

# 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.



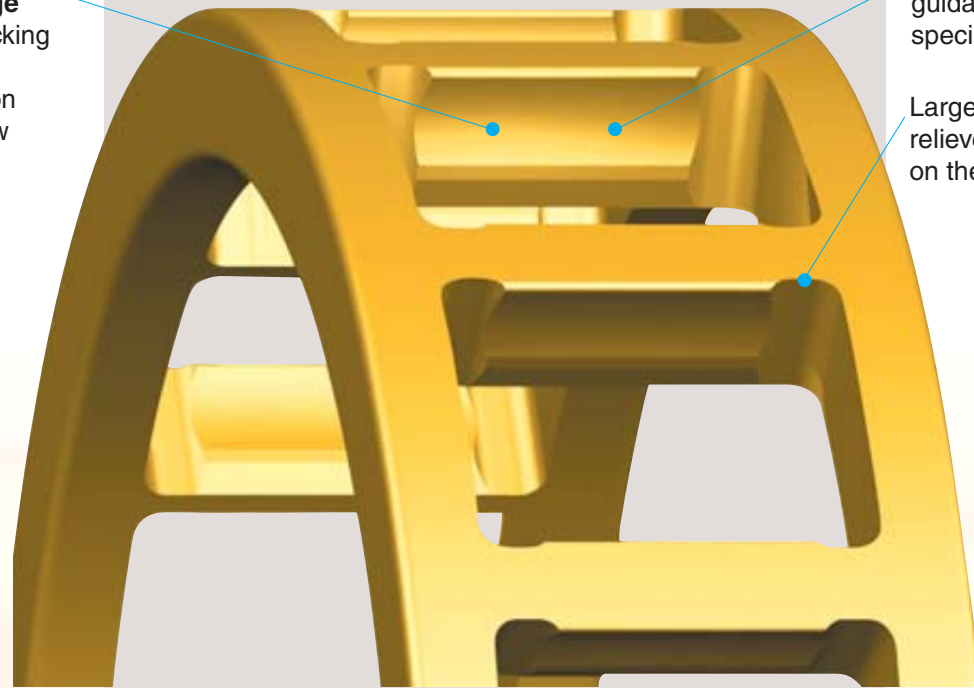
## Cylindrical Roller Bearing

# EM Series

A newly developed standard bearing

### Advantages of a roller-guided cage

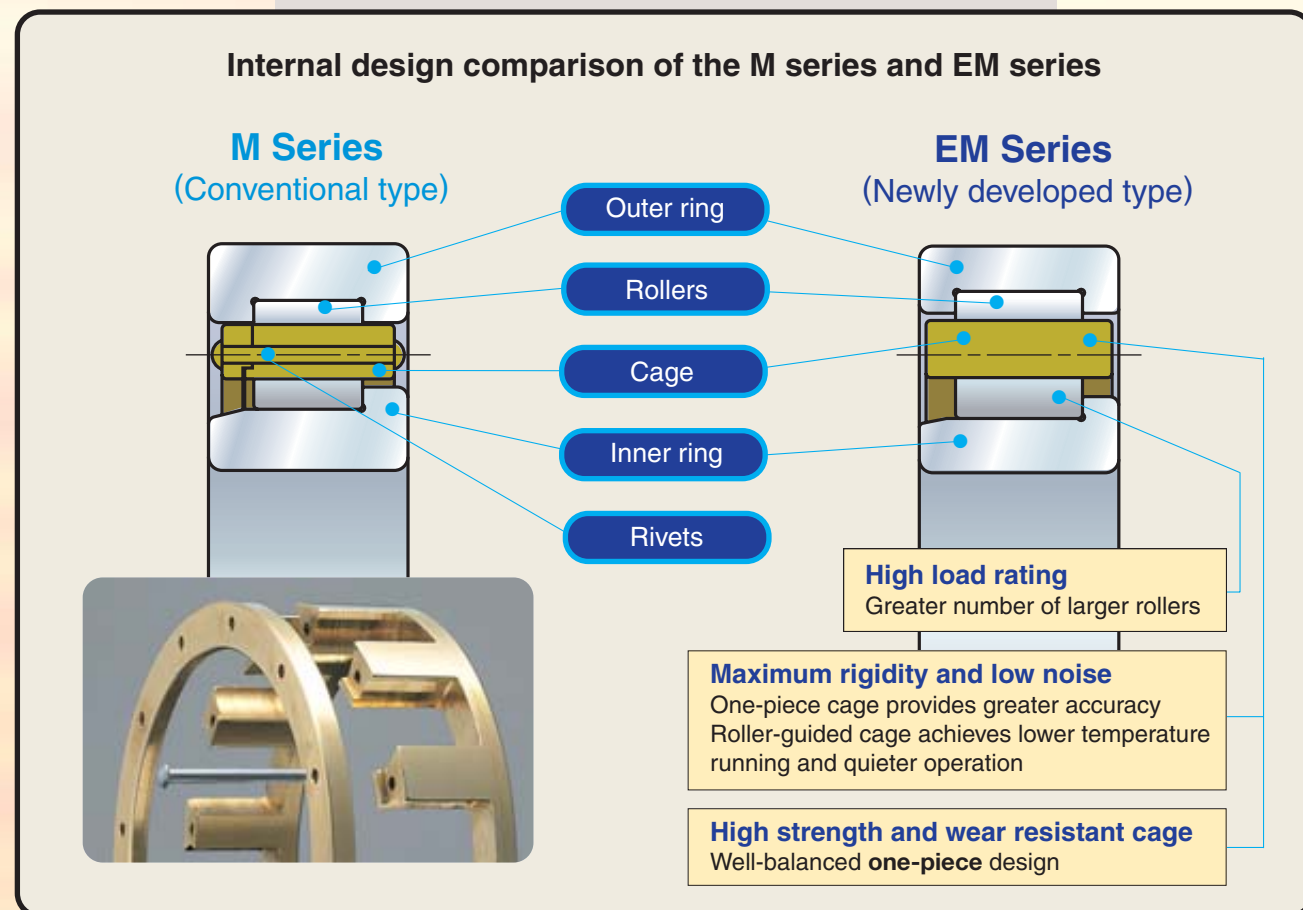
- Trouble-free packing of grease
- Quieter operation
- Improved oil flow



