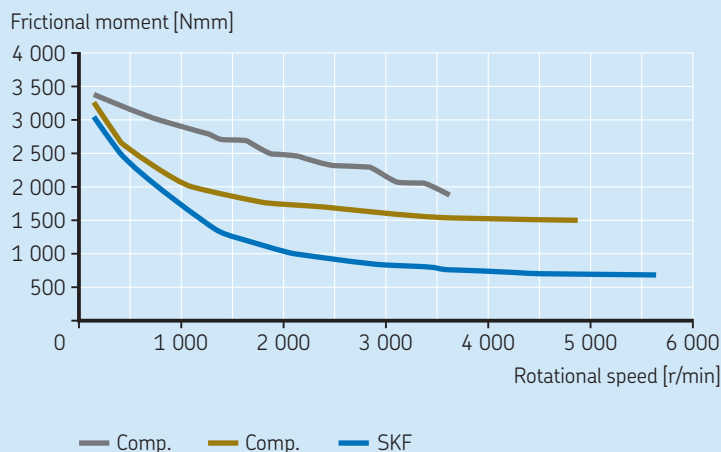


Fig. 5



Frictional moment comparison SKF vs competitors



The assortment

For grease lubricated bearings, roller guided cages (designation suffices J, P, M) are preferable to shoulder guided cages (designation suffix ML).

Larger cylindrical roller bearings, those with a bore > 100 mm, are also available with a roller guided brass cage (designation suffix M) particularly in the 10, 02 and 03 series.

For applications with high shock loads one piece roller guided brass cages (designation suffix MR or MRD) are available on request.

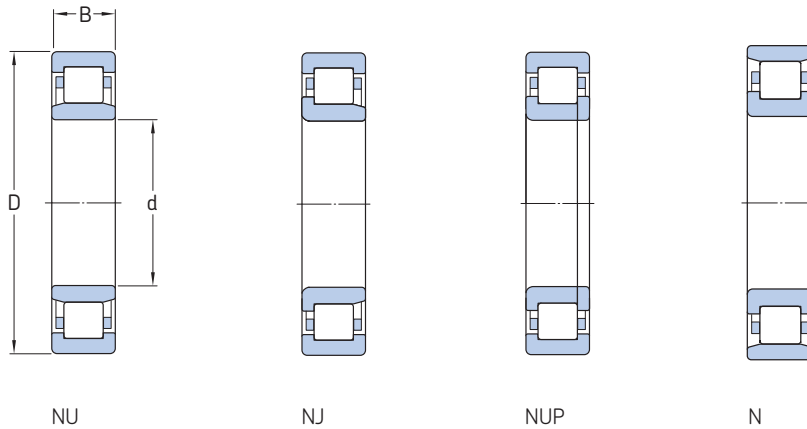
INSOCOAT bearings

SKF provides electrically insulated bearings, called INSOCOAT. INSOCOAT bearings are designed to prevent current from passing through the bearing. The bearings are a very cost-effective solution compared with other insulation methods. By integrating the insulating properties into the bearing, INSOCOAT bearings can improve reliability and increase motor uptime by virtually eliminating the problem of electrical erosion. Bearings with a bore diameter >70 mm have the coating applied to the inner ring.



