



Complex bearings



TECHNICAL SUPPLEMENT

T122 - 123

PRODUCT INFORMATION

P124 - 131



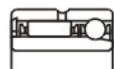
NKX, NKX..Z

P124 - 125



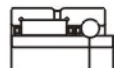
NKXR, NKXR..Z

P126 - 127



NKIA 59

P128 - 129



NKIB 59

P130 - 131

1. Bearing materials

Depending on the thrust bearing type that is combined with a radial needle roller bearing, **SLB** Complex Bearings can be categorized as thrust ball bearings (series NKX), thrust cylindrical roller bearings (series NKXR). The series NKX and NKXR complex bearings can carry a relatively large axial load in one direction and can be axially located.

When used in opposing pairs, they can bear an axial load in both directions and can be axially located. However, because they cannot accommodate a greater axial expansion, they should be mounted on a shorter shaft whose axial expansion is small.

The variant with a dust-proofing cover on its thrust bearing (suffix Z) is easily handled because the thrust bearing is a non-separable type. This arrangement can also prevent splashing of the grease within the thrust bearing.

Generally, radial needle roller bearings in these complex bearings use a shaft as a raceway surface, without using an inner ring. However, they can incorporate an inner ring when a shaft is inappropriate as a raceway surface.

The tolerance class of the inscribed enveloping circle diameter (F_w) with needle roller bearings is class F6, the same as with machined ring needle roller bearings.

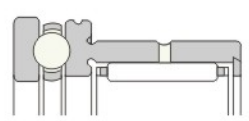


Fig. 1 Series NKX

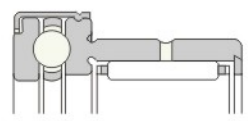


Fig. 2 Series NKX..Z

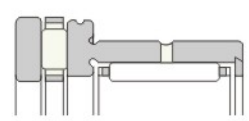


Fig. 3 Series NKXR

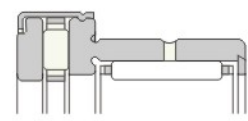


Fig. 4 Series NKXR..Z

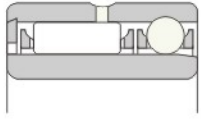


Fig. 5 Series NKIA

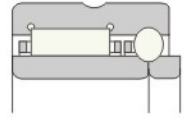
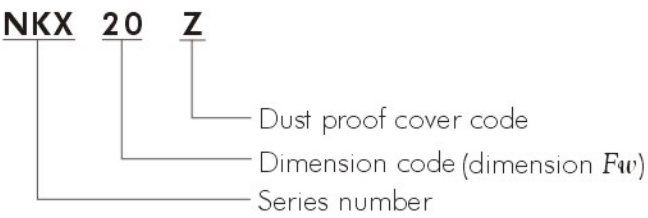


Fig. 6 Series NKIB

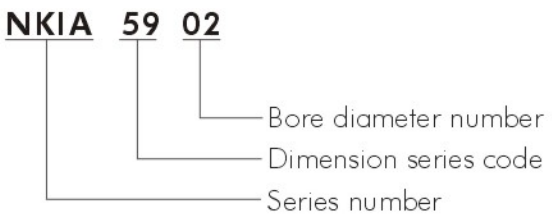
2. Interpreting bearing numbers

The bearing numbers of **SLB** Complex Bearings comprise a series number, dimension series code, Dimension code, and suffix.

Series NKX, NKXR



Series NKIA, NKIB



3. Bearing fits

Table 1 summarizes the fits of radial needle roller bearings to a shaft and housing. The thrust bearing washers of series NKX and NKXR bearings are installed in a housing whose bore diameter is at least 0.5 mm larger than the outside diameter D_1 or D_2 of the bearing washer.

Table 1 Fit to shaft and housing

Bearing number	Shaft	Housing
Series NKX, NKXR	k5	K6(M6)
Series NKIA, NKIB	k5	M6

Remarks: Fits appearing in parentheses are for applications requiring greater rigidity.

