

Cylindrical Roller Bearings

EM Series

NSK has developed a higher load-carrying capacity machined cage with low noise and superior cage strength. Our EM series is a standard cylindrical roller bearing that facilitates interchangeability across the globe, while offering better performance for every application.



Cylindrical Roller Bearing

EM Series

A newly developed standard bearing

Advantages of a roller-guided cage

- Trouble-free packing of grease
- Quieter operation
- Improved oil flow

Greater accuracy of the roller guidance achieved through special pocket profiling

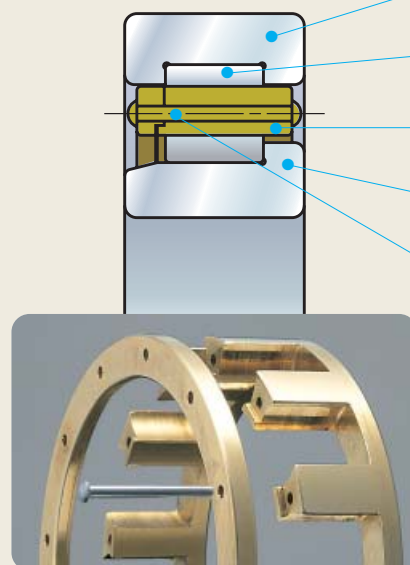
Large pocket corner radii relieve stress concentrations on the cage



Design concept of our newly developed standard bearing—the EM series

Internal design comparison of the M series and EM series

M Series (Conventional type)



Outer ring

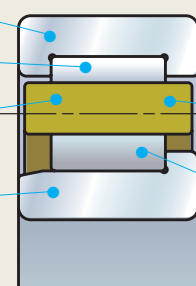
Rollers

Cage

Inner ring

Rivets

EM Series (Newly developed type)



High load rating
Greater number of larger rollers

Maximum rigidity and low noise
One-piece cage provides greater accuracy
Roller-guided cage achieves lower temperature running and quieter operation

High strength and wear resistant cage
Well-balanced **one-piece** design

NSK has been supplying a standard cage for single row cylindrical roller bearings as indicated here:

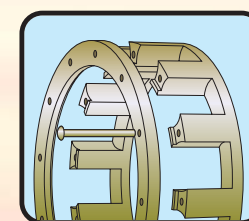
Standard machined cage — M type (Riveted-type, two-piece, brass, ring-guided cage)

High load-carrying E type — MA1 type (One-piece, brass, ring-guided cage)

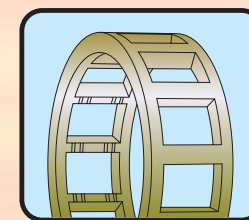
You can now take advantage of NSK's newly developed cylindrical roller bearing, the EM series, which combines the strengths and technologies of both previous cages into a one-piece brass roller-guided cage.

NSK has achieved a new design involving even newer concepts, while maintaining excellence in function and service life. Our EM series can meet your high load-carrying capacity needs for the new era.

EM Series Bearing Interchange Guide

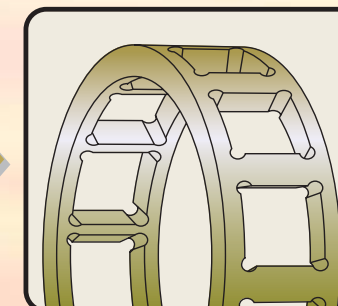


M	MR
MA	M
M1A	M1
L1	·
FY	·
MY	·
·	·

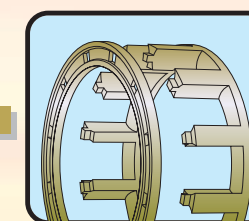


EMA1
EMP
·
·

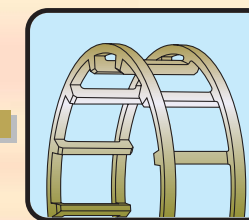
NSK EM Series



Upper: cage symbols of NSK
Lower: cage symbols of other manufacturers
(Reference use only)