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



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

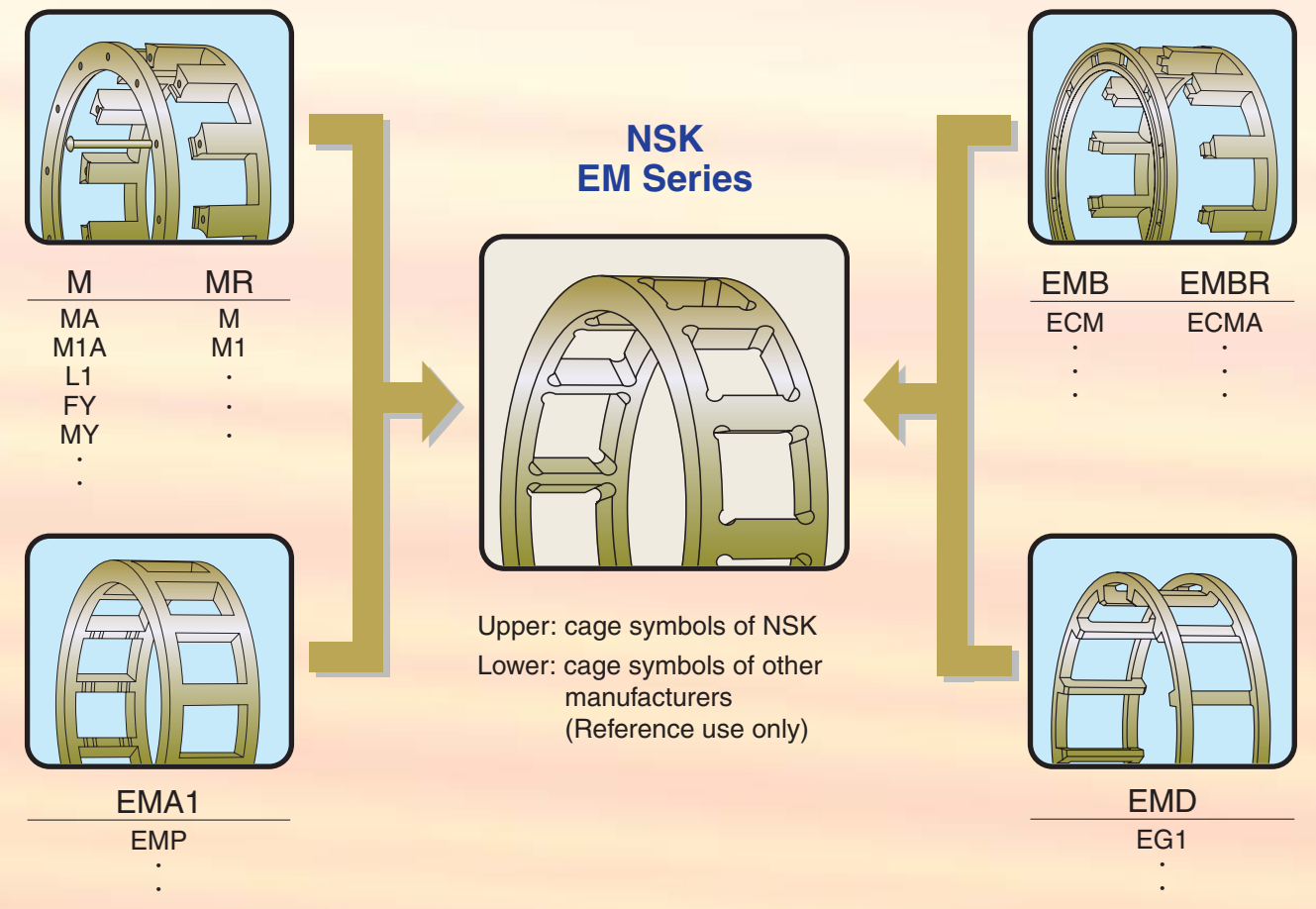
Standard machined cage — M type (Riveted-type, two-piece, brass, ring-guided cage)