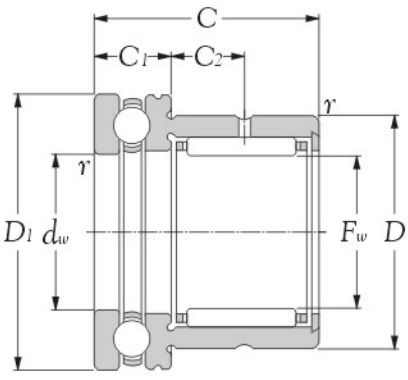
4. Rating life calculation

The rating life (L) of a complex bearings can be determined by inputting the results of the following calculations into the formula below:

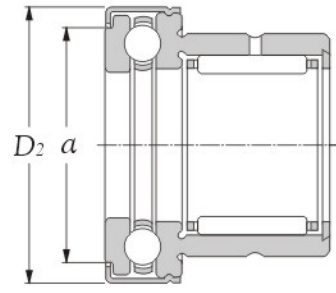
Calculate the rating life (L_r) of the radial needle roller bearing according to the working radial load.

Calculate the rating life (L_a) of the thrust bearing according to the working axial load.

$$L = \frac{1}{\left(\frac{1}{L_r^{1.1}} + \frac{1}{L_a^{1.1}}\right)^{0.91}} \dots\dots\dots(1)$$



Type NKX
(Open type)



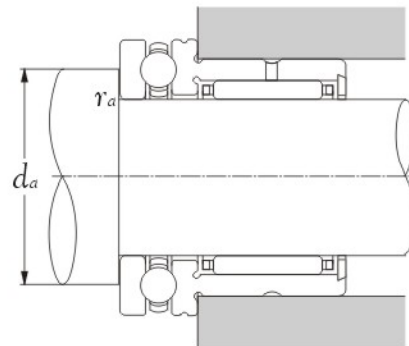
Type NKX.Z
(With cover)

Inner bore F_w mm	Bearing number		Boundary dimensions (mm)										Basic load ratings (Radial)			
			d_w	D	D_1	D_2	C _{-0.25} ⁰	C_1 _{-0.20} ⁰	C_2	a	$r_s \text{ min}^{(1)}$	dynamic C	static Co N	dynamic C kgf	static Co kgf	
10 ^{+0.022} _{-0.013}	NKX 10	NKX 10 Z	10 ^{+0.040} _{+0.025}	19	24	25.0	23	9	6.5	19.7	0.3	5450	6450	555	660	
12 ^{+0.027} _{+0.016}	NKX 12	NKX 12 Z	12 ^{+0.050} _{+0.032}	21	26	27.0	23	9	6.5	21.7	0.3	6000	7700	615	785	
15 ^{+0.027} _{+0.016}	NKX 15	NKX 15 Z	15 ^{+0.050} _{+0.032}	24	28	29.0	23	9	6.5	23.7	0.3	8250	10200	840	1040	
17 ^{+0.027} _{+0.016}	NKX 17	NKX 17 Z	17 ^{+0.050} _{+0.032}	26	30	31.0	25	9	8.0	25.7	0.3	10400	14400	1060	1460	
20 ^{+0.033} _{+0.020}	NKX 20	NKX 20 Z	20 ^{+0.061} _{+0.040}	30	35	36.0	30	10	10.5	30.7	0.3	16400	27100	1670	2760	
25 ^{+0.033} _{+0.020}	NKX 25	NKX 25 Z	25 ^{+0.061} _{+0.040}	37	42	43.0	30	11	9.5	37.7	0.6	14200	24000	1450	2450	
30 ^{+0.033} _{+0.020}	NKX 30	NKX 30 Z	30 ^{+0.061} _{+0.040}	42	47	48.0	30	11	9.5	42.7	0.6	22300	39500	2280	4000	
35 ^{+0.041} _{+0.025}	NKX 35	NKX 35 Z	35 ^{+0.075} _{+0.050}	47	52	53.0	30	12	9.0	47.7	0.6	20000	36000	2040	3650	
40 ^{+0.041} _{+0.025}	NKX 40	NKX 40 Z	40 ^{+0.075} _{+0.050}	52	60	61.0	32	13	10.0	55.7	0.6	25900	52500	2650	5350	
45 ^{+0.041} _{+0.025}	NKX 45	NKX 45 Z	45 ^{+0.075} _{+0.050}	58	65	66.5	32	14	9.0	60.5	0.6	27600	59000	2810	6000	
50 ^{+0.041} _{+0.025}	NKX 50	NKX 50 Z	50 ^{+0.075} _{+0.050}	62	70	71.5	35	14	10.0	65.5	0.6	27900	62000	2850	6300	
60 ^{+0.049} _{+0.030}	NKX 60	NKX 60 Z	60 ^{+0.090} _{+0.060}	72	85	86.5	40	17	12.0	80.5	1.0	29800	71500	3050	7300	
70 ^{+0.049} _{+0.030}	NKX 70	NKX 70 Z	70 ^{+0.090} _{+0.060}	85	95	96.5	40	18	11.0	90.5	1.0	36500	86000	3700	8750	

