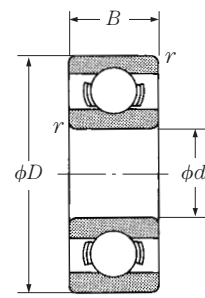




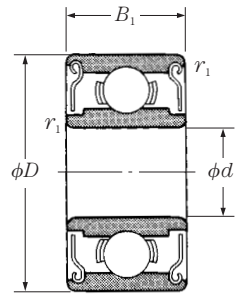
Bearing Tables
CONTENTS

	Page
Deep groove ball bearings	
Single-row deep groove ball bearings	32 – 37
Metric series Bore diameter 1 – 9 mm	32 – 35
Inch series Bore diameter 1.016 – 9.525 mm	36 – 37
Deep groove ball bearings with flanged outer ring	38 – 43
Metric series Bore diameter 1 – 9 mm	38 – 41
Inch series Bore diameter 1.191 – 9.525 mm	42 – 43
Deep groove ball bearings with extended inner ring	44 – 45
Inch series Bore diameter 1.191 – 7.938 mm	
Deep groove ball bearings with extended inner ring, flanged	46 – 47
Inch series Bore diameter 1.191 – 7.938 mm	
Ball bearings for synchros	48 – 49
Inch series Bore diameter 1.984 – 6.350 mm	
Extra-thin-section deep groove ball bearings	50 – 51
Metric series Bore diameter 10 – 15 mm	
Angular contact ball bearings	
Metric series Bore diameter 4 – 9 mm	50 – 51

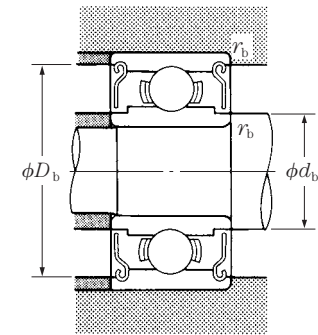
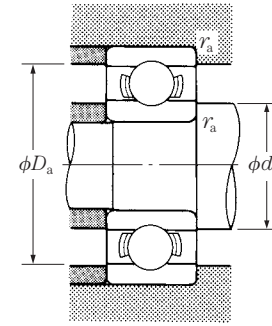
Metric series
600, MR
Bore diameter
1 – 4 mm



Open type



Shielded type
ZZ · ZZ1



d	Boundary dimensions (mm)					Basic load ratings (N)				Limiting speeds (min ⁻¹)		Bearing numbers			Abutment and fillet dimensions (mm)						Mass (g)		Basic bearing numbers	Actual size ⁽²⁾			
	D	B	B ₁	r ⁽¹⁾ min.	r ₁ ⁽¹⁾ min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z · ZZ	Oil Open Z	Open	Shielded	Seals	d _a min.	d _b max.	D _a max.	D _b min.	r _a max.	r _b max.	Open approx.	Shielded approx.					
1	3	1	—	0.05	—	80	23	8	2.5	130 000	150 000	681	—	—	—	1.4	—	2.6	—	0.05	—	0.03	—	681 MR 31 691			
	3	1.5	—	0.05	—	80	23	8	2.5	130 000	150 000	MR 31	—	—	—	1.4	—	2.6	—	0.05	—	0.04	—				
	4	1.6	—	0.1	—	138	35	14	3.5	100 000	120 000	691	—	—	—	1.8	—	3.2	—	0.1	—	0.09	—				
1.2	4	1.8	2.5	0.1	0.1	138	35	14	3.5	110 000	130 000	MR 41 X	MR 41 XZZ	—	—	2.0	1.9	3.2	3.5	0.1	0.1	0.10	0.14	MR 41 X			
1.5	4	1.2	2	0.05	0.05	112	33	11	3.5	100 000	120 000	681 X	681 XZZ	—	—	1.9	2.1	3.6	3.6	0.05	0.05	0.07	0.11	681 X 691 X 601 X			
	5	2	2.6	0.15	0.15	237	69	24	7	85 000	100 000	691 X	691 XZZ	—	—	2.7	2.5	3.8	4.3	0.15	0.15	0.17	0.20				
	6	2.5	3	0.15	0.15	330	98	34	10	75 000	90 000	601 X	601 XZZ	—	—	2.7	3.0	4.8	5.4	0.15	0.15	0.33	0.38				
2	5	1.5	2.3	0.08	0.08	169	50	17	5	85 000	100 000	682	682 ZZ	—	—	2.6	2.7	4.4	4.2	0.08	0.08	0.12	0.17	682 MR 52 B 692			
	5	2	2.5	0.1	0.1	187	58	19	6	85 000	100 000	MR 52 B	MR 52 BZZ	—	—	2.8	2.7	4.2	4.4	0.1	0.1	0.16	0.23				
	6	2.3	3	0.15	0.15	330	98	34	10	75 000	90 000	692	692 ZZ	—	—	3.2	3.0	4.8	5.4	0.15	0.15	0.28	0.38				
2.5	6	2.5	2.5	0.15	0.15	330	98	34	10	75 000	90 000	MR 62	MR 62 ZZ	—	—	3.2	3.0	4.8	5.4	0.15	0.15	0.30	0.29	MR 62 MR 72 602 682 X 692 X			
	7	2.5	3	0.15	0.15	385	127	39	13	63 000	75 000	MR 72	MR 72 ZZ	—	—	3.2	3.8	5.8	6.2	0.15	0.15	0.45	0.49				
	7	2.8	3.5	0.15	0.15	385	127	39	13	63 000	75 000	602	602 ZZ	—	—	3.2	3.8	5.8	6.2	0.15	0.15	0.51	0.58				
	6	1.8	2.6	0.08	0.08	208	74	21	7.5	71 000	80 000	682 X	682 XZZ	—	—	3.1	3.7	5.4	5.4	0.08	0.08	0.23	0.29				
	7	2.5	3.5	0.15	0.15	385	127	39	13	63 000	75 000	692 X	692 XZZ	—	—	3.7	3.8	5.8	6.2	0.15	0.15	0.41	0.55				
3	8	2.5	—	0.2	—	560	179	57	18	60 000	67 000	MR 82 X	—	—	4.1	—	6.4	—	0.2	—	0.56	—	MR 82 X 602 X				
	8	2.8	4	0.15	0.15	550	175	56	18	60 000	71 000	602 X	602 XZZ	—	—	3.7	4.1	6.8	7.0	0.15	0.15	0.63			0.83		
	6	2	2.5	0.1	0.1	208	74	21	7.5	71 000	80 000	MR 63	MR 63 ZZ	—	—	3.8	3.7	5.2	5.4	0.1	0.1	0.20			0.27		
3	7	2	3	0.1	0.1	390	130	40	13	63 000	75 000	683 A	683 AZZ	—	—	3.8	4.0	6.2	6.4	0.1	0.1	0.32	0.45	MR 63 683 A MR 83 693 MR 93 603 623 633			
	8	2.5	—	0.15	—	560	179	57	18	60 000	67 000	MR 83	—	—	—	—	6.8	—	0.15	—	0.54	—					
	8	3	4	0.15	0.15	560	179	57	18	60 000	67 000	693	693 ZZ	—	—	4.2	4.3	6.8	7.3	0.15	0.15	0.61	0.83				
	9	2.5	4	0.2	0.15	570	187	58	19	56 000	67 000	MR 93	MR 93 ZZ	—	—	4.6	4.3	7.4	7.9	0.2	0.15	0.73	1.18				
	9	3	5	0.15	0.15	570	187	58	19	56 000	67 000	603	603 ZZ	—	—	4.2	4.3	7.8	7.9	0.15	0.15	0.87	—				
	10	4	4	0.15	0.15	630	218	64	22	50 000	60 000	623	623 ZZ	—	—	4.2	4.3	8.8	8.0	0.15	0.15	1.65	1.66				
	13	5	5	0.2	0.2	1 300	485	133	49	40 000	48 000	633	633 ZZ	—	—	4.6	6.0	11.4	11.3	0.2	0.2	3.38	3.33				
	4	7	2	—	0.1	—	310	115	32	12	60 000	67 000	MR 74	—	—	—	—	6.2	—	0.1	—	0.22	—			MR 74 MR 74 MR 84 684 A MR 104 B 694 604 624 634	
		7	—	2.5	—	0.1	255	107	26	11	60 000	71 000	—	MR 74 ZZ	—	—	—	4.8	—	6.3	—	0.1	—				
8		2	3	0.15	0.1	395	139	40	14	56 000	67 000	MR 84	MR 84 ZZ	—	—	5.2	5.0	6.8	7.4	0.15	0.1	0.36	0.56				
9		2.5	4	(0.15)	(0.15)	640	225	65	23	53 000	63 000	684 A	684 AZZ	—	—	4.8	5.2	8.2	8.1	0.1	0.1	0.63	1.01				
10		3	4	0.2	0.15	710	270	73	28	50 000	60 000	MR 104 B	MR 104 BZZ	—	—	5.6	5.9	8.4	8.8	0.2	0.15	1.04	1.42				
11		4	4	0.15	0.15	960	345	98	35	48 000	56 000	694	694 ZZ	—	—	5.2	5.6	9.8	9.9	0.15	0.15	1.7	1.75				
12	4	4	0.2	0.2	960	345	98	35	48 000	56 000	604	604 ZZ	—	—	5.6	5.6	10.4	9.9	0.2	0.2	2.25	2.29					
13	5	5	0.2	0.2	1 300	485	133	49	40 000	48 000	624	624 ZZ	—	—	5.6	6.0	11.4	11.3	0.2	0.2	3.03	3.04					
16	5	5	0.3	0.3	1 730	670	177	68	36 000	43 000	634	634 ZZ1	—	—	6.0	7.5	14.0	13.8	0.3	0.3	5.24	5.21					