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.

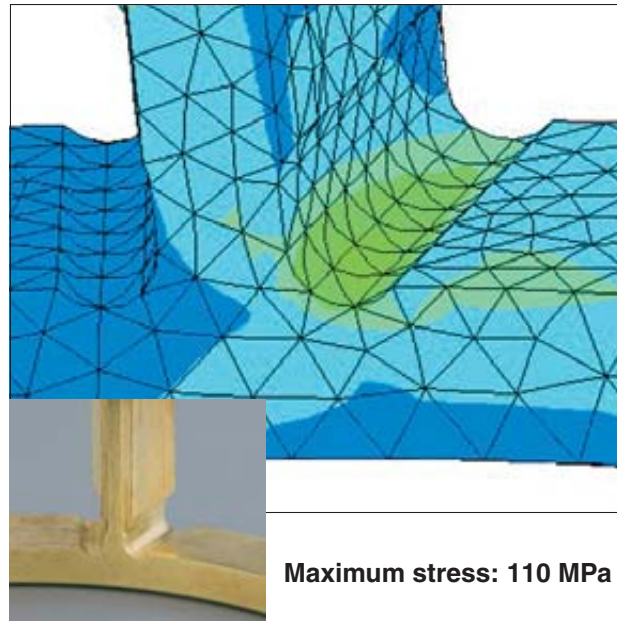
NSK has achieved a new design involving even newer concepts, while maintaining excellence in function and service life. Our EM series can meet your high load-carrying capacity needs for the new era.