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r .

Technical supplement

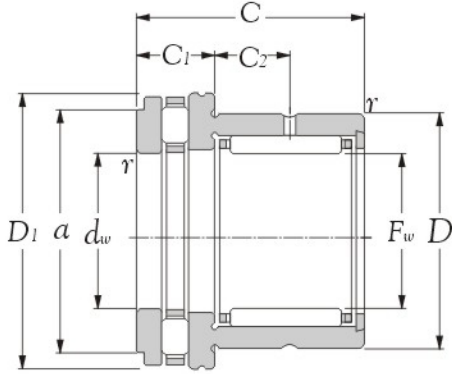
	Cages	Precision	Grease
	Steel - <input checked="" type="checkbox"/>		
	Polymid - <input checked="" type="checkbox"/>	Normal (ISO)	Nil
	Brass - <input checked="" type="checkbox"/>		



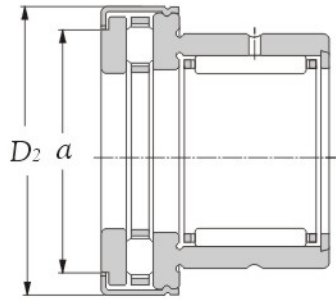
dynamic C	Basic load ratings (Axial)		dynamic C	static Co	Max runout speed		Abutment dimensions		Weight kg.	
	static Co	dynamic C			grease	oil	d_a <i>min</i>	r_{as} <i>max</i>	Type NKX	Type NKX..Z
N		kgf			r/min					
10000	14000	1020	1420		6700	9500	18	0.3	0.037	0.039
10300	15400	1050	1570		6400	9200	20	0.3	0.042	0.044
10500	16800	1070	1710		6200	8800	23	0.3	0.044	0.048
10800	18200	1100	1850		6000	8500	25	0.3	0.051	0.056
14200	24700	1450	2520		5200	7500	29	0.3	0.085	0.090
19600	37000	1990	3800		4600	6500	35	0.6	0.125	0.132
20400	42000	2080	4300		4300	6200	40	0.6	0.140	0.148
20400	44500	2080	4550		3900	5600	45	0.6	0.167	0.175
26900	63000	2740	6400		3500	5000	52	0.6	0.216	0.225
27900	69000	2840	7050		3200	4600	57	0.6	0.252	0.265
28800	75500	2930	7700		3100	4500	62	0.6	0.302	0.318
41500	113000	4200	11500		2600	3700	75	1.0	0.465	0.484
43000	127000	4400	12900		2400	3400	85	1.0	0.612	0.635



NEEDLE ROLLER BEARINGS WITH THRUST
CYLINDRICAL ROLLER BEARINGS



Type NKXR
(Open type)