Notes (1) The values in parentheses are not based on ISO 15.

(2) Actual dimensions of bore and outside diameter only.

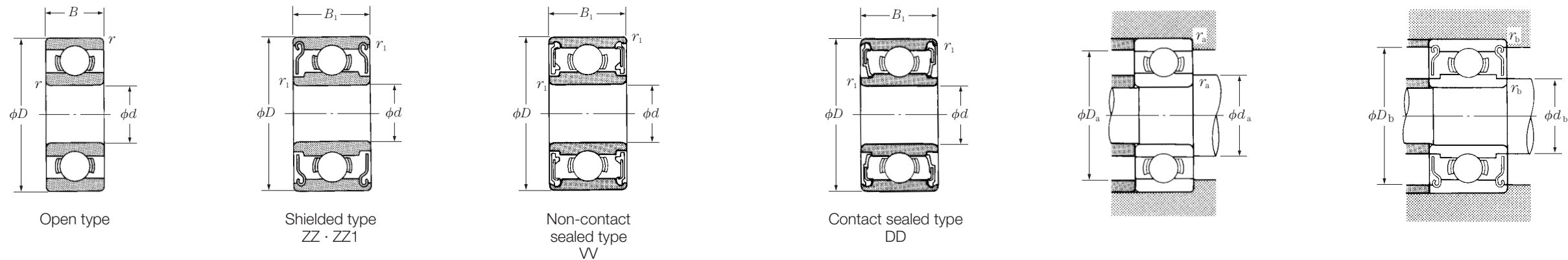
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
 2. Bearings with double shields (ZZ, ZZ1) are also available with single shields (Z, Z1).