## EM Series Bearing Interchange Guide

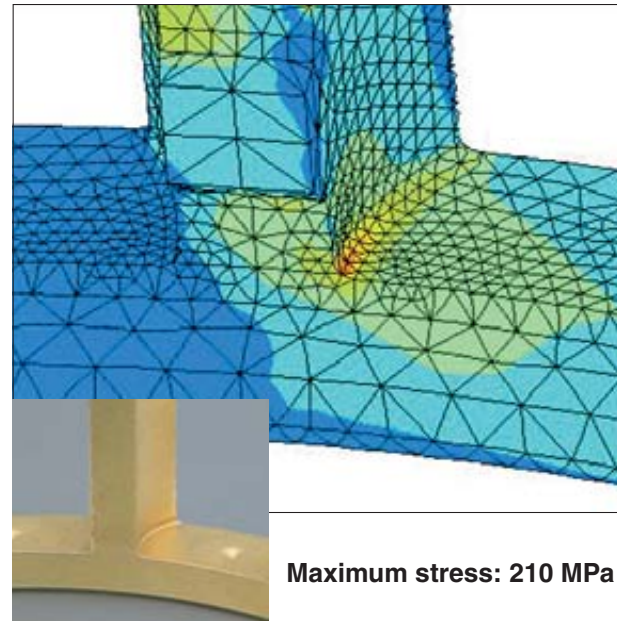


## Results of FEM analysis

### EM Series

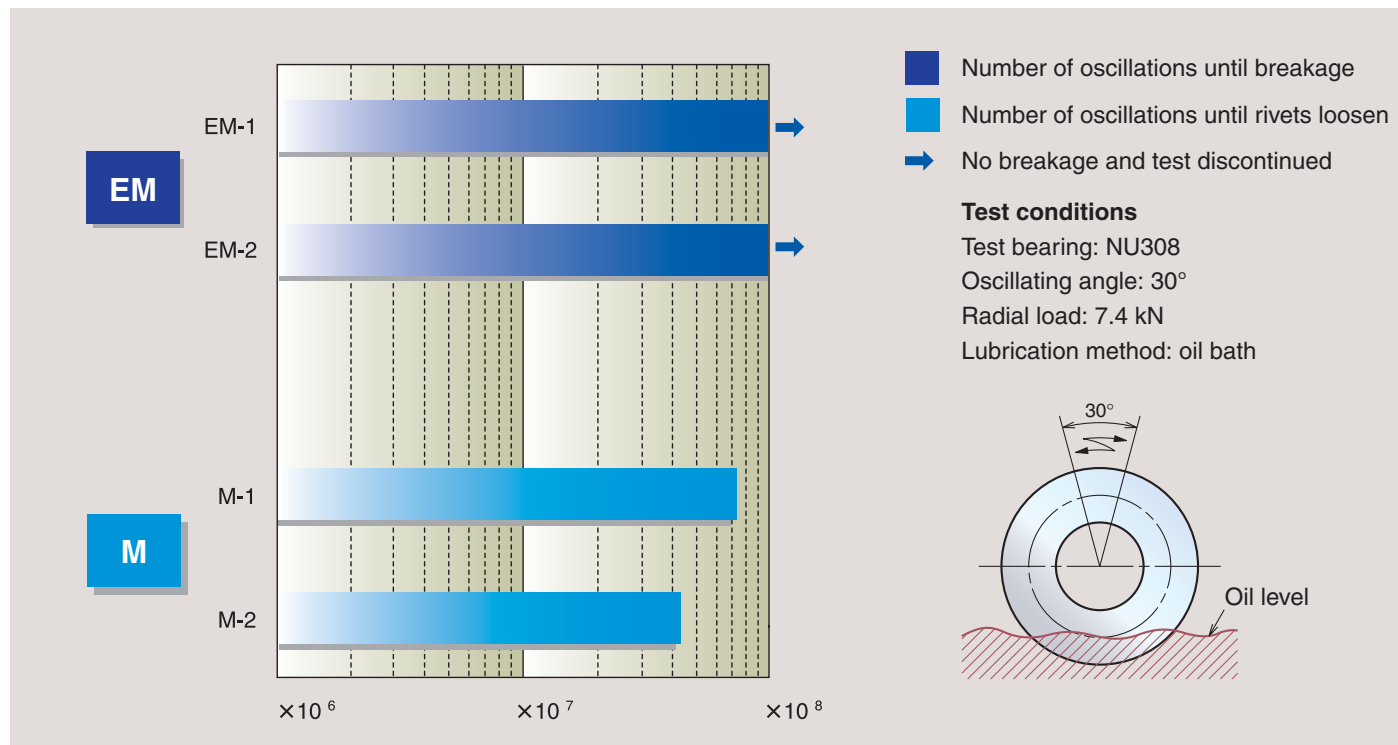


### Major competitor's M Series



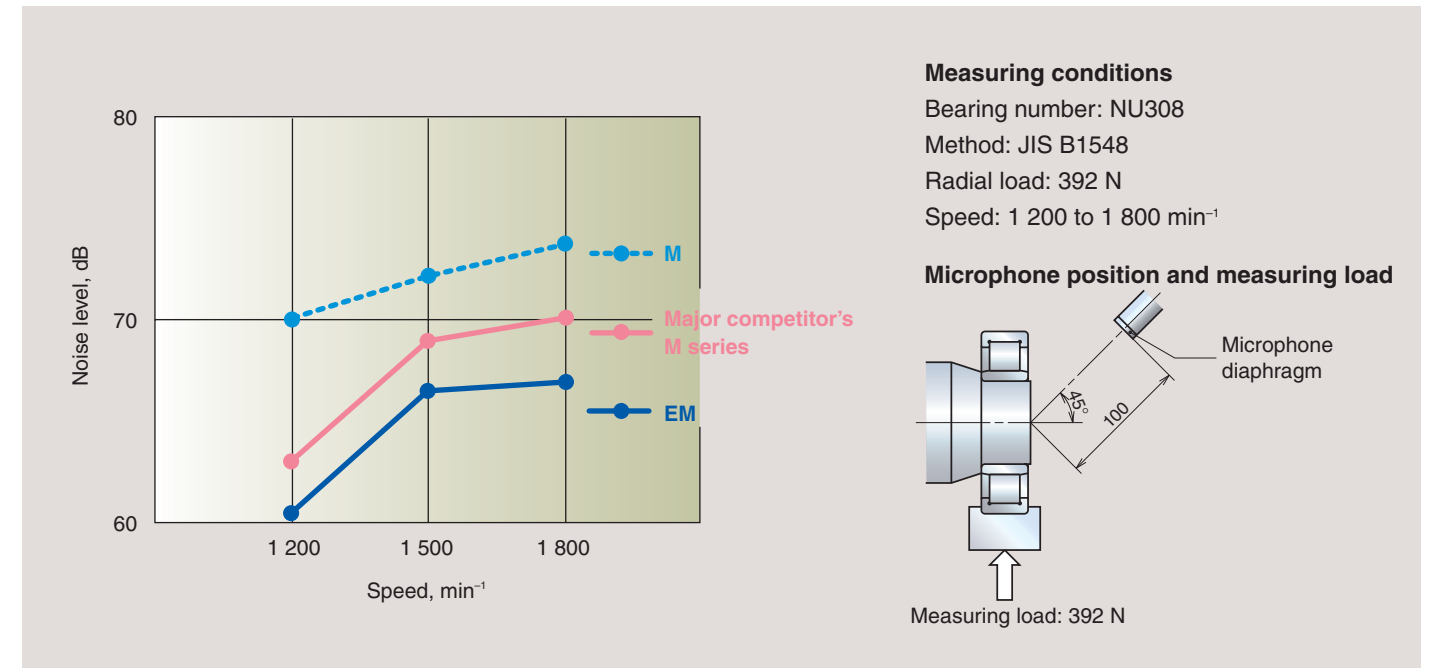