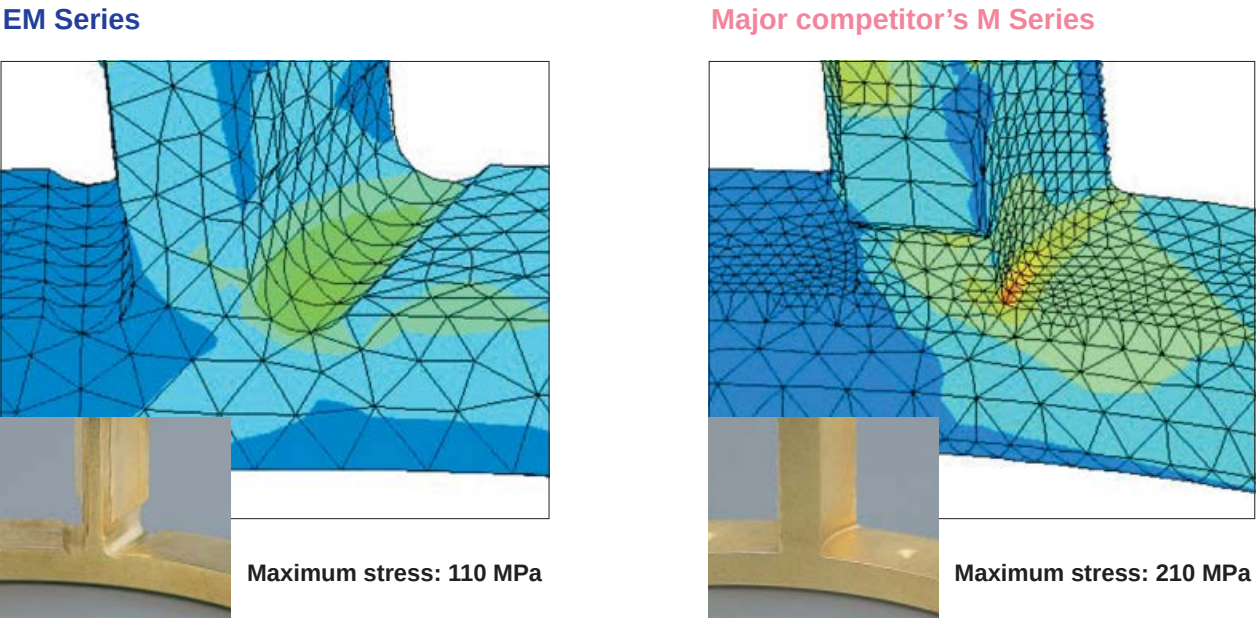


EMB	EMBR
ECM	ECMA
·	·
·	·



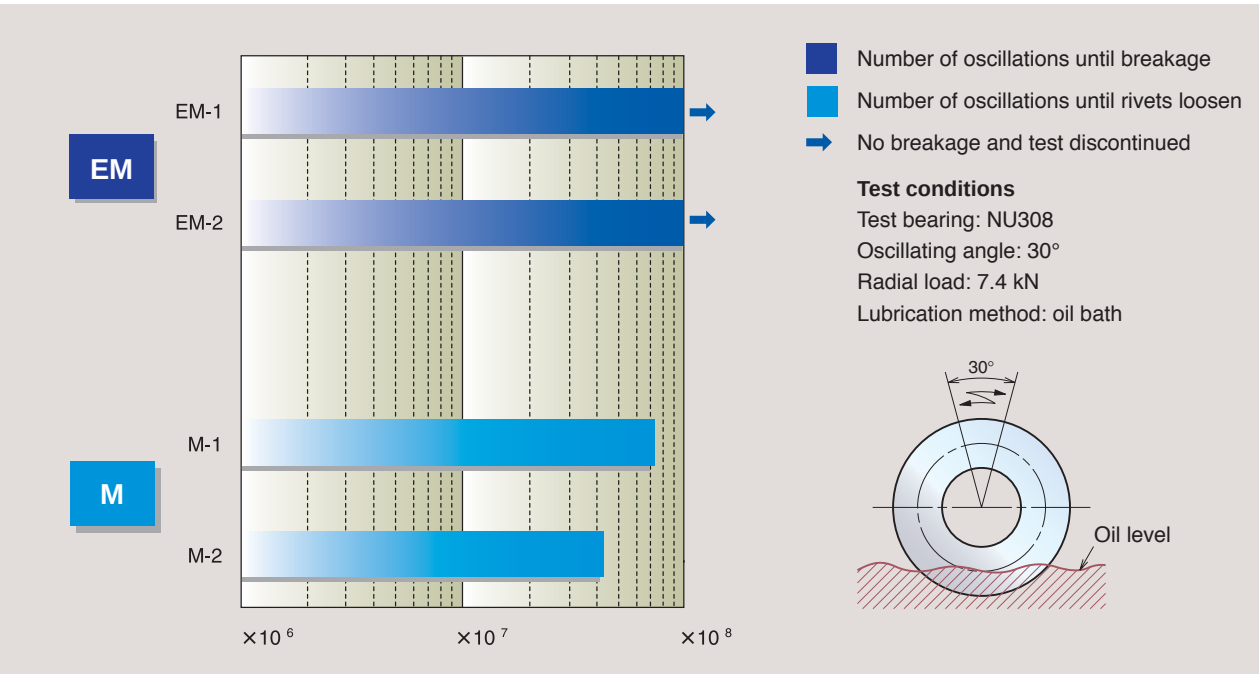
EMD
EG1
·
·

Results of FEM analysis



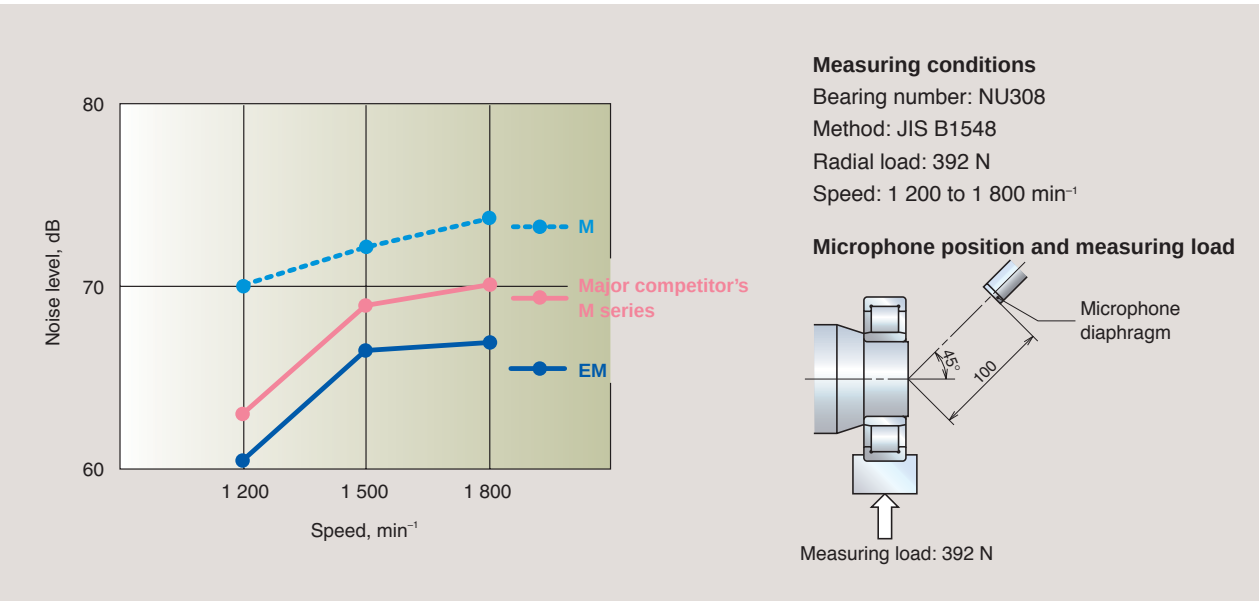
Tests confirm that the stress levels of NSK's EM series