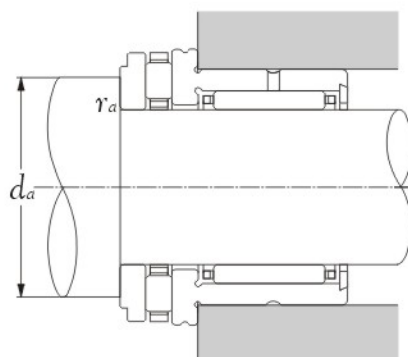
Type NKXR.Z
(With cover)

Inner bore F_w mm	Bearing number		Boundary dimensions (mm)									Basic load ratings (Radial)			
			d_w	D	D_1	D_2	C _{0 -0.25}	C_1 _{0 -0.20}	C_2	a	r s min ¹	dynamic C	static Co	dynamic C	static Co
15 ^{+0.027} _{+0.016}	NKXR 15	NKXR 15 Z	15 ^{+0.030} _{+0.032}	24	28	29.0	23	9	6.5	23.7	0.3	8250	10200	840	1040
17 ^{+0.027} _{+0.016}	NKXR 17	NKXR 17 Z	17 ^{+0.030} _{+0.032}	26	30	31.0	25	9	8.0	25.7	0.3	10400	14400	1060	1460
20 ^{+0.033} _{+0.030}	NKXR 20	NKXR 20 Z	20 ^{+0.061} _{+0.040}	30	35	36.0	30	10	10.5	30.7	0.3	16400	27100	1670	2760
25 ^{+0.033} _{+0.030}	NKXR 25	NKXR 25 Z	25 ^{+0.061} _{+0.040}	37	42	43.0	30	11	9.5	37.7	0.6	14200	24000	1450	2450
30 ^{+0.033} _{+0.030}	NKXR 30	NKXR 30 Z	30 ^{+0.061} _{+0.040}	42	47	48.0	30	11	9.5	42.7	0.6	22300	39500	2280	4000
35 ^{+0.041} _{+0.025}	NKXR 35	NKXR 35 Z	35 ^{+0.075} _{+0.050}	47	52	53.0	30	12	9.0	47.7	0.6	20000	36000	2040	3650
40 ^{+0.041} _{+0.025}	NKXR 40	NKXR 40 Z	40 ^{+0.075} _{+0.050}	52	60	61.0	32	13	10.0	55.7	0.6	25900	52500	2650	5350
45 ^{+0.041} _{+0.025}	NKXR 45	NKXR 45 Z	45 ^{+0.075} _{+0.050}	58	65	66.5	32	14	9.0	60.5	0.6	27600	59000	2810	6000
50 ^{+0.041} _{+0.025}	NKXR 50	NKXR 50 Z	50 ^{+0.075} _{+0.050}	62	70	71.5	35	14	10.0	65.5	0.6	27900	62000	2850	6300

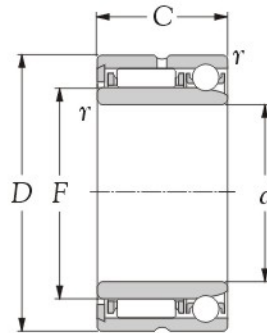
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r .

Technical supplement

	Cages	Precision	Grease
	Steel - <input checked="" type="checkbox"/>		
	Polymid - <input type="checkbox"/>	Normal (ISO)	Nil
	Brass - <input type="checkbox"/>		



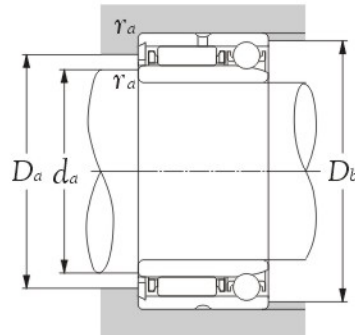
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	static Co	dynamic C			grease	oil	d_a min	r_{as} max	Type NKXR	Type NKXR.Z
N		kgf			r/min					
12900	28600	1310	2920	2800	11000	25	0.3	0.048	0.052	
13400	31000	1370	3150	2500	10000	27	0.3	0.050	0.053	
20200	46500	2060	4700	2100	8500	32	0.3	0.090	0.095	
27300	68000	2780	6900	1800	7000	39	0.6	0.128	0.135	
27800	72500	2840	7400	1500	6000	44	0.6	0.162	0.169	
31000	87000	3150	8900	1400	5500	49	0.6	0.184	0.195	
43000	121000	4350	12400	1200	4800	56	0.6	0.226	0.237	
45500	135000	4650	13800	1100	4400	61	0.6	0.267	0.286	
48000	150000	4900	15300	1000	4000	66	0.6	0.309	0.329	