Tests confirm that the stress levels of NSK's EM series cages are 50 % lower than that of major competitor's M series.

## Cage strength test results



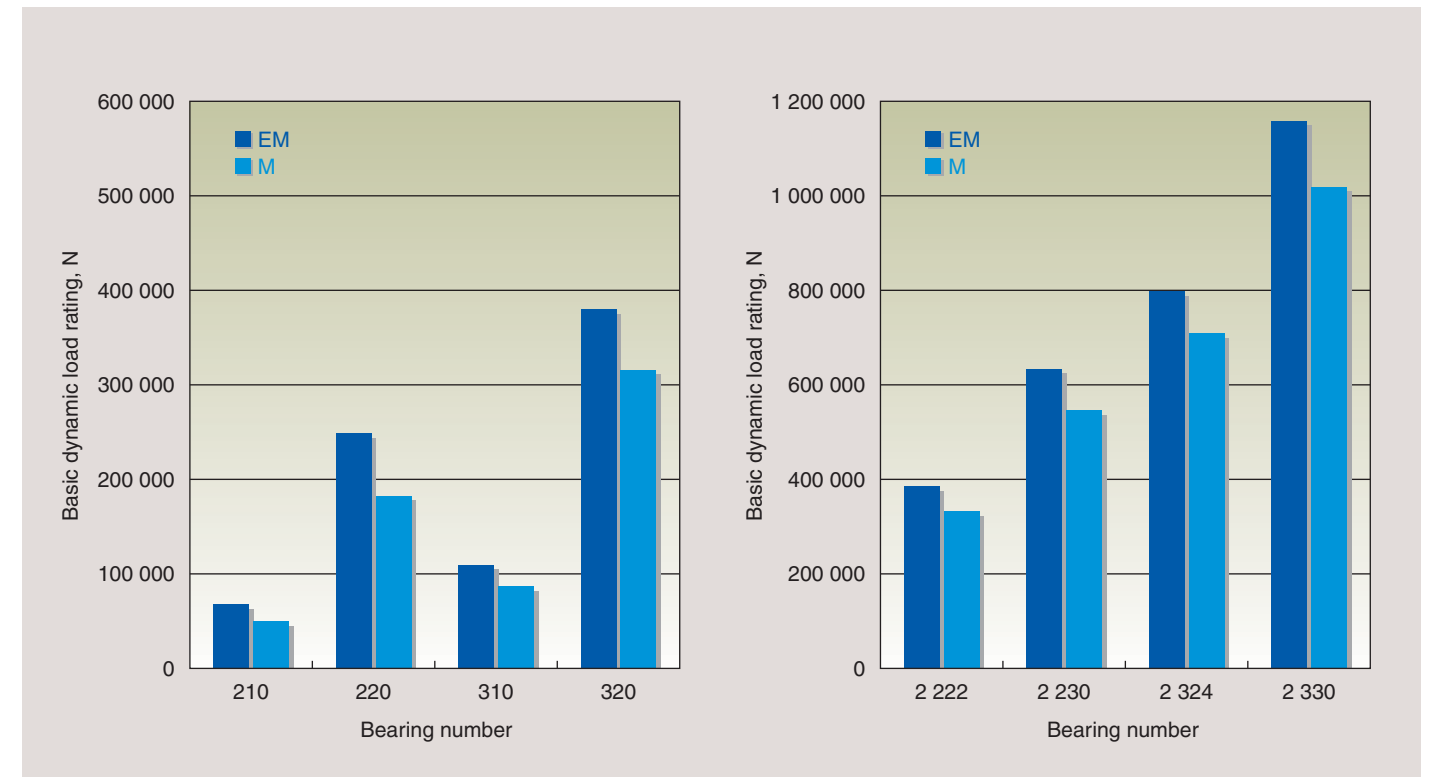
Test results show that NSK's EM series has greater cage strength performance than that of conventional M-type cages.