cages are 50% lower than that of major competitor's M series.

Cage strength test results



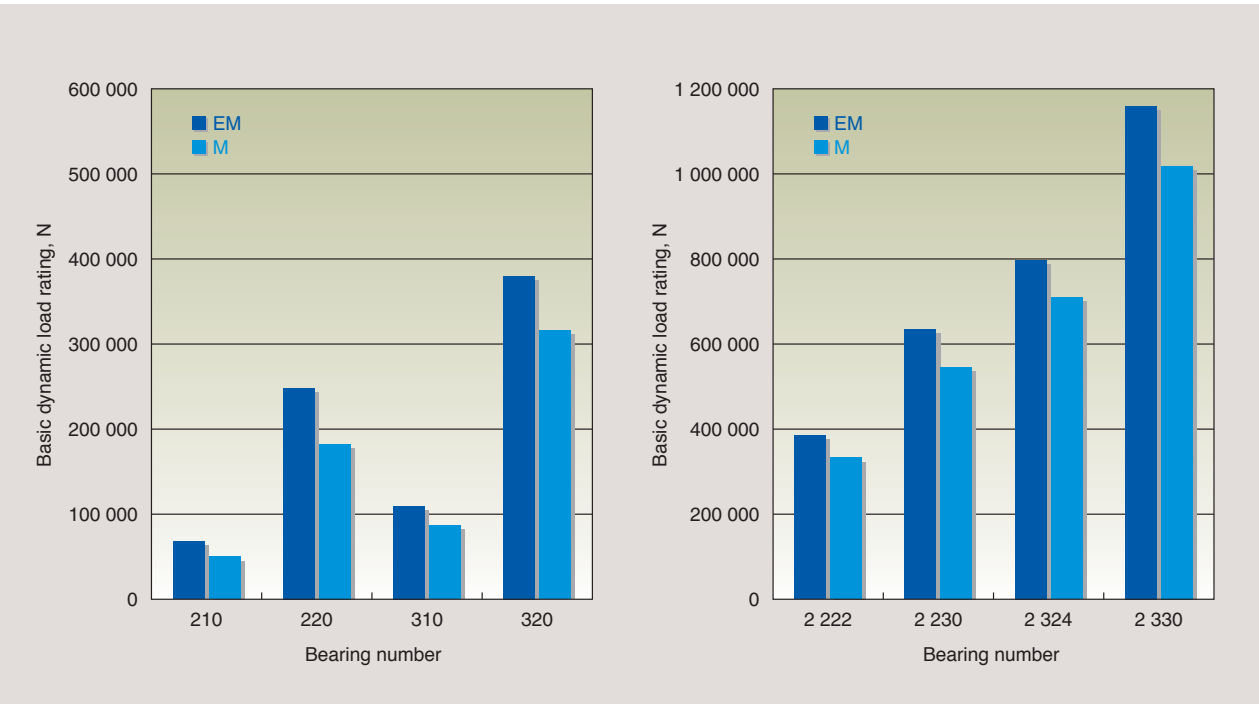
Test results show that NSK's EM series has greater cage strength performance than that of conventional M-type cages.