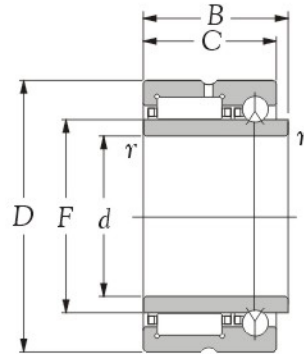
Inner bore <i>d</i> mm	Bearing number	Boundary dimensions				Basic load ratings (Radial)			
		<i>D</i>	<i>C</i>	<i>F</i>	<i>r</i> min ¹⁾	dynamic <i>C</i> N	static <i>C</i> ₀	dynamic <i>C</i> kgf	static <i>C</i> ₀
15	NKIA 5902	28	18	20	0.3	9500	13400	970	1370
17	NKIA 5903	30	18	22	0.3	10100	14900	1030	1520
20	NKIA 5904	37	23	25	0.3	16500	22100	1680	2250
22	NKIA 59/22	39	23	28	0.3	17500	24800	1790	2530
25	NKIA 5905	42	23	30	0.3	17400	25000	1770	2550
30	NKIA 5906	47	23	35	0.3	19400	30500	1980	3100
35	NKIA 5907	55	27	42	0.6	25700	46000	2630	4700
40	NKIA 5908	62	30	48	0.6	31000	61000	3150	6250
45	NKIA 5909	68	30	55	0.6	33000	69500	3350	7100
50	NKIA 5910	72	30	60	0.6	33500	73500	3450	7500
55	NKIA 5911	80	34	63	1.0	44500	95500	4500	9700
60	NKIA 5912	85	34	68	1.0	45500	101000	4600	10300
65	NKIA 5913	90	34	75	1.0	46000	106000	4700	10800
70	NKIA 5914	100	40	80	1.0	62500	146000	6350	14900

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
Cages	Precision	Grease	
Steel - <input checked="" type="checkbox"/>	Normal (ISO)	Nil	
Polymid - <input type="checkbox"/>			
Brass - <input type="checkbox"/>			



dynamic C	Basic load ratings (Axial)		dynamic C	static Co	Max runout speed		Abutment dimensions				Weight kg(s).
	static Co	dynamic C			grease	oil	d_a <i>min</i>	D_a <i>max</i>	D_b <i>max</i>	r_a <i>max</i>	
N		kgf			r/min						
2340	3050	239	310	13000	20000	17.5	22.0	25.5	0.3	0.050	
2530	3550	258	360	12000	18000	19.5	24.0	27.5	0.3	0.056	
4700	6150	480	625	11000	16000	22.5	28.0	34.5	0.3	0.111	
4900	6750	500	690	9500	14000	24.5	31.0	36.5	0.3	0.120	
5100	7350	520	750	8500	13000	27.5	33.0	39.5	0.3	0.130	
5400	8550	550	870	7500	11000	32.5	38.0	44.5	0.3	0.147	
7400	12300	755	1260	6500	9500	40.0	45.0	50.0	0.6	0.243	
7750	14000	790	1430	5500	8500	45.0	51.0	57.0	0.6	0.347	
8500	17100	870	1740	5000	7500	50.0	58.0	63.0	0.6	0.401	
8800	18700	900	1910	4300	6500	55.0	63.0	67.0	0.6	0.410	
14300	33000	1460	3350	4300	6500	61.0	66.5	74.0	1.0	0.590	
14800	36000	1510	3650	4000	6000	66.0	71.5	79.0	1.0	0.632	
15200	39000	1550	4000	3700	5500	71.0	78.5	84.0	1.0	0.708	
18600	47500	1890	4850	3300	5000	76.0	84.0	94.0	1.0	1.050	