Metric series

600, MR

Bore diameter

5 – 9 mm



d	Boundary dimensions (mm)					Basic load ratings (N) / {kgf}				Limiting speeds (min ⁻¹)			Bearing numbers			Abutment and fillet dimensions (mm)						Mass (g)		Basic bearing numbers	Actual size ⁽²⁾				
	D	B	B ₁	r ⁽¹⁾ min.	r ₁ ⁽¹⁾ min.	C _r	C _{or}	C _r	C _{or}	Open Z·ZZ V·W	D·DD	Oil Open Z	Open	Shielded	Seales	d _a min.	d _b max.	D _a max.	D _b min.	r _a max.	r _b max.	Open approx.	Shielded approx.						
5	8	2	—	0.1	—	310	120	31	12	53 000	—	63 000	MR 85	—	—	—	—	—	—	—	—	—	—	0.26	—	MR 85 MR 85 MR 95 MR 105 MR 115 685 695 605 625 635 MR 106 MR 126 686 A 696 606 626 636 MR 117 MR 137 687 697 607 627 637 MR 128 MR 148 688 A 698 608 628 638 689 699 609 629 639			
	8	—	2.5	—	0.1	278	131	28	13	53 000	—	63 000	—	MR 85 ZZ	—	—	—	5.8	5.8	—	7.4	—	0.1	—	—			0.34	—
	9	2.5	3	0.15	0.15	430	168	44	17	50 000	—	60 000	MR 95	MR 95 ZZ1	—	—	6.2	6.0	7.8	8.2	0.15	0.15	0.50	0.58	—			—	
	10	3	4	0.15	0.15	430	168	44	17	50 000	—	60 000	MR 105	MR 105 ZZ	—	—	6.2	6.0	8.8	8.4	0.15	0.15	0.95	1.29	—			—	
	11	—	4	—	0.15	715	276	73	28	48 000	—	56 000	—	MR 115 ZZ	VV	—	—	—	6.3	—	9.8	—	0.15	—	—			1.5	—
	11	3	5	0.15	0.15	715	281	73	29	45 000	—	53 000	685	685 ZZ	—	—	6.2	6.2	9.8	9.9	0.15	0.15	1.2	1.96	—			—	
	13	4	4	0.2	0.2	1 080	430	110	44	43 000	40 000	50 000	695	695 ZZ1	VV	DD	6.6	6.6	11.4	11.2	0.2	0.2	2.45	2.5	—			—	
	14	5	5	0.2	0.2	1 330	505	135	52	40 000	38 000	50 000	605	605 ZZ	—	DD	6.6	6.9	12.4	12.2	0.2	0.2	3.54	3.48	—			—	
	16	5	5	0.3	0.3	1 730	670	177	68	36 000	32 000	43 000	625	625 ZZ1	VV	DD	7.0	7.5	14.0	13.8	0.3	0.3	4.95	4.86	—			—	
	19	6	6	0.3	0.3	2 340	885	238	90	32 000	30 000	40 000	635	635 ZZ1	VV	DD	7.0	8.5	17.0	16.5	0.3	0.3	8.56	8.34	—			—	
6	10	2.5	3	0.15	0.1	495	218	51	22	45 000	—	53 000	MR 106	MR 106 ZZ1	—	—	7.2	7.0	8.8	9.3	0.15	0.1	0.56	0.68	MR 106 MR 126 686 A 696 606 626 636 MR 117 MR 137 687 697 607 627 637 MR 128 MR 148 688 A 698 608 628 638 689 699 609 629 639				
	12	3	4	0.2	0.15	715	292	73	30	43 000	40 000	50 000	MR 126	MR 126 ZZ	—	DD	7.6	7.2	10.4	10.9	0.2	0.15	1.27	1.74			—	—	
	13	3.5	5	0.15	0.15	1 080	440	110	45	40 000	38 000	50 000	686 A	686 A ZZ	VV	DD	7.2	7.4	11.8	11.7	0.15	0.15	1.91	2.69			—	—	
	15	5	5	0.2	0.2	1 730	670	177	68	40 000	36 000	45 000	696	696 ZZ1	VV	DD	7.6	7.9	13.4	13.3	0.2	0.2	3.88	3.72			—	—	
	17	6	6	0.3	0.3	2 260	835	231	85	38 000	34 000	45 000	606	606 ZZ	VV	DD	8.0	8.2	15.0	14.8	0.3	0.3	5.97	6.08			—	—	
	19	6	6	0.3	0.3	2 340	885	238	90	32 000	30 000	40 000	626	626 ZZ1	VV	DD	8.0	8.5	17.0	16.5	0.3	0.3	8.15	7.94			—	—	
7	11	2.5	3	0.15	0.1	455	201	47	21	43 000	—	50 000	MR 117	MR 117 ZZ	—	—	8.2	8.0	9.8	10.5	0.15	0.1	0.62	0.72	MR 117 MR 137 687 697 607 627 637 MR 128 MR 148 688 A 698 608 628 638 689 699 609 629 639				
	13	3	4	0.2	0.15	540	276	55	28	40 000	—	48 000	MR 137	MR 137 ZZ	—	—	8.6	9.0	11.4	11.6	0.2	0.15	1.58	2.02			—	—	
	14	3.5	5	0.15	0.15	1 170	510	120	52	40 000	34 000	45 000	687	687 ZZ1	VV	DD	8.2	8.5	12.8	12.7	0.15	0.15	2.13	2.97			—	—	
	17	5	5	0.3	0.3	1 610	710	164	73	36 000	28 000	43 000	697	697 ZZ1	VV	DD	9.0	10.2	15.0	14.8	0.3	0.3	5.26	5.12			—	—	
	19	6	6	0.3	0.3	2 340	885	238	90	36 000	32 000	43 000	607	607 ZZ1	VV	DD	9.0	9.1	17.0	16.5	0.3	0.3	7.67	7.51			—	—	
8	12	2.5	3.5	0.15	0.1	545	274	56	28	40 000	—	48 000	MR 128	MR 128 ZZ1	—	—	9.2	9.0	10.8	11.3	0.15	0.1	0.71	0.97	MR 128 MR 148 688 A 698 608 628 638 689 699 609 629 639				
	14	3.5	4	0.2	0.15	820	385	83	39	38 000	32 000	45 000	MR 148	MR 148 ZZ	VV	DD	9.6	9.2	12.4	12.8	0.2	0.15	1.86	2.16			—	—	
	16	4	5	0.2	0.2	1 610	710	164	73	36 000	28 000	43 000	688 A	688 A ZZ1	VV	DD	9.6	10.2	14.4	14.2	0.2	0.2	3.12	4.02			—	—	
	19	6	6	0.3	0.3	2 240	910	228	93	36 000	28 000	43 000	698	698 ZZ	VV	DD	10.0	10.0	17.0	16.5	0.3	0.3	7.23	7.18			—	—	
	22	7	7	0.3	0.3	3 300	1 370	335	140	34 000	28 000	40 000	608	608 ZZ	VV	DD	10.0	10.5	20.0	19.0	0.3	0.3	12.1	12.2			—	—	
	24	8	8	0.3	0.3	3 350	1 430	340	146	28 000	24 000	34 000	628	628 ZZ	VV	DD	10.0	12.0	22.0	20.5	0.3	0.3	17.2	17.4			—	—	
	28	9	9	0.3	0.3	4 550	1 970	465	201	28 000	22 000	34 000	638	638 ZZ1	VV	DD	10.0	12.8	26.0	22.8	0.3	0.3	28.3	28.6			—	—	
	9	17	4	5	0.2	0.2	1 330	665	136	68	36 000	24 000	43 000	689	689 ZZ1	VV	DD	10.6	11.5	15.4	15.2	0.2	0.2	3.53			4.43	—	—
9	20	6	6	0.3	0.3	1 720	840	175	86	34 000	24 000	40 000	699	699 ZZ1	VV	DD	11.0	12.0	18.0	17.2	0.3	0.3	8.45	8.33	—	—			
	24	7	7	0.3	0.3	3 350	1 430	340	146	32 000	24 000	38 000	609	609 ZZ	VV	DD	11.0	12.0	22.8	20.5	0.3	0.3	14.5	14.7	—	—			
	26	8	8	(0.6)	(0.6)	4 550	1 970	465	201	28 000	22 000	34 000	629	629 ZZ	VV	DD	11.0	12.8	24.0	22.8	0.3	0.3	19.5	19.3	—	—			
	30	10	10	0.6	0.6	5 100	2 390	520	244	24 000	—	30 000	639	639 ZZ	VV	—	13.0	16.1	26.0	25.6	0.6	0.6	36.5	36	—	—			

Notes (1) The values in parentheses are not based on ISO 15.

(2) Actual dimensions of bore and outside diameter only.

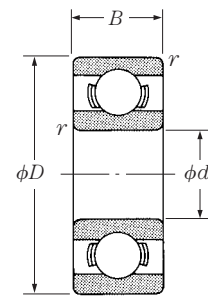
- Remarks
1. When using bearings with a rotating outer ring, please contact NSK if they are sealed or shielded.
 2. Bearings with double shields (ZZ, ZZ1) are also available with single shields (Z, Z1).
 3. Bearings with snap rings are also available, please contact NSK.

Inch series

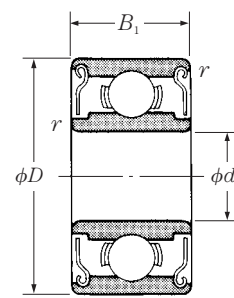
R

Bore diameter

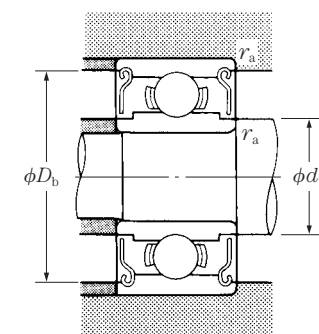
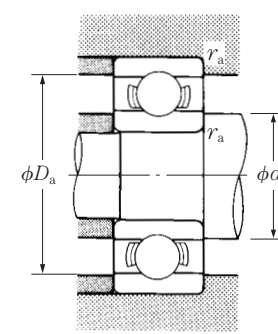
1.016 – 9.525 mm