## Noise measurement test results



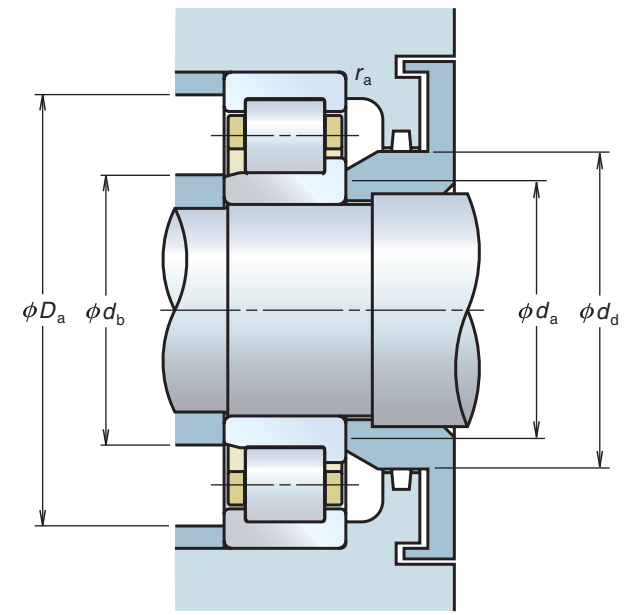
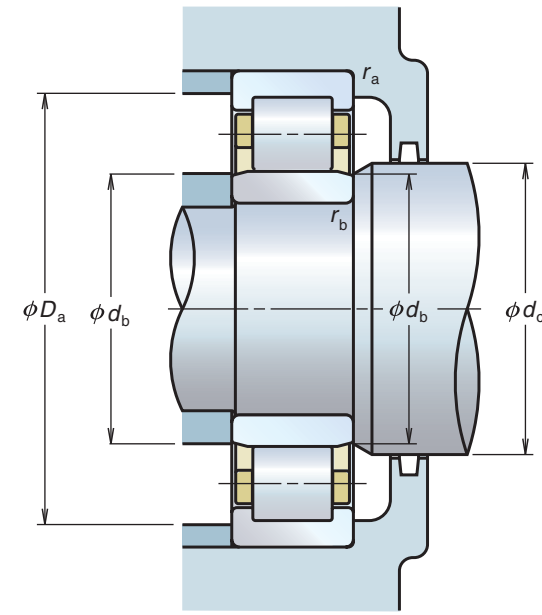
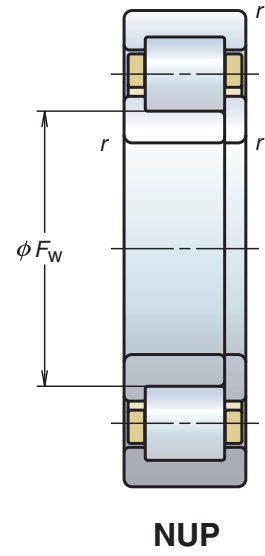
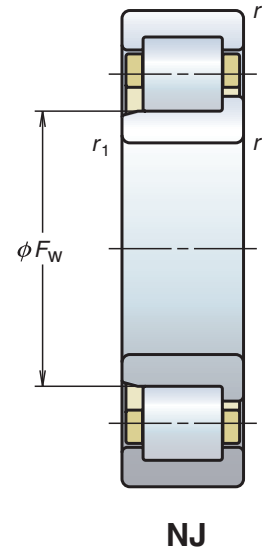
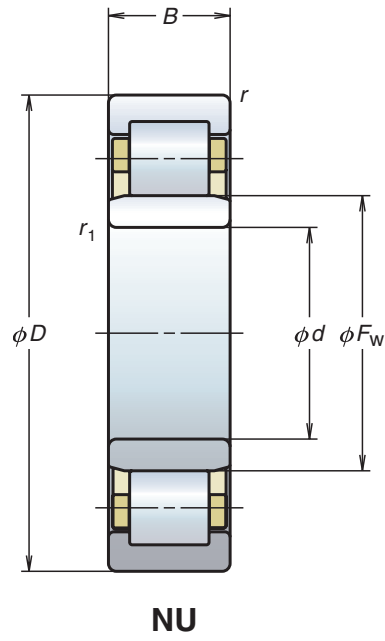
The EM series exhibited noise levels 5 dB lower than competitive two-piece cage designs.