Cylindrical roller bearings for large electric motors

d 100 – 120 mm

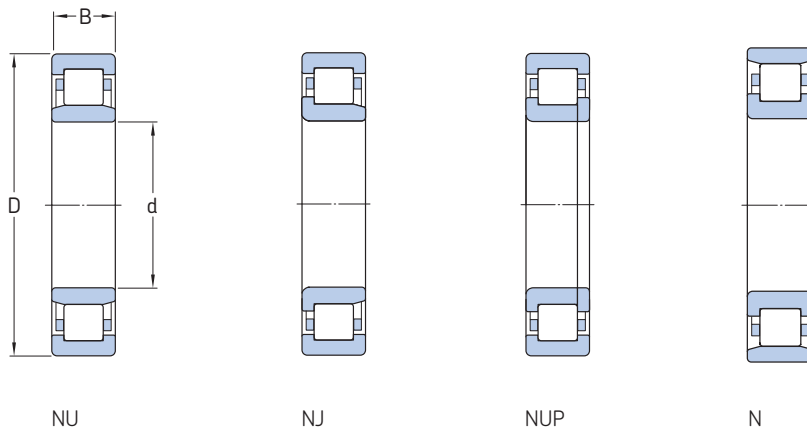


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed	Bearing with standard cage	Bearing with M cage
mm			kN		kN	r/min		kg	–
100	150	24	85,8	114	13,7	5 000	7 500	1,45	NU 1020 M
100	180	34	285	305	36,5	4 000	4 500	3,4	* NU 220 ECM
100	180	34	285	305	36,5	4 000	4 500	3,5	* NJ 220 ECM
100	180	34	285	305	36,5	4 000	4 500	3,6	* NUP 220 ECM
100	180	46	380	450	54	4 000	4 500	4,75	* NU 2220 ECM
100	180	46	380	450	54	4 000	4 500	4,8	* NJ 2220 ECM
100	180	46	380	450	54	4 000	4 500	4,9	* NUP 2220 ECM
100	215	47	450	440	51	3 200	3 800	7,45	* NU 320 ECM
100	215	47	450	440	51	3 200	3 800	7,65	* NJ 320 ECM
100	215	47	450	440	51	3 200	3 800	7,85	* NUP 320 ECM
100	215	47	450	440	51	3 200	3 800	7,5	* N 320 ECM
100	215	73	670	735	85	3 200	3 800	12	* NU 2320 ECM
100	215	73	670	735	85	3 200	3 800	12,2	* NJ 2320 ECM
100	215	73	670	735	85	3 200	3 800	12,5	* NUP 2320 ECM
100	250	58	429	475	53	3 000	3 600	14	NU 420 M
105	160	26	101	137	16	4 800	7 500	1,9	NU 1021 M
105	260	60	501	570	64	2 800	3 400	19	NU 421 M
110	170	28	128	166	19,3	4 500	7 000	2,35	NU 1022 M
110	200	38	335	365	42,5	3 600	4 000	4,8	* NU 222 ECM
110	200	38	335	365	42,5	3 600	4 000	4,9	* NJ 222 ECM
110	200	38	335	365	42,5	3 600	4 000	5	* NUP 222 ECM
110	200	38	335	365	42,5	3 600	4 000	4,8	* N 222 ECM
110	240	50	530	540	61	3 000	3 400	10,3	* NU 322 ECM
110	240	50	530	540	61	3 000	3 400	10,5	* NJ 322 ECM
110	240	50	530	540	61	3 000	3 400	10,7	* NUP 322 ECM
110	240	50	530	540	61	3 000	3 400	10,2	* N 322 ECM
110	280	65	532	585	64	2 600	3 200	20	NU 422 M
110	280	65	532	585	64	2 600	3 200	20,3	NJ 422 M
120	180	28	134	183	20,8	4 000	6 300	2,55	NU 1024 M
120	215	40	390	430	49	3 400	3 600	5,75	* NU 224 ECM
120	215	40	390	430	49	3 400	3 600	5,85	* NJ 224 ECM
120	215	40	390	430	49	3 400	3 600	6	* NUP 224 ECM
120	215	40	390	430	49	3 400	3 600	5,75	* N 224 ECM
120	215	58	520	630	72	3 400	3 600	8,3	* NU 2224 ECM
120	215	58	520	630	72	3 400	3 600	8,5	* NJ 2224 ECM
120	215	58	520	630	72	3 400	3 600	8,7	* NUP 2224 ECM
120	260	55	610	620	69,5	2 800	3 200	13	* NU 324 ECM
120	260	55	610	620	69,5	2 800	3 200	13,3	* NJ 324 ECM
120	260	55	610	620	69,5	2 800	3 200	13,7	* NUP 324 ECM
120	260	55	610	620	69,5	2 800	3 200	13	* N 324 ECM
120	260	86	915	1 040	116	2 800	4 300	23,3	* NU 2324 ECM
120	260	86	915	1 040	116	2 800	4 300	23,6	* NJ 2324 ECM
120	260	86	915	1 040	116	2 800	4 300	24	* NUP 2324 ECM
120	310	72	644	735	78	2 400	2 800	28	NU 424 M

* SKF Explorer bearing

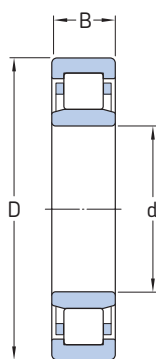
Cylindrical roller bearings for large electric motors