Noise measurement test results



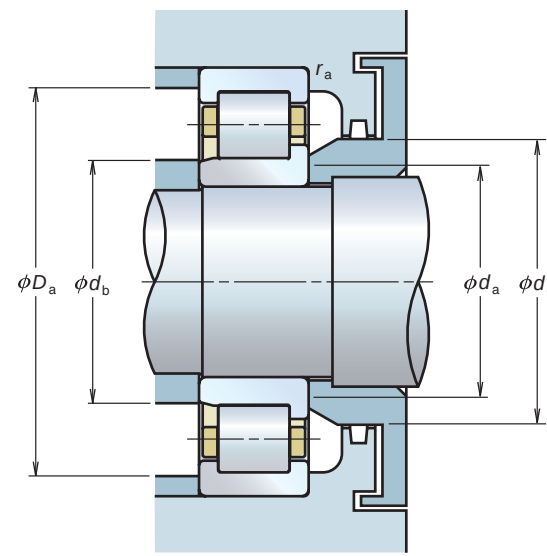
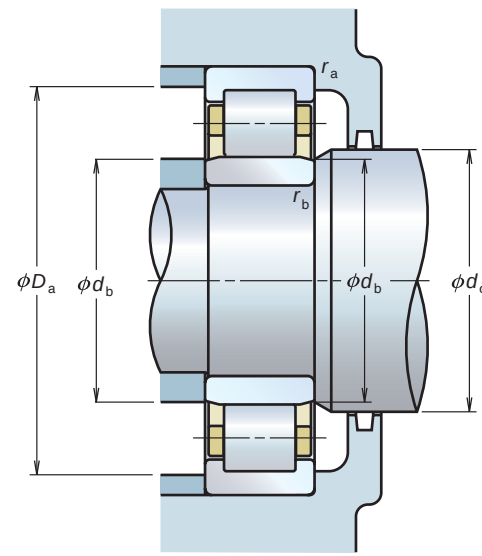
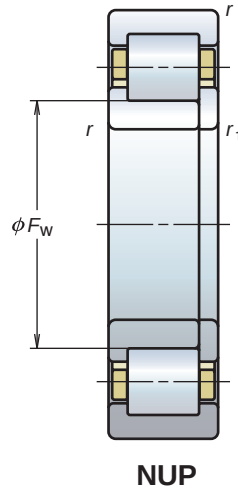
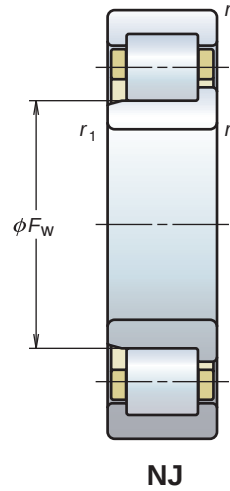
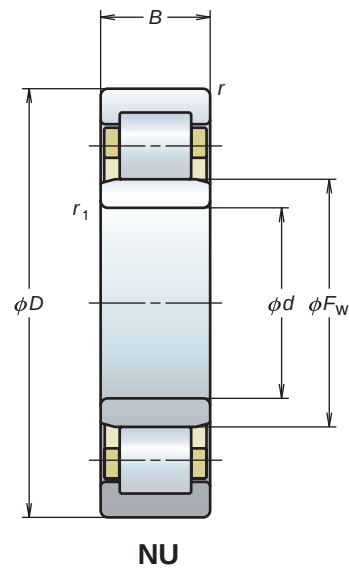
The EM series exhibited noise levels 5 dB lower than competitive two-piece cage designs.

Higher Load Rating



The EM series benefits from a 30% higher load-carrying capacity than the conventional M series.