Open type



Shielded type
ZZ · ZS



d	Boundary dimensions (mm/inch)				Basic load ratings (N/kgf)				Limiting speeds (min ⁻¹)		Bearing numbers		Abutment and fillet dimensions (mm)					Mass (g)		Basic bearing numbers	Actual size ⁽¹⁾				
	D	B	B ₁	r min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z·ZZ	Oil Open Z	Open	Shielded	d _a min.	d _b max.	D _a max.	D _b min.	r _a max.	Open approx.	Shielded approx.						
1.016	0.0400	3.175	0.1250	1.191	0.0469	—	—	0.1	80	23	8	2.5	130 000	150 000	R 09	—	1.9	—	2.3	—	0.1	0.04	—	R 09	
1.191	0.0469	3.967	0.1562	1.588	0.0625	2.380	0.0937	0.1	138	35	14	3.5	110 000	130 000	R 0	R 0 ZZ	2.0	1.9	3.1	3.5	0.1	0.09	0.11	R 0	
1.397	0.0550	4.762	0.1875	1.984	0.0781	2.779	0.1094	0.1	231	66	24	6.5	90 000	110 000	R 1	R 1 ZZ	2.2	2.3	3.9	4.1	0.1	0.15	0.19	R 1	
1.984	0.0781	6.350	0.2500	2.380	0.0937	3.571	0.1406	0.1	310	108	32	11	67 000	80 000	R 1-4	R 1-4 ZZ	2.8	3.9	5.5	5.9	0.1	0.35	0.50	R 1-4	
2.380	0.0937	4.762	0.1875	1.588	0.0625	—	—	0.1	188	60	19	6	80 000	95 000	R 133	—	3.2	—	3.9	—	0.1	0.10	—	R 133	
		4.762	0.1875	—	—	2.380	0.0937	0.1	143	52	15	5.5	80 000	95 000	—	R 133 ZZS	—	3.0	—	4.2	0.1	—	0.13	R 133	
		7.938	0.3125	2.779	0.1094	3.571	0.1406	0.15	550	175	56	18	60 000	71 000	R 1-5	R 1-5 ZZ	3.6	4.1	6.7	7.0	0.15	0.60	0.72	R 1-5	
3.175	0.1250	6.350	0.2500	2.380	0.0937	2.779	0.1094	0.1	283	95	29	9.5	67 000	80 000	R 144	R 144 ZZ	4.0	3.9	5.5	5.9	0.1	0.25	0.27	R 144	
		7.938	0.3125	2.779	0.1094	3.571	0.1406	0.1	560	179	57	18	60 000	67 000	R 2-5	R 2-5 ZZ	4.0	4.3	7.1	7.3	0.1	0.55	0.72	R 2-5	
		9.525	0.3750	2.779	0.1094	3.571	0.1406	0.15	640	225	65	23	53 000	63 000	R 2-6	R 2-6 ZZS	4.4	4.6	8.3	8.2	0.15	0.96	1.13	R 2-6	
3.175		9.525	0.3750	3.967	0.1562	3.967	0.1562	0.3	630	218	64	22	56 000	67 000	R 2	R 2 ZZ	5.2	4.8	7.5	8.0	0.3	1.36	1.39	R 2	
		12.700	0.5000	4.366	0.1719	4.366	0.1719	0.3	640	225	65	23	53 000	63 000	R 2 A	R 2 A ZZ	5.2	4.6	10.7	8.2	0.3	3.3	3.23	R 2 A	
3.967	0.1562	7.938	0.3125	2.779	0.1094	3.175	0.1250	0.1	360	149	37	15	53 000	63 000	R 155	R 155 ZZS	4.8	5.5	7.1	7.3	0.1	0.51	0.56	R 155	
4.762	0.1875	7.938	0.3125	2.779	0.1094	3.175	0.1250	0.1	360	149	37	15	53 000	63 000	R 156	R 156 ZZS	5.6	5.5	7.1	7.3	0.1	0.39	0.42	R 156	
		9.525	0.3750	3.175	0.1250	3.175	0.1250	0.1	710	270	73	28	50 000	60 000	R 166	R 166 ZZ	5.6	5.9	8.7	8.8	0.1	0.81	0.85	R 166	
		12.700	0.5000	3.967	0.1562	4.978	0.1960	0.3	1 300	485	133	49	43 000	53 000	R 3	R 3 ZZ	6.8	6.5	10.7	11.2	0.3	2.21	2.79	R 3	
6.350	0.2500	9.525	0.3750	3.175	0.1250	3.175	0.1250	0.1	420	204	43	21	48 000	56 000	R 168 B	R 168 B ZZ	7.2	7.0	8.7	8.9	0.1	0.58	0.62	R 168 B	
		12.700	0.5000	3.175	0.1250	4.762	0.1875	0.15	1 080	440	110	45	40 000	50 000	R 188	R 188 ZZ	7.6	7.4	11.5	11.6	0.15	1.53	2.21	R 188	
6.350		15.875	0.6250	4.978	0.1960	4.978	0.1960	0.3	1 610	660	164	68	38 000	45 000	R 4 B	R 4 B ZZ	8.4	8.4	13.8	13.8	0.3	4.50	4.43	R 4 B	
		19.050	0.7500	5.558	0.2188	7.142	0.2812	0.4	2 620	1 060	267	108	36 000	43 000	R 4 AA	R 4 AA ZZ	9.4	9.0	16.0	16.6	0.4	7.48	9.17	R 4 AA	
7.938	0.3125	12.700	0.5000	3.967	0.1562	3.967	0.1562	0.15	540	276	55	28	40 000	48 000	R 1810	R 1810 ZZ	9.2	9.0	11.5	11.6	0.15	1.56	1.48	R 1810	
9.525	0.3750	22.225	0.8750	5.558	0.2188	7.142	0.2812	0.4	3 350	1 410	340	144	32 000	38 000	R 6	R 6 ZZ	12.6	11.9	19.2	20.0	0.4	9.02	11	R 6	

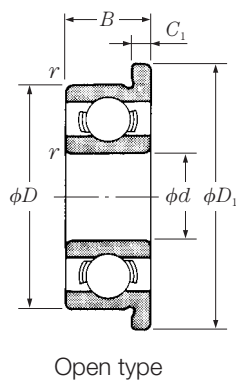
Note ⁽¹⁾ Actual dimensions of bore and outside diameter only.

Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.

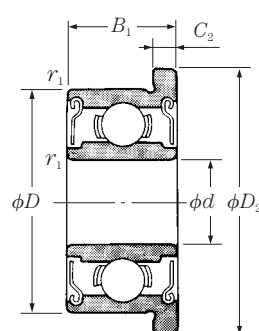
2. Bearings with double shields (ZZ, ZZS) are also available with single shields (Z, ZS).

Deep groove ball bearings with flanged outer ring

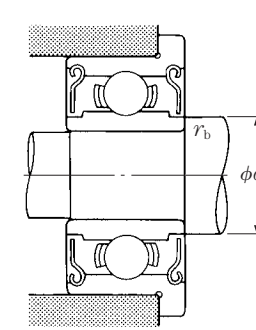
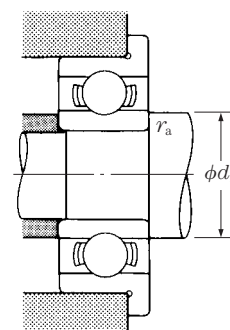
Metric series
F600, MF
Bore diameter
1 – 4 mm