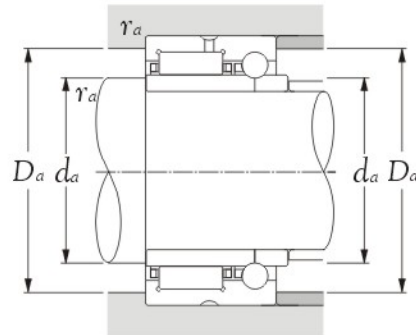


Inner bore <i>d</i> mm	Bearing number	Boundary dimensions					Basic load ratings (Radial)			
		<i>D</i>	<i>B</i>	<i>C</i>	<i>F</i>	<i>r</i> 's min ¹⁾	dynamic <i>C</i> N	static <i>C</i> ₀	dynamic <i>C</i> kgf	static <i>C</i> ₀
15	NKIB 5902	28	20	18	20	0.3	10800	13600	1100	1390
17	NKIB 5903	30	20	18	22	0.3	11200	14600	1140	1490
20	NKIB 5904	37	25	23	25	0.3	21300	25500	2170	2600
22	NKIB 59/22	39	25	23	28	0.3	23200	29300	2360	2990
25	NKIB 5905	42	25	23	30	0.3	24000	31500	2450	3200
30	NKIB 5906	47	25	23	35	0.3	25500	35500	2600	3600
35	NKIB 5907	55	30	42	42	0.6	32000	50000	3300	5100
40	NKIB 5908	62	34	48	28	0.6	43500	66500	4450	6800
45	NKIB 5909	68	34	52	52	0.6	46000	73000	4700	7450
50	NKIB 5910	72	34	58	58	0.6	48000	80000	4900	8150
55	NKIB 5911	80	38	63	63	1.0	58500	99500	6000	10100
60	NKIB 5912	85	38	68	68	1.0	61500	108000	6250	11000
65	NKIB 5913	90	38	72	72	1.0	62500	112000	6350	11400
70	NKIB 5914	100	45	80	80	1.0	85500	156000	8750	15900

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement

Cages	Precision	Grease
Steel -	✓	
Polymid -	X	Normal (ISO)
Brass -	X	



dynamic C	Basic load ratings (Axial)		dynamic C	static Co	Max runout speed		Abutment dimensions			Weight kg.
	static Co	dynamic C			grease	oil	d_a <i>min</i>	D_a <i>max</i>	r_a <i>max</i>	
N		kgf			r/min					
2750	4200	280	430	13000	20000	17.5	25.5	0.3	0.052	
2960	4900	300	495	12000	18000	19.5	27.5	0.3	0.058	
4650	7400	475	755	11000	16000	22.5	34.5	0.3	0.107	
5000	8650	510	880	9500	14000	24.5	36.5	0.3	0.122	
5150	9250	525	945	8500	13000	27.5	39.5	0.3	0.134	
5600	11200	570	1140	7500	11000	32.5	44.5	0.3	0.151	
7050	14900	720	1520	6500	9500	40.0	50.0	0.6	0.247	
8700	19400	890	1980	5500	8500	45.0	57.0	0.6	0.320	
9100	21400	925	2180	5000	7500	50.0	63.0	0.6	0.380	
9600	24300	980	2480	4300	6500	55.0	67.0	0.6	0.385	
11400	29400	1170	3000	4300	6500	61.0	74.0	1.0	0.555	
11800	32000	1200	3250	4000	6000	66.0	79.0	1.0	0.595	
12100	34000	1240	3500	3700	5500	71.0	84.0	1.0	0.640	
15900	44500	1620	4550	3300	5000	76.0	94.0	1.0	0.985	