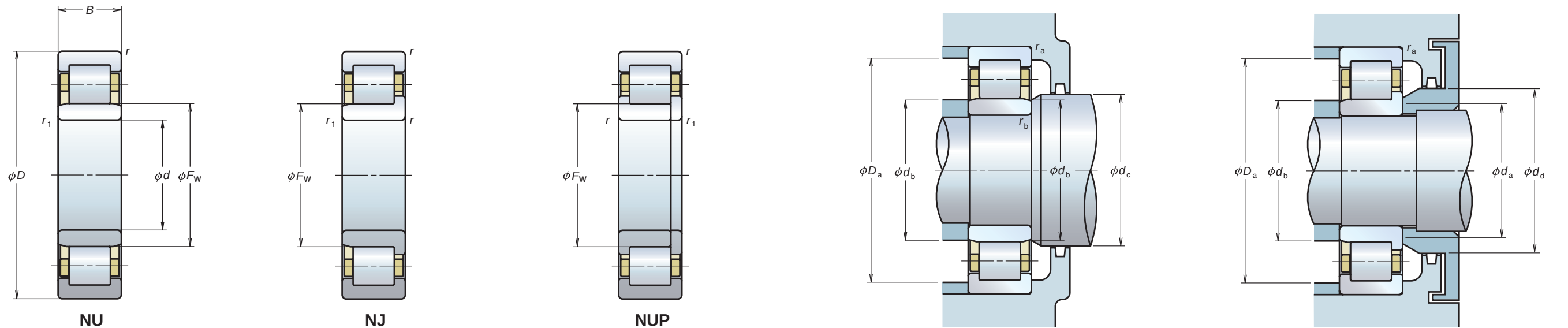
EM Series Bearing Table



Boundary Dimensions (mm)						Basic Load Ratings [N]		Limiting Speeds [min ⁻¹]		Bearing Numbers			Abutment and Fillet Dimensions (mm)								Permissible Axial Movement (mm)	Mass (kg) approx
d	D	B	r min	r ₁ min	F _w	C _r	C _{or}	Grease	Oil	NU	NJ	NUP	d _a min	d _b min	d _b max	d _c min	d _d min	D _a max	r _a max	r _b max		
25	52	15	1	0.6	31.5	29 300	27 700	13 000	16 000	NU205EM	NJ	NUP	30	29	30	34	37	47	1	0.6	1.2	0.155
	62	17	1.1	1.1	34	41 500	37 500	10 000	13 000	NU305EM	NJ	NUP	31.5	31.5	32	37	40	55.5	1	1	1.2	0.279
30	62	16	1	0.6	37.5	39 000	37 500	11 000	13 000	NU206EM	NJ	NUP	35	34	36	40	44	57	1	0.6	1.2	0.236
	72	19	1.1	1.1	40.5	53 000	50 000	8 500	11 000	NU306EM	NJ	NUP	36.5	36.5	39	44	48	65.5	1	1	1.2	0.410
35	72	17	1.1	0.6	44	50 500	50 000	9 500	11 000	NU207EM	NJ	NUP	41.5	39	42	46	50	65.5	1	0.6	1.2	0.341
	80	21	1.5	1.1	46.2	66 500	65 500	8 000	9 500	NU307EM	NJ	NUP	43	41.5	44	48	53	72	1.5	1	1.2	0.547
40	80	18	1.1	1.1	49.5	55 500	55 500	8 500	10 000	NU208EM	NJ	NUP	46.5	46.5	48	52	56	73.5	1	1	1.2	0.430
	90	23	1.5	1.5	52	83 000	81 500	6 700	8 500	NU308EM	NJ	NUP	48	48	50	55	60	82	1.5	1.5	1.2	0.751
45	85	19	1.1	1.1	54.5	63 000	66 500	7 500	9 000	NU209EM	NJ	NUP	51.5	51.5	52	57	61	78.5	1	1	1.2	0.492
	100	25	1.5	1.5	58.5	97 500	98 500	6 300	7 500	NU309EM	NJ	NUP	53	53	56	60	66	92	1.5	1.5	1.4	1.01
50	90	20	1.1	1.1	59.5	69 000	76 500	7 100	8 500	NU210EM	NJ	NUP	56.5	56.5	57	62	67	83.5	1	1	1.7	0.564
	110	27	2	2	65	110 000	113 000	5 600	6 700	NU310EM	NJ	NUP	59	59	63	67	73	101	2	2	1.4	1.32
55	100	21	1.5	1.1	66	86 500	98 500	6 300	7 500	NU211EM	NJ	NUP	63	61.5	64	68	73	92	1.5	1	1.2	0.736
	120	29	2	2	70.5	137 000	143 000	5 000	6 300	NU311EM	NJ	NUP	64	64	68	72	80	111	2	2	1.4	1.67
60	110	22	1.5	1.5	72	97 500	107 000	6 000	7 100	NU212EM	NJ	NUP	68	68	70	75	80	102	1.5	1.5	1.2	0.930
	130	31	2.1	2.1	77	150 000	157 000	4 800	5 600	NU312EM	NJ	NUP	71	71	75	79	86	119	2	2	1.5	2.06
65	120	23	1.5	1.5	78.5	108 000	119 000	5 300	6 300	NU213EM	NJ	NUP	73	73	76	81	87	112	1.5	1.5	1.4	1.17
	140	33	2.1	2.1	82.5	181 000	191 000	4 300	5 300	NU313EM	NJ	NUP	76	76	80	85	93	129	2	2	1.5	2.56
70	125	24	1.5	1.5	83.5	119 000	137 000	5 000	6 300	NU214EM	NJ	NUP	78	78	81	86	92	117	1.5	1.5	1.4	1.29
	150	35	2.1	2.1	89	205 000	222 000	4 000	5 000	NU314EM	NJ	NUP	81	81	86	92	100	139	2	2	1.5	3.09
75	130	25	1.5	1.5	88.5	130 000	156 000	4 800	6 000	NU215EM	NJ	NUP	83	83	86	90	96	122	1.5	1.5	1.4	1.44
	160	37	2.1	2.1	95	240 000	263 000	3 800	4 800	NU315EM	NJ	NUP	86	86	92	97	106	149	2	2	1.4	3.73
80	140	26	2	2	95.3	139 000	167 000	4 500	5 300	NU216EM	NJ	NUP	89	89	92	97	104	131	2	2	1.4	1.7
	170	39	2.1	2.1	101	256 000	282 000	3 600	4 300	NU316EM	NJ	NUP	91	91	98	105	114	159	2	2	1.5	4.45
85	150	28	2	2	100.5	167 000	199 000	4 300	5 000	NU217EM	NJ	NUP	94	94	98	104	110	141	2	2	1.3	2.11
	180	41	3	3	108	291 000	330 000	3 400	4 000	NU317EM	NJ	NUP	98	98	105	110	119	167	2.5	2.5	2	5.26