Open type



Shielded type
 ZZ · ZZ1



d	Boundary dimensions (mm)										Basic load ratings (N) {kgf}				Limiting speeds (min ⁻¹)		Bearing numbers			Abutment and fillet dimensions (mm)				Mass (g)		Basic bearing numbers	Actual size ⁽²⁾
	D	D ₁	D ₂	B	B ₁	C ₁	C ₂	r ⁽¹⁾ min.	r ₁ ⁽¹⁾ min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z·ZZ	Oil Open Z	Open	Shielded	Sealed	d _a min.	d _b max.	r _a max.	r _b max.	Open approx.	Shielded			
1	3	3.8	—	1	—	0.3	—	0.05	—	80	23	8	2.5	130 000	150 000	F 681	—	—	1.4	—	0.05	—	0.04	—	F 681 F 691		
	4	5	—	1.6	—	0.5	—	0.1	—	138	35	14	3.5	100 000	120 000	F 691	—	—	1.8	—	0.1	—	0.14	—			
1.2	4	4.8	—	1.8	—	0.4	—	0.1	—	138	35	14	3.5	110 000	130 000	MF 41 X	—	—	2.0	—	0.1	—	0.12	—	MF 41 X		
1.5	4	5	5	1.2	2	0.4	0.6	0.05	0.05	112	33	11	3.5	100 000	120 000	F 681 X	F 681 XZZ	—	1.9	2.1	0.05	0.05	0.09	0.14	F 681 X F 691 X F 601 X		
	5	6.5	6.5	2	2.6	0.6	0.8	0.15	0.15	237	69	24	7	85 000	100 000	F 691 X	F 691 XZZ	—	2.7	2.5	0.15	0.15	0.21	0.28			
	6	7.5	7.5	2.5	3	0.6	0.8	0.15	0.15	330	98	34	10	75 000	90 000	F 601 X	F 601 XZZ	—	2.7	3.0	0.15	0.15	0.42	0.52			
2	5	6.1	6.1	1.5	2.3	0.5	0.6	0.08	0.08	169	50	17	5	85 000	100 000	F 682	F 682 ZZ	—	2.6	2.7	0.08	0.08	0.16	0.22	F 682 MF 52 B F 692		
	5	6.2	6.2	2	2.5	0.6	0.6	0.1	0.1	187	58	19	6	85 000	100 000	MF 52 B	MF 52 B ZZ	—	2.8	2.7	0.1	0.1	0.21	0.27			
	6	7.5	7.5	2.3	3	0.6	0.8	0.15	0.15	330	98	34	10	75 000	90 000	F 692	F 692 ZZ	—	3.2	3.0	0.15	0.15	0.35	0.48			
	6	7.2	—	2.5	—	0.6	—	0.15	—	330	98	34	10	75 000	90 000	MF 62	—	—	3.2	—	0.15	—	0.36	—			
	7	8.2	8.2	2.5	3	0.6	0.6	0.15	0.15	385	127	39	13	63 000	75 000	MF 72	MF 72 ZZ	—	3.2	3.8	0.15	0.15	0.52	0.56			
7	8.5	8.5	2.8	3.5	0.7	0.9	0.15	0.15	385	127	39	13	63 000	75 000	F 602	F 602 ZZ	—	3.2	3.8	0.15	0.15	0.60	0.71				
2.5	6	7.1	7.1	1.8	2.6	0.5	0.8	0.08	0.08	208	74	21	7.5	71 000	80 000	F 682 X	F 682 XZZ	—	3.1	3.7	0.08	0.08	0.25	0.36	F 682 X F 692 X MF 82 X F 602 X		
	7	8.5	8.5	2.5	3.5	0.7	0.9	0.15	0.15	385	127	39	13	63 000	67 000	F 692 X	F 692 XZZ	—	3.7	3.8	0.15	0.15	0.51	0.68			
	8	9.2	—	2.5	—	0.6	—	0.2	—	560	179	57	18	60 000	71 000	MF 82 X	—	—	4.1	—	0.2	—	0.62	—			
	8	9.5	9.5	2.8	4	0.7	0.9	0.15	0.15	550	175	56	18	60 000	71 000	F 602 X	F 602 XZZ	—	3.7	4.1	0.15	0.15	0.74	0.98			
3	6	7.2	7.2	2	2.5	0.6	0.6	0.1	0.1	208	74	21	7.5	71 000	80 000	MF 63	MF 63 ZZ	—	3.8	3.7	0.1	0.1	0.27	0.33	MF 63 F 683 A MF 83		
	7	8.1	8.1	2	3	0.5	0.8	0.1	0.1	390	130	40	13	63 000	75 000	F 683 A	F 683 A ZZ	—	3.8	4.0	0.1	0.1	0.37	0.53			
	8	9.2	—	2.5	—	0.6	—	0.15	—	560	179	57	18	60 000	67 000	MF 83	—	—	4.2	—	0.15	—	0.56	—			
4	8	9.5	9.5	3	4	0.7	0.9	0.15	0.15	560	179	57	18	60 000	67 000	F 693	F 693 ZZ	—	4.2	4.3	0.15	0.15	0.70	0.97	F 693 MF 93 F 603 F 623 F 633		
	9	10.2	10.6	2.5	4	0.6	0.8	0.2	0.15	570	187	58	19	56 000	67 000	MF 93	MF 93 ZZ	—	4.6	4.3	0.2	0.15	0.81	1.34			
	9	10.5	10.5	3	5	0.7	1	0.15	0.15	570	187	58	19	56 000	67 000	F 603	F 603 ZZ	—	4.2	4.3	0.15	0.15	1.0	1.63			
	10	11.5	11.5	4	4	1	1	0.15	0.15	630	218	64	22	50 000	60 000	F 623	F 623 ZZ	—	4.2	4.3	0.15	0.15	1.85	1.86			
	13	15	15	5	5	1	1	0.2	0.2	1 300	485	133	49	36 000	43 000	F 633	F 633 ZZ	—	4.6	6.0	0.2	0.2	3.73	3.59			
	7	8.2	—	2	—	0.6	—	0.1	—	310	115	32	12	60 000	67 000	MF 74	—	—	4.8	—	0.1	—	0.29	—			
	7	—	8.2	—	2.5	—	0.6	—	0.1	—	255	107	26	11	60 000	71 000	—	MF 74 ZZ	—	—	4.8	—	0.1	—			—
8	9.2	9.2	2	3	0.6	0.6	0.15	0.1	395	139	40	14	56 000	67 000	MF 84	MF 84 ZZ	—	5.2	5.0	0.15	0.1	0.44	0.63				
9	10.3	10.3	2.5	4	0.6	1	(0.15)	(0.15)	640	225	65	23	53 000	63 000	F 684	F 684 ZZ	—	4.8	5.2	0.1	0.1	0.70	1.14				
10	11.2	11.6	3	4	0.6	0.8	0.2	0.15	710	270	73	28	50 000	60 000	MF 104 B	MF 104 B ZZ	—	5.6	5.9	0.2	0.15	1.13	1.59	MF 104 B F 694 F 604			
11	12.5	12.5	4	4	1	1	0.15	0.15	960	345	98	35	48 000	56 000	F 694	F 694 ZZ	—	5.2	5.6	0.15	0.15	1.91	1.96				
12	13.5	13.5	4	4	1	1	0.2	0.2	960	345	98	35	48 000	56 000	F 604	F 604 ZZ	—	5.6	5.6	0.2	0.2	2.53	2.53				
13	15	15	5	5	1	1	0.2	0.2	1 300	485	133	49	40 000	48 000	F 624	F 624 ZZ	—	5.6	6.0	0.2	0.2	3.38	3.53	F 624 F 634			
16	18	18	5	5	1	1	0.3	0.3	1 730	670	177	68	36 000	43 000	F 634	F 634 ZZ1	—	6.0	7.5	0.3	0.3	5.73	5.65				

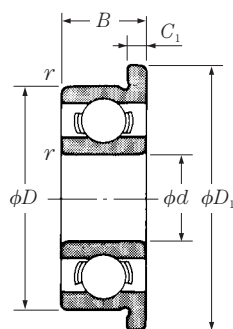
Notes ⁽¹⁾ The values in parentheses are not based on ISO 15.

⁽²⁾ Actual dimensions of bore and outside diameter only.

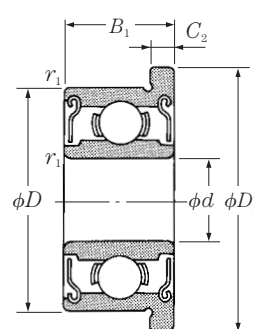
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
 2. Bearings with double shields (ZZ, ZZ1) are also available with single shields (Z, Z1).

Deep groove ball bearings with flanged outer ring

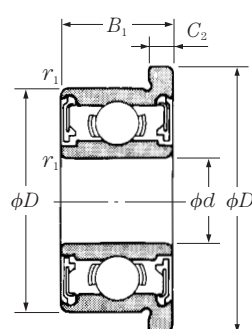
Metric series
F600, MF
Bore diameter
5 – 9 mm



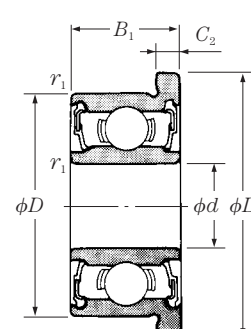
Open type



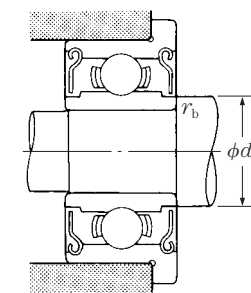
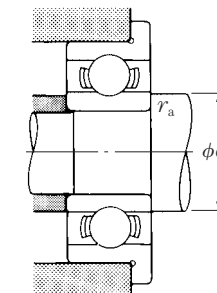
Shielded type
ZZ · ZZ1