d 130 – 280 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed	Bearing with standard cage	Bearing with M cage
mm			kN		kN	r/min		kg	–
130	200	33	165	224	25	3 800	5 600	3,85	NU 1026 M
130	200	33	165	224	25	3 800	5 600	3,85	NJ 1026 M
130	230	40	415	455	51	3 200	3 400	6,45	* NU 226 ECM
130	230	40	415	455	51	3 200	3 400	6,6	* NJ 226 ECM
130	230	40	415	455	51	3 200	3 400	6,75	* NUP 226 ECM
130	280	58	720	750	81,5	2 400	3 000	16,1	* NU 326 ECM
130	280	58	720	750	81,5	2 400	3 000	16,5	* NJ 326 ECM
130	280	58	720	750	81,5	2 400	3 000	17	* NUP 326 ECM
130	280	58	720	750	81,5	2 400	3 000	16	* N 326 ECM
140	210	33	179	255	28	3 600	5 300	4,05	NU 1028 M
140	250	42	450	510	57	2 800	3 200	9	* NU 228 ECM
140	250	42	450	510	57	2 800	3 200	9,2	* NJ 228 ECM
140	250	42	450	510	57	2 800	3 200	9,4	* NUP 228 ECM
140	300	62	780	830	88	2 400	2 800	22	* NU 328 ECM
140	300	62	780	830	88	2 400	2 800	22,5	* NJ 328 ECM
140	300	62	780	830	88	2 400	2 800	23	* NUP 328 ECM
150	225	35	198	290	31,5	3 200	5 000	4,9	NU 1030 M
150	270	45	510	600	64	2 600	2 800	11,8	* NU 230 ECM
150	270	45	510	600	64	2 600	2 800	12	* NJ 230 ECM
150	270	45	510	600	64	2 600	2 800	12,2	* NUP 230 ECM
150	270	73	735	930	100	2 600	2 800	18,5	* NU 2230 ECM
150	270	73	735	930	100	2 600	2 800	19	* NJ 2230 ECM
150	320	65	900	965	100	2 200	4 000	26,3	* NU 330 ECM
150	320	65	900	965	100	2 200	4 000	27	* NJ 330 ECM
160	240	38	229	325	35,5	3 000	4 800	5,95	NU 1032 M
160	290	48	585	680	72	2 400	2 600	14,1	* NU 232 ECM
160	290	48	585	680	72	2 400	2 600	14,4	* NJ 232 ECM
160	290	48	585	680	72	2 400	2 600	14,8	* NUP 232 ECM
160	290	48	585	680	72	2 400	2 600	14	* N 232 ECM
160	290	80	930	1 200	129	2 400	3 600	24,3	* NU 2232 ECM
160	290	80	930	1 200	129	2 400	3 600	24,8	* NJ 2232 ECM
160	340	68	1 000	1 080	112	2 000	3 600	32	* NU 332 ECM
160	340	68	1 000	1 080	112	2 000	3 600	32,5	* NJ 332 ECM
170	260	42	275	400	41,5	2 800	4 300	8	NU 1034 M
170	260	42	275	400	41,5	2 800	4 300	8	NJ 1034 M
170	310	52	695	815	85	2 200	3 800	18,2	* NU 234 ECM
170	310	52	695	815	85	2 200	3 800	18,6	* NJ 234 ECM
170	310	52	695	815	85	2 200	3 800	19	* NUP 234 ECM
170	360	72	952	1 180	116	1 700	2 200	37,5	NU 334 ECM
170	360	72	952	1 180	116	1 700	2 200	38,5	N 334 ECM

* SKF Explorer bearing



NU



NJ



NUP



N

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations
d	D	B	dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with M cage
mm			C	C ₀	P _u			kg	–
180	280	46	336	475	51	2 600	4 000	10,5	NU 1036 M
180	320	52	720	850	88	2 200	3 600	19	* NU 236 ECM
180	320	52	720	850	88	2 200	3 600	19,3	* NJ 236 ECM
180	320	52	720	850	88	2 200	3 600	19,8	* NUP 236 ECM
180	320	86	1 100	1 430	146	2 200	3 200	31,5	* NU 2236 ECM
180	320	86	1 100	1 430	146	2 200	3 200	32	* NJ 2236 ECM
180	380	75	1 020	1 290	125	1 600	2 200	44	NU 336 ECM
180	380	75	1 020	1 290	125	1 600	2 200	44	NJ 336 ECM
190	290	46	347	500	53	2 600	3 800	11	NU 1038 M
190	290	46	347	500	53	2 600	3 800	11	NJ 1038 M
190	340	55	800	965	98	2 000	3 400	24	* NU 238 ECM
190	340	55	800	965	98	2 000	3 400	24,5	* NJ 238 ECM
190	340	55	800	965	98	2 000	3 400	25	* NUP 238 ECM
190	340	92	1 220	1 600	160	2 000	3 000	39	* NU 2238 ECM
190	400	78	1 140	1 500	143	1 500	2 000	50	NU 338 ECM
200	310	51	380	570	58,5	2 400	3 000	14,5	NU 1040 M
200	360	58	850	1 020	100	1 900	3 200	28,5	* NU 240 ECM
200	360	58	850	1 020	100	1 900	3 200	29	* NJ 240 ECM
220	340	56	495	735	73,5	2 200	2 800	18,5	NU 1044 M
220	340	56	495	735	73,5	2 200	2 800	18,5	NJ 1044 M
220	400	65	1 060	1 290	125	1 600	3 000	38,5	* NU 244 ECM
220	400	65	1 060	1 290	125	1 600	3 000	39	* NJ 244 ECM
220	400	65	1 060	1 290	125	1 600	3 000	39,5	* NUP 244 ECM
240	360	56	523	800	78	2 000	2 600	20	NU 1048 M
260	400	65	627	965	96,5	1 800	2 400	29,5	NU 1052 M
280	420	65	660	1 060	102	1 700	2 200	31,5	NU 1056 M

* SKF Explorer bearing

The Power of Knowledge Engineering

Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

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