The following are also available: 1. N and NF type bearings 2. Cages with an outside diameter of less than 650 mm 3. Please contact NSK for details.

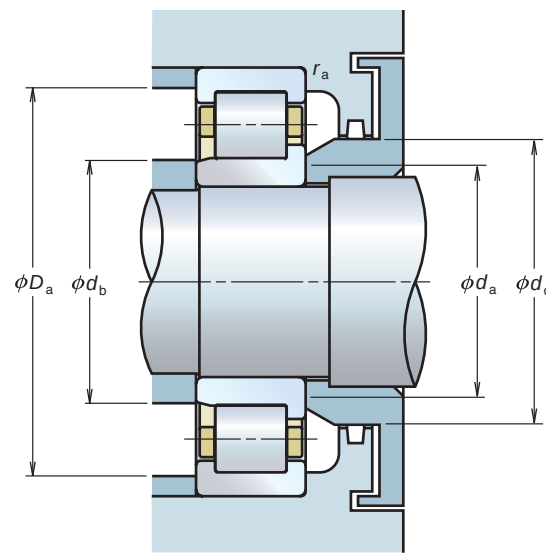
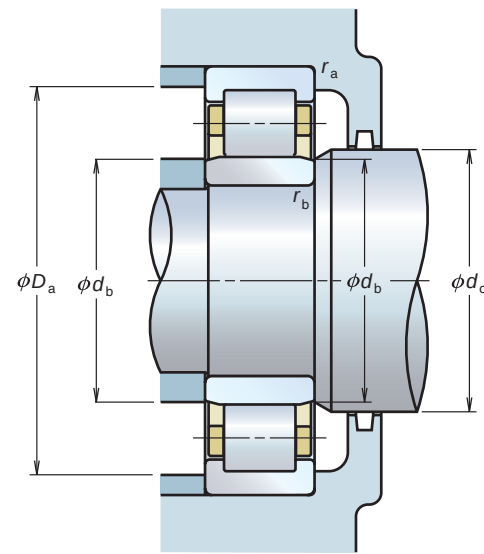
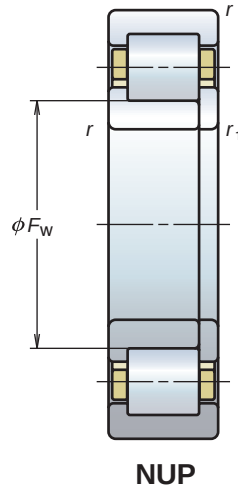
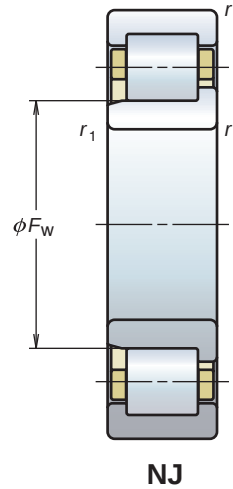
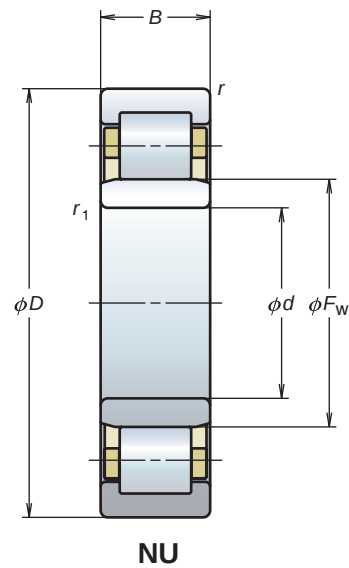
EM Series Bearing Table