Non-contact
sealed type
VV



Contact sealed type
DD



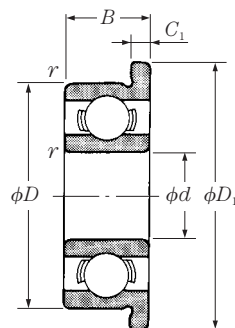
d	Boundary dimensions (mm)									Basic load ratings (N)				Limiting speeds (min ⁻¹)			Bearing numbers			Abutment and fillet dimensions (mm)				Mass (g)		Basic bearing numbers	Actual size ⁽¹⁾		
	D	D ₁	D ₂	B	B ₁	C ₁	C ₂	r min.	r ₁ min.	C _r	C _{or}	C _r	C _{or}	Open Z·ZZ V·W	Grease D·DD	Oil Open Z	Open	Shielded	Sealed	d _a min.	d _b max.	r _a max.	r _b max.	Open approx.	Shielded approx.				
5	8	9.2	—	2	—	0.6	—	0.1	—	310	120	31	12	53 000	—	63 000	MF 85	—	—	—	5.8	—	0.1	—	0.33	—	MF 85		
	8	—	9.2	—	2.5	—	0.6	—	0.1	278	131	28	13	53 000	—	63 000	—	MF 85 ZZ	—	—	—	5.8	—	0.1	—	—	0.41		MF 85
	9	10.2	10.2	2.5	3	0.6	0.6	0.15	0.15	430	168	44	17	50 000	—	60 000	MF 95	—	—	—	6.2	6.0	0.15	0.15	0.59	0.66	MF 95		
	10	11.2	11.6	3	4	0.6	0.8	0.15	0.15	430	168	44	17	50 000	—	60 000	MF 105	—	—	—	6.2	6.0	0.15	0.15	1.05	1.46	MF 105		
6	11	12.5	12.5	3	5	0.8	1	0.15	0.15	715	281	73	29	45 000	—	53 000	F 685	F 685 ZZ	—	—	6.2	6.2	0.15	0.15	1.37	2.18	F 685		
	13	15	15	4	4	1	1	0.2	0.2	1 080	430	110	44	43 000	40 000	50 000	F 695	F 695 ZZ	VV	DD	6.6	6.6	0.2	0.2	2.79	2.84	F 695		
	14	16	16	5	5	1	1	0.2	0.2	1 330	505	135	52	40 000	38 000	50 000	F 605	F 605 ZZ	—	DD	6.6	6.9	0.2	0.2	3.9	3.85	F 605		
	16	18	18	5	5	1	1	0.3	0.3	1 730	670	177	68	36 000	32 000	43 000	F 625	F 625 ZZ1	VV	DD	7.0	7.5	0.3	0.3	5.37	5.3	F 625		
	19	22	22	6	6	1.5	1.5	0.3	0.3	2 340	885	238	90	32 000	30 000	40 000	F 635	F 635 ZZ1	VV	DD	7.0	8.5	0.3	0.3	9.49	9.49	F 635		
	7	10	11.2	11.2	2.5	3	0.6	0.6	0.15	0.1	495	218	51	22	45 000	—	53 000	MF 106	MF 106 ZZ1	—	—	7.2	7.0	0.15	0.1	0.65	0.77		MF 106
12		13.2	13.6	3	4	0.6	0.8	0.2	0.15	715	292	73	30	43 000	40 000	50 000	MF 126	MF 126 ZZ	—	DD	7.6	7.2	0.2	0.15	1.38	1.94	MF 126		
13		15	15	3.5	5	1	1.1	0.15	0.15	1 080	440	110	45	40 000	38 000	50 000	F 686 A	F 686 A ZZ	VV	DD	7.2	7.4	0.15	0.15	2.25	3.04	F 686 A		
15		17	17	5	5	1.2	1.2	0.2	0.2	1 730	670	177	68	40 000	36 000	45 000	F 696	F 696 ZZ1	VV	DD	7.6	7.9	0.2	0.2	4.34	4.26	F 696		
17		19	19	6	6	1.2	1.2	0.3	0.3	2 260	835	231	85	38 000	34 000	45 000	F 606	F 606 ZZ	VV	DD	8.0	8.2	0.3	0.3	6.58	6.61	F 606		
19		22	22	6	6	1.5	1.5	0.3	0.3	2 340	885	238	90	32 000	30 000	40 000	F 626	F 626 ZZ1	VV	DD	8.0	8.5	0.3	0.3	9.09	9.09	F 626		
8	22	25	25	7	7	1.5	1.5	0.3	0.3	3 300	1 370	335	140	30 000	28 000	36 000	F 636	F 636 ZZ	VV	DD	8.0	10.5	0.3	0.3	14.6	14.7	F 636		
	11	12.2	12.2	2.5	3	0.6	0.6	0.15	0.1	455	201	47	21	43 000	—	50 000	MF 117	MF 117 ZZ	—	—	8.2	8.0	0.15	0.1	0.72	0.82	MF 117		
	13	14.2	14.6	3	4	0.6	0.8	0.2	0.15	540	276	55	28	40 000	—	48 000	MF 137	MF 137 ZZ	—	—	8.6	9.0	0.2	0.15	1.7	2.23	MF 137		
	14	16	16	3.5	5	1	1.1	0.15	0.15	1 170	510	120	52	40 000	34 000	45 000	F 687	F 687 ZZ1	VV	DD	8.2	8.5	0.15	0.15	2.48	3.37	F 687		
	17	19	19	5	5	1.2	1.2	0.3	0.3	1 610	710	164	73	36 000	28 000	43 000	F 697	F 697 ZZ1	VV	DD	9.0	10.2	0.3	0.3	5.65	5.65	F 697		
	19	22	22	6	6	1.5	1.5	0.3	0.3	2 340	885	238	90	36 000	32 000	43 000	F 607	F 607 ZZ1	VV	DD	9.0	9.1	0.3	0.3	8.66	8.66	F 607		
9	22	25	25	7	7	1.5	1.5	0.3	0.3	3 300	1 370	335	140	30 000	28 000	36 000	F 627	F 627 ZZ	VV	DD	9.0	10.5	0.3	0.3	14.2	14.2	F 627		
	12	13.2	13.6	2.5	3.5	0.6	0.8	0.15	0.1	545	274	56	28	40 000	—	48 000	MF 128	MF 128 ZZ1	—	—	9.2	9.0	0.15	0.1	0.82	1.15	MF 128		
	14	15.6	15.6	3.5	4	0.8	0.8	0.2	0.15	820	385	83	39	38 000	32 000	45 000	MF 148	MF 148 ZZ	VV	DD	9.6	9.2	0.2	0.15	2.09	2.39	MF 148		
	16	18	18	4	5	1	1.1	0.2	0.2	1 610	710	164	73	36 000	30 000	43 000	F 688 A	F 688 A ZZ1	VV	DD	9.6	10.2	0.2	0.2	3.54	4.47	F 688 A		
	19	22	22	6	6	1.5	1.5	0.3	0.3	2 240	910	228	93	36 000	28 000	43 000	F 698	F 698 ZZ	VV	DD	10.0	10.0	0.3	0.3	8.35	8.3	F 698		
	22	25	25	7	7	1.5	1.5	0.3	0.3	3 300	1 370	335	140	34 000	28 000	40 000	F 608	F 608 ZZ	VV	DD	10.0	10.5	0.3	0.3	13.4	13.5	F 608		
9	17	19	19	4	5	1	1.1	0.2	0.2	1 330	665	136	68	36 000	24 000	43 000	F 689	F 689 ZZ1	VV	DD	10.6	11.5	0.2	0.2	3.97	4.91	F 689		
	20	23	23	6	6	1.5	1.5	0.3	0.3	1 720	840	175	86	34 000	24 000	40 000	F 699	F 699 ZZ1	VV	DD	11.0	12.0	0.3	0.3	9.51	9.51	F 699		

Note ⁽¹⁾ Actual dimensions of bore and outside diameter only.