## Higher Load Rating



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

# EM Series Bearing Table



d	D	Boundary Dimensions (mm)				Basic Load Ratings [N]		Limiting Speeds [min <sup>-1</sup> ]		Bearing Numbers			Abutment and Fillet Dimensions (mm)						Permissible Axial Movement (mm)	Mass (kg) approx.		
		B	r min.	r1 min.	Fw	Cr	Cor	Grease	Oil	NU	NJ	NUP	da min.	db min.	db max.	dc min.	dd min.	Da max.			ra max.	rb 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
	52	18	1	0.6	31.5	35 000	34 500	12 000	14 000	NU2205EM	NJ	NUP	30	29	30	34	37	47	1	0.6	1.2	0.184
	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
	62	24	1.1	1.1	34	57 000	56 000	9 000	11 000	NU2305EM	NJ	NUP	31.5	31.5	32	37	40	55.5	1	1	1.2	0.384
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
	62	20	1	0.6	37.5	49 000	50 000	9 500	12 000	NU2206EM	NJ	NUP	35	34	36	40	44	57	1	0.6	1.2	0.292
	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
	72	27	1.1	1.1	40.5	74 500	77 500	8 000	9 500	NU2306EM	NJ	NUP	36.5	36.5	39	44	48	65.5	1	1	1.2	0.586
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
	72	23	1.1	0.6	44	61 500	65 500	8 500	10 000	NU2207EM	NJ	NUP	41.5	39	42	46	50	65.5	1	0.6	2.2	0.458
	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
	80	31	1.5	1.1	46.2	93 000	101 000	6 700	8 500	NU2307EM	NJ	NUP	43	41.5	44	48	53	72	1.5	1	1.2	0.809
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
	80	23	1.1	1.1	49.5	72 500	77 500	7 500	9 000	NU2208EM	NJ	NUP	46.5	46.5	48	52	56	73.5	1	1	1.2	0.548
	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
	90	33	1.5	1.5	52	114 000	122 000	6 000	7 500	NU2308EM	NJ	NUP	48	48	50	55	60	82	1.5	1.5	1.2	1.08
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
	85	23	1.1	1.1	54.5	76 000	84 500	6 700	8 500	NU2209EM	NJ	NUP	51.5	51.5	52	57	61	78.5	1	1	1.2	0.595
	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
	100	36	1.5	1.5	58.5	137 000	153 000	5 300	6 700	NU2309EM	NJ	NUP	53	53	56	60	66	92	1.5	1.5	1.4	1.46
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
	90	23	1.1	1.1	59.5	83 500	97 000	6 300	8 000	NU2210EM	NJ	NUP	56.5	56.5	57	62	67	83.5	1	1	1.2	0.642
	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
	110	40	2	2	65	163 000	187 000	5 000	6 300	NU2310EM	NJ	NUP	59	59	63	67	73	101	2	2	1.9	1.94
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
	100	25	1.5	1.1	66	101 000	122 000	5 600	7 100	NU2211EM	NJ	NUP	63	61.5	64	68	73	92	1.5	1	1.2	0.881
	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
	120	43	2	2	70.5	201 000	233 000	4 500	5 600	NU2311EM	NJ	NUP	64	64	68	72	80	111	2	2	1.4	2.48