Boundary Dimensions (mm)						Basic Load Ratings [N]		Limiting Speeds [min ⁻¹]		Bearing Numbers			Abutment and Fillet Dimensions (mm)									Permissible Axial Movement (mm)	Mass (kg) approx
d	D	B	r min	r ₁ min	F _w	C _r	C _{or}	Grease	Oil	NU	NJ	NUP	d _a min	d _b min	d _b max	d _c min	d _d min	D _a max	r _a max	r _b max			
90	160	30	2	2	107	182 000	217 000	4 000	4 800	NU218EM	NJ	NUP	99	99	104	109	116	151	2	2		1.4	2.6
	190	43	3	3	113.5	315 000	355 000	3 200	3 800	NU318EM	NJ	NUP	103	103	111	117	127	177	2.5	2.5		1.5	6.1
95	170	32	2.1	2.1	112.5	220 000	265 000	3 800	4 500	NU219EM	NJ	NUP	106	106	110	116	123	159	2	2		1.4	3.17
	200	45	3	3	121.5	335 000	385 000	3 000	3 600	NU319EM	NJ	NUP	108	108	118	124	134	187	2.5	2.5		1.5	7.13
100	180	34	2.1	2.1	119	249 000	305 000	3 600	4 300	NU220EM	NJ	NUP	111	111	116	122	130	169	2	2		1.4	3.81
	215	47	3	3	127.5	380 000	425 000	2 800	3 400	NU320EM	NJ	NUP	113	113	124	132	143	202	2.5	2.5		1.8	8.63
105	190	36	2.1	2.1	125	262 000	310 000	3 400	4 000	NU221EM	NJ	NUP	116	116	121	129	137	179	2	2		1.4	4.58
	225	49	3	3	133	425 000	480 000	2 600	3 200	NU321EM	NJ	NUP	118	118	131	137	149	212	2.5	2.5		1.8	9.84
110	200	38	2.1	2.1	132.5	293 000	365 000	3 200	3 800	NU222EM	NJ	NUP	121	121	129	135	144	189	2	2		1.4	5.37
	200	53	2.1	2.1	132.5	385 000	515 000	2 800	3 400	NU2222EM	NJ	NUP	121	121	129	135	144	189	2	2		1.4	7.65
	240	50	3	3	143	450 000	525 000	2 600	3 000	NU322EM	NJ	NUP	123	123	139	145	158	227	2.5	2.5		3.8	11.8
120	215	40	2.1	2.1	143.5	335 000	420 000	3 000	3 400	NU224EM	NJ	NUP	131	131	140	146	156	204	2	2		1.5	6.43
	215	58	2.1	2.1	143.5	450 000	620 000	2 600	3 200	NU2224EM	NJ	NUP	131	131	140	146	156	204	2	2		2	9.51
	260	55	3	3	154	530 000	610 000	2 200	2 800	NU324EM	NJ	NUP	133	133	150	156	171	247	2.5	2.5		1.8	15
	260	86	3	3	154	795 000	1 030 000	2 000	2 600	NU2324EM	NJ	NUP	133	133	150	156	171	247	2.5	2.5		2.8	25
130	230	40	3	3	153.5	365 000	455 000	2 600	3 200	NU226EM	NJ	NUP	143	143	150	158	168	217	2.5	2.5		1.5	8.03
	230	64	3	3	153.5	530 000	735 000	2 400	3 000	NU2226EM	NJ	NUP	143	143	150	158	168	217	2.5	2.5		3	9.44
	280	58	4	4	167	615 000	735 000	2 200	2 600	NU326EM	NJ	NUP	146	146	163	169	184	264	3	3		2.3	18.7
	280	93	4	4	167	920 000	1 230 000	1 900	2 400	NU2326EM	NJ	NUP	146	146	163	169	184	264	3	3		2.3	30
140	250	42	3	3	169	395 000	515 000	2 400	3 000	NU228EM	NJ	NUP	153	153	165	171	182	237	2.5	2.5		1.5	9.38
	250	68	3	3	169	550 000	790 000	2 200	2 800	NU2228EM	NJ	NUP	153	153	165	171	182	237	2.5	2.5		2.5	15.2
	300	62	4	4	180	665 000	795 000	2 000	2 400	NU328EM	NJ	NUP	156	156	176	182	198	284	3	3		3.3	22.8
	300	102	4	4	180	1 020 000	1 380 000	1 700	2 200	NU2328EM	NJ	NUP	156	156	176	182	198	284	3	3		2.8	37.7
150	270	45	3	3	182	450 000	595 000	2 200	2 800	NU230EM	NJ	NUP	163	163	177	184	196	257	2.5	2.5		1.5	11.9
	270	73	3	3	182	635 000	930 000	2 000	2 600	NU2230EM	NJ	NUP	163	163	177	184	196	257	2.5	2.5		3	19.3
	320	65	4	4	193	760 000	920 000	1 800	2 200	NU330EM	NJ	NUP	166	166	188	195	213	304	3	3		3.2	27.1
	320	108	4	4	193	1 160 000	1 600 000	1 600	2 000	NU2330EM	NJ	NUP	166	166	188	195	213	304	3	3		2.2	45.1

The following are also available: 1. N and NF type bearings 2. Cages with an outside diameter of less than 650 mm 3. Please contact NSK for details.