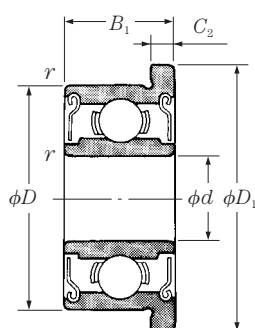
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
 2. Bearings with double shields (ZZ, ZZ1) are also available with single shields (Z, Z1).

Deep groove ball bearings with flanged outer ring

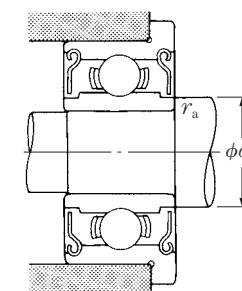
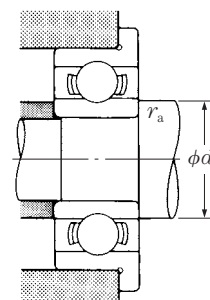
Inch series
FR
Bore diameter
1.191 – 9.525 mm



Open type



Shielded type
ZZ · ZJS



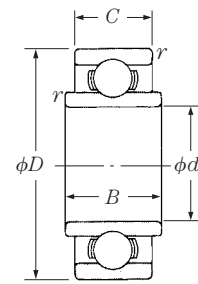
d	Boundary dimensions (mm/inch)												Basic load ratings (N) {kgf}				Limiting speeds (min ⁻¹)		Bearing numbers		Abutment and fillet dimensions (mm)			Mass (g)		Basic bearing numbers	Actual size ⁽¹⁾		
	D	D ₁	B	B ₁	C ₁	C ₂	r min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z-ZZ	Oil Open Z	Open	Shielded	d _a min.	d _b max.	r _a max.	Open	Shielded approx.									
1.191	0.0469	3.967	0.1562	5.156	0.203	1.588	0.0625	2.380	0.0937	0.330	0.013	0.790	0.031	0.1	138	35	14	3.5	110 000	130 000	FR 0	FR 0 ZZ	2.0	1.9	0.1	0.11	0.16	FR 0	
1.397	0.0550	4.762	0.1875	5.944	0.234	1.984	0.0781	2.779	0.1094	0.580	0.023	0.790	0.031	0.1	231	66	24	6.5	90 000	110 000	FR 1	FR 1 ZZ	2.2	2.3	0.1	0.20	0.25	FR 1	
1.984	0.0781	6.350	0.2500	7.518	0.296	2.380	0.0937	3.571	0.1406	0.580	0.023	0.790	0.031	0.1	310	108	32	11	67 000	80 000	FR 1-4	FR 1-4 ZZ	2.8	3.9	0.1	0.41	0.58	FR 1-4	
2.380	0.0937	4.762	0.1875	5.944	0.234	1.588	0.0625	—	—	0.460	0.018	—	—	0.1	188	60	19	6	80 000	95 000	FR 133	—	3.2	—	0.1	0.13	—	FR 133	
		4.762	0.1875	5.944	0.234	—	—	2.380	0.0937	—	—	0.790	0.031	0.1	143	52	15	5.5	80 000	95 000	—	FR 133 ZJS	—	3.0	0.1	—	0.19	FR 133	
		7.938	0.3125	9.119	0.359	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.15	550	175	56	18	60 000	71 000	FR 1-5	FR 1-5 ZZ	3.6	4.1	0.15	0.68	0.82	FR 1-5	
3.175	0.1250	6.350	0.2500	7.518	0.296	2.380	0.0937	2.779	0.1094	0.580	0.023	0.790	0.031	0.1	283	95	29	9.5	67 000	80 000	FR 144	FR 144 ZZ	4.0	3.9	0.1	0.31	0.35	FR 144	
		7.938	0.3125	9.119	0.359	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.1	560	179	57	18	60 000	67 000	FR 2-5	FR 2-5 ZZ	4.0	4.3	0.1	0.62	0.81	FR 2-5	
		9.525	0.3750	10.719	0.422	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.15	640	225	65	23	53 000	63 000	FR 2-6	FR 2-6 ZJS	4.4	4.6	0.15	1.04	1.25	FR 2-6	
		9.525	0.3750	11.176	0.440	3.967	0.1562	3.967	0.1562	0.760	0.030	0.760	0.030	0.3	630	218	64	22	56 000	67 000	FR 2	FR 2 ZZ	5.2	4.8	0.3	1.51	1.55	FR 2	
3.967	0.1562	7.938	0.3125	9.119	0.359	2.779	0.1094	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	360	149	37	15	53 000	63 000	FR 155	FR 155 ZJS	4.8	5.5	0.1	0.59	0.67	FR 155	
4.762	0.1875	7.938	0.3125	9.119	0.359	2.779	0.1094	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	360	149	37	15	53 000	63 000	FR 156	FR 156 ZJS	5.6	5.5	0.1	0.47	0.53	FR 156	
		9.525	0.3750	10.719	0.422	3.175	0.1250	3.175	0.1250	0.580	0.023	0.790	0.031	0.1	710	270	73	28	50 000	60 000	FR 166	FR 166 ZZ	5.6	5.9	0.1	0.90	0.98	FR 166	
		12.700	0.5000	14.351	0.565	4.978	0.1960	4.978	0.1960	1.070	0.042	1.070	0.042	0.3	1 300	485	133	49	43 000	53 000	FR 3	FR 3 ZZ	6.8	6.5	0.3	2.97	3.09	FR 3	
6.350	0.2500	9.525	0.3750	10.719	0.422	3.175	0.1250	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	420	204	43	21	48 000	56 000	FR 168 B	FR 168 BZZ	7.2	7.0	0.1	0.66	0.75	FR 168 B	
		12.700	0.5000	13.894	0.547	3.175	0.1250	4.762	0.1875	0.580	0.023	1.140	0.045	0.15	1 080	440	110	45	40 000	50 000	FR 188	FR 188 ZZ	7.6	7.4	0.15	1.64	2.49	FR 188	
		15.875	0.6250	17.526	0.690	4.978	0.1960	4.978	0.1960	1.070	0.042	1.070	0.042	0.3	1 610	660	164	68	38 000	45 000	FR 4 B	FR 4 BZZ	8.4	8.4	0.3	4.78	4.78	FR 4 B	
7.938	0.3125	12.700	0.5000	13.894	0.547	3.967	0.1562	3.967	0.1562	0.790	0.031	0.790	0.031	0.15	540	276	55	28	40 000	48 000	FR 1810	FR 1810 ZZ	9.2	9.0	0.15	1.71	1.63	FR 1810	
9.525	0.3750	22.225	0.8750	24.613	0.969	7.142	0.2812	7.142	0.2812	1.570	0.062	1.570	0.062	0.4	3 350	1 410	340	144	32 000	38 000	FR 6	FR 6 ZZ	12.6	11.9	0.4	10.1	12.1	FR 6	

Note ⁽¹⁾ Actual dimensions of bore and outside diameter only.

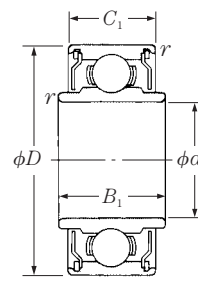
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
2. Bearings with double shields (ZZ, ZJS) are also available with single shields (Z, ZS).