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

d	D	Boundary Dimensions (mm)				F <sub>w</sub>	Basic Load Ratings [N]		Limiting Speeds [min <sup>-1</sup> ]		Bearing Numbers			Abutment and Fillet Dimensions (mm)							Permissible Axial Movement (mm)	Mass (kg) approx.
		B	r min.	r <sub>1</sub> min.			C <sub>r</sub>	C <sub>or</sub>	Grease	Oil	NU	NJ	NUP	d <sub>a</sub> min.	d <sub>b</sub> min.	d <sub>b</sub> max.	d <sub>c</sub> min.	d <sub>d</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.		
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
	110	28	1.5	1.5	72	131 000	157 000	5 300	6 300	NU2212EM	NJ	NUP	68	68	70	75	80	102	1.5	1.5	1.2	1.19
	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
	130	46	2.1	2.1	77	222 000	262 000	4 300	5 300	NU2312EM	NJ	NUP	71	71	75	79	86	119	2	2	1.5	3.08
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
	120	31	1.5	1.5	78.5	149 000	181 000	4 800	6 000	NU2213EM	NJ	NUP	73	73	76	81	87	112	1.5	1.5	1.4	1.58
	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
	140	48	2.1	2.1	82.5	233 000	265 000	3 800	4 800	NU2313EM	NJ	NUP	76	76	80	85	93	129	2	2	1.5	3.67
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
	125	31	1.5	1.5	83.5	156 000	194 000	4 500	5 600	NU2214EM	NJ	NUP	78	78	81	86	92	117	1.5	1.5	1.4	1.67
	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
	150	51	2.1	2.1	89	274 000	325 000	3 600	4 500	NU2314EM	NJ	NUP	81	81	86	92	100	139	2	2	1.5	4.51
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
	130	31	1.5	1.5	88.5	162 000	207 000	4 300	5 300	NU2215EM	NJ	NUP	83	83	86	90	96	122	1.5	1.5	1.4	1.76
	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
	160	55	2.1	2.1	95	330 000	395 000	3 400	4 300	NU2315EM	NJ	NUP	86	86	92	97	106	149	2	2	4.4	5.57
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
	140	33	2	2	95.3	186 000	243 000	4 000	5 000	NU2216EM	NJ	NUP	89	89	92	97	104	131	2	2	1.4	2.18
	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
	170	58	2.1	2.1	101	355 000	430 000	3 200	4 000	NU2316EM	NJ	NUP	91	91	98	105	114	159	2	2	1.5	6.57
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
	150	36	2	2	100.5	217 000	279 000	3 800	4 500	NU2217EM	NJ	NUP	94	94	98	104	110	141	2	2	1.3	2.75
	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
	180	60	3	3	108	395 000	485 000	3 000	3 800	NU2317EM	NJ	NUP	98	98	105	110	119	167	2.5	2.5	1.5	7.69
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
	160	40	2	2	107	242 000	315 000	3 600	4 300	NU2218EM	NJ	NUP	99	99	104	109	116	151	2	2	1.9	3.5
	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
	190	64	3	3	113.5	435 000	535 000	2 800	3 400	NU2318EM	NJ	NUP	103	103	111	117	127	177	2.5	2.5	3.0	9.08
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
	170	43	2.1	2.1	112.5	286 000	370 000	3 400	4 000	NU2219EM	NJ	NUP	106	106	110	116	123	159	2	2	1.4	4.29
	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
	200	67	3	3	121.5	460 000	585 000	2 600	3 400	NU2319EM	NJ	NUP	108	108	118	124	134	187	2.5	2.5	1.5	10.6
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
	180	46	2.1	2.1	119	335 000	445 000	3 200	3 800	NU2220EM	NJ	NUP	111	111	116	122	130	169	2	2	1.4	5.23
	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
	215	73	3	3	127.5	570 000	715 000	2 400	3 000	NU2320EM	NJ	NUP	113	113	124	132	143	202	2.5	2.5	1.8	13.4
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
	190	50	2.1	2.1	125	350 000	455 000	3 000	3 600	NU2221EM	NJ	NUP	116	116	121	129	137	179	2	2	1.4	6.32
	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
	225	77	3	3	133	635 000	805 000	2 300	3 000	NU2321EM	NJ	NUP	118	118	131	137	149	212	2.5	2.5	1.8	15.5
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
	240	80	3	3	143	675 000	880 000	2 200	2 800	NU2322EM	NJ	NUP	123	123	139	145	158	227	2.5	2.5	3.3	18.8

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

d	D	Boundary Dimensions (mm)				F <sub>w</sub>	Basic Load Ratings [N]		Limiting Speeds [min <sup>-1</sup> ]		Bearing Numbers			Abutment and Fillet Dimensions (mm)						Permissible Axial Movement (mm)	Mass (kg) approx.	
		B	r min.	r <sub>1</sub> min.			C <sub>r</sub>	C <sub>or</sub>	Grease	Oil	NU	NJ	NUP	d <sub>a</sub> min.	d <sub>b</sub> min.	d <sub>b</sub> max.	d <sub>c</sub> min.	d <sub>d</sub> min.	D <sub>a</sub> max.			r <sub>a</sub> max.
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
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

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