EM Series Bearing Table



Boundary Dimensions (mm)						Basic Load Ratings [N]		Limiting Speeds [min ⁻¹]		Bearing Numbers			Abutment and Fillet Dimensions (mm)								Permissible Axial Movement (mm)	Mass (kg) approx
d	D	B	r min	r ₁ min	F _w	C _r	C _{or}	Grease	Oil	NU	NJ	NUP	d _a min	d _b min	d _b max	d _c min	d _d min	D _a max	r _a max	r _b max		
160	290	48	3	3	195	500 000	665 000	2 200	2 600	NU232EM	NJ	NUP	173	173	190	197	210	277	2.5	2.5	1.8	14.7
	290	80	3	3	193	810 000	1 190 000	1 900	2 400	NU2232EM	NJ	NUP	173	173	188	197	210	277	2.5	2.5	3.3	24.5
	340	68	4	4	204	860 000	1 050 000	1 700	2 000	NU332EM	NJ	NUP	176	176	199	211	228	324	3	3	3.2	32.1
	340	114	4	4	204	1 310 000	1 820 000	1 500	1 900	NU2332EM	NJ	NUP	176	176	199	211	228	324	3	3	2.7	53.9
170	310	52	4	4	207	605 000	800 000	2 000	2 400	NU234EM	NJ	NUP	186	186	202	211	223	294	3	3	3.8	18.3
	310	86	4	4	205	925 000	1 330 000	1 800	2 200	NU2234EM	NJ	NUP	186	186	200	211	223	294	3	3	2.8	29.9
	360	72	4	4	218	930 000	1 150 000	1 600	2 000	NU334EM	NJ	NUP	186	186	213	223	241	344	3	3	1.7	37.9
	360	120	4	4	216	1 490 000	2 070 000	1 400	1 800	NU2334EM	NJ	NUP	186	186	210	223	241	344	3	3	6.2	63.4
180	320	52	4	4	217	625 000	850 000	1 900	2 200	NU236EM	NJ	NUP	196	196	212	221	233	304	3	3	2.2	19
	320	86	4	4	215	1 010 000	1 510 000	1 700	2 000	NU2236EM	NJ	NUP	196	196	210	221	233	304	3	3	2.7	31.4
	380	75	4	4	231	985 000	1 230 000	1 500	1 800	NU336EM	NJ	NUP	196	196	226	235	255	364	3	3	2.2	44
	380	126	4	4	227	1 560 000	2 220 000	1 300	1 700	NU2336EM	NJ	NUP	196	196	222	235	255	364	3	3	6.2	74.6
190	340	55	4	4	230	695 000	955 000	1 800	2 200	NU238EM	NJ	NUP	206	206	225	234	247	324	3	3	1.7	23
	340	92	4	4	228	1 100 000	1 670 000	1 600	2 000	NU2238EM	NJ	NUP	206	206	223	234	247	324	3	3	1.7	38.3
	400	78	5	5	245	1 060 000	1 340 000	1 400	1 700	NU338EM	NJ	NUP	210	210	240	248	268	380	4	4	1.7	50.6
	400	132	5	5	240	1 770 000	2 520 000	1 300	1 600	NU2338EM	NJ	NUP	210	210	235	248	268	380	4	4	6.2	86.2
200	360	58	4	4	243	765 000	1 060 000	1 700	2 000	NU240EM	NJ	NUP	216	216	238	247	261	344	3	3	2.2	27.4
	360	98	4	4	241	1 220 000	1 870 000	1 500	1 800	NU2240EM	NJ	NUP	216	216	235	247	261	344	3	3	2.2	46.1
	420	80	5	5	258	1 140 000	1 450 000	1 300	1 600	NU340EM	NJ	NUP	220	220	252	263	283	400	4	4	1.2	57.1
	420	138	5	5	253	1 910 000	2 760 000	1 200	1 500	NU2340EM	NJ	NUP	220	220	247	263	283	400	4	4	7.7	99.3

The following are also available: 1. N and NF type bearings 2. Cages with an outside diameter of less than 650 mm 3. Please contact NSK for details.

Worldwide Sales Offices

NSK LTD.-HEADQUARTERS, TOKYO, JAPAN www.nsk.com
INDUSTRIAL MACHINERY BUSINESS DIVISION-HEADQUARTERS tel: 03-3779-7227
GLOBAL AFTERMARKET DEPARTMENT tel: 03-3779-7253
PRECISION MACHINERY DEPARTMENT tel: 03-3779-7163
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AUTOMOTIVE BUSINESS DIVISION-HEADQUARTERS tel: 03-3779-7189

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South Africa:
NSK SOUTH AFRICA (PTY) LTD.
Johannesburg tel: 011-458-3600

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Australia:
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NSK (CHINA) RESEARCH & DEVELOPMENT CO., LTD.
Jiangsu tel: 0512-5796-3000

NSK (SHANGHAI) TRADING CO., LTD.
Jiangsu tel: 0512-5796-3000

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NSK FRANCE S.A.S.
Paris tel: 01-30-57-39-39

Germany:

NSK DEUTSCHLAND GMBH
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