Deep groove ball bearings with extended inner ring

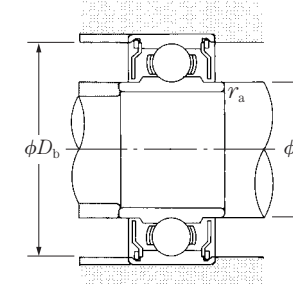
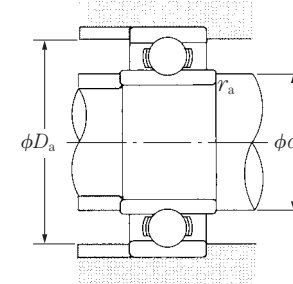
Inch series
RW
 Bore diameter
1.016 – 9.525 mm



Open type



Shielded type
 ZZ · ZJS



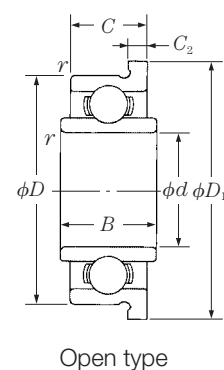
d	Boundary dimensions (mm/inch)											Basic load ratings (N) (kgf)				Limiting speeds (min ⁻¹)		Bearing numbers		Abutment and fillet dimensions (mm)					Mass (g)		Basic bearing numbers	Actual size ⁽¹⁾	
	D	B	B ₁	C	C ₁	r min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z·ZZ	Oil Open Z	Open	Shielded	d _a min.	d _b max.	D _a max.	D _b min.	r _a max.	Open approx.	Shielded approx.								
1.016	0.0400	3.175	0.1250	1.984	0.0781	—	—	1.191	0.0469	—	—	0.1	80	23	8	2.5	130 000	150 000	RW 09	—	1.9	—	2.3	—	0.1	0.05	—	RW 09	
1.191	0.0469	3.967	0.1562	2.380	0.0937	3.175	0.1250	1.588	0.0625	2.380	0.0937	0.1	138	35	14	3.5	110 000	130 000	RW 0	RW 0 ZZ	2.0	1.9	3.1	3.5	0.1	0.11	0.16	RW 0	
1.397	0.0550	4.762	0.1875	2.779	0.1094	3.571	0.1406	1.984	0.0781	2.779	0.1094	0.1	231	66	24	6.5	90 000	110 000	RW 1	RW 1 ZZ	2.2	2.3	3.9	4.1	0.1	0.17	0.25	RW 1	
1.984	0.0781	6.350	0.2500	3.175	0.1250	4.366	0.1719	2.380	0.0937	3.571	0.1406	0.1	310	108	32	11	67 000	80 000	RW 1-4	RW 1-4 ZZ	2.8	3.9	5.5	5.9	0.1	0.46	0.46	RW 1-4	
2.380	0.0937	4.762	0.1875	2.380	0.0937	—	—	1.588	0.0625	—	—	0.1	188	60	19	6	80 000	95 000	RW 133	—	3.2	—	3.9	—	0.1	0.12	—	RW 133	
	4.762	0.1875	—	—	3.175	0.1250	—	—	2.380	0.0937	0.1	143	52	15	5.5	80 000	95 000	—	RW 133 ZZS	—	3.0	—	4.2	0.1	—	0.17	—	RW 133	
	7.938	0.3125	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.15	550	175	56	18	60 000	71 000	RW 1-5	RW 1-5 ZZ	3.6	4.1	6.7	7.0	0.15	0.63	0.73	RW 1-5		
3.175	0.1250	6.350	0.2500	3.175	0.1250	3.571	0.1406	2.380	0.0937	2.779	0.1094	0.1	283	95	29	9.5	67 000	80 000	RW 144	RW 144 ZZ	4.0	3.9	5.5	5.9	0.1	0.30	0.33	RW 144	
	7.983	0.3125	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.1	560	179	57	18	60 000	67 000	RW 2-5	RW 2-5 ZZ	4.0	4.3	7.1	7.3	0.1	0.74	0.74	RW 2-5		
	9.525	0.3750	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.15	640	225	65	23	53 000	63 000	RW 2-6	RW 2-6 ZZS	4.4	4.6	8.3	8.2	0.15	1.0	1.1	RW 2-6		
	9.525	0.3750	4.762	0.1875	4.762	0.1875	3.967	0.1562	3.967	0.1562	0.3	630	218	64	22	56 000	67 000	RW 2	RW 2 ZZ	5.2	4.8	7.5	8.0	0.3	1.4	1.3	RW 2		
3.967	0.1562	7.938	0.3125	3.571	0.1406	3.967	0.1562	2.779	0.1094	3.175	0.1250	0.1	360	149	37	15	53 000	63 000	RW 155	RW 155 ZZS	4.8	5.5	7.1	7.3	0.1	0.56	0.62	RW 155	
4.762	0.1875	7.938	0.3125	3.571	0.1406	3.967	0.1562	2.779	0.1094	3.175	0.1250	0.1	360	149	37	15	53 000	63 000	RW 156	RW 156 ZZS	5.6	5.5	7.1	7.3	0.1	0.44	0.49	RW 156	
	9.525	0.3750	3.967	0.1562	3.967	0.1562	3.175	0.1250	3.175	0.1250	0.1	710	270	73	28	50 000	60 000	RW 166	RW 166 ZZ	5.6	5.9	8.7	8.8	0.1	0.82	0.87	RW 166		
	12.700	0.5000	4.762	0.1875	5.771	0.2272	3.967	0.1562	4.978	0.1960	0.3	1 300	485	133	49	43 000	53 000	RW 3	RW 3 ZZ	6.8	6.5	10.7	11.2	0.3	2.33	2.90	RW 3		
6.350	0.2500	9.525	0.3750	3.967	0.1562	3.967	0.1562	3.175	0.1250	3.175	0.1250	0.1	420	204	43	21	48 000	56 000	RW 168 B	RW 168 BZZ	7.2	7.0	8.7	8.9	0.1	0.62	0.66	RW 168 B	
	12.700	0.5000	3.967	0.1562	5.558	0.2188	3.175	0.1250	4.762	0.1875	0.15	1 080	440	110	45	40 000	50 000	RW 188	RW 188 ZZ	7.6	7.4	11.5	11.6	0.15	1.7	2.1	RW 188		
	15.875	0.6250	5.771	0.2272	5.771	0.2272	4.978	0.1960	4.978	0.1960	0.3	1 610	660	164	68	38 000	45 000	RW 4 B	RW 4 BZZ	8.4	8.4	13.8	13.8	0.3	4.72	4.62	RW 4 B		
7.938	0.3125	12.700	0.5000	4.762	0.1875	4.762	0.1875	3.967	0.1562	3.967	0.1562	0.15	540	276	55	28	40 000	48 000	RW 1810	RW 1810 ZZ	9.2	9.0	11.5	11.6	0.15	1.9	1.6	RW 1810	
9.525	0.3750	22.225	0.8750	7.142	0.2812	—	—	5.558	0.2188	—	—	0.4	3 350	1 410	340	144	32 000	38 000	RW 6	—	12.6	—	19.2	—	0.4	10	—	RW 6	

Note ⁽¹⁾ Actual dimensions of bore and outside diameter only.

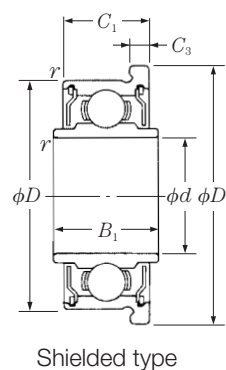
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
 2. Bearings with double shields (ZZ, ZZS) are also available with single shields (Z, ZS).

Deep groove ball bearings with extended inner ring, flanged

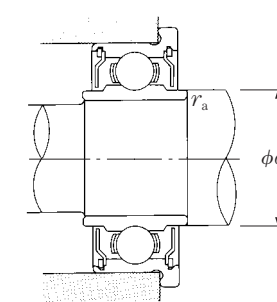
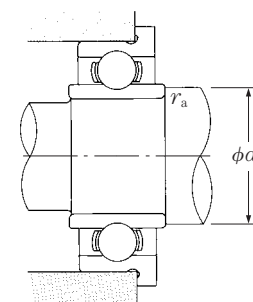
Inch series
FRW
Bore diameter
1.191 – 7.938 mm



Open type



Shielded type
ZZ · ZZS



d	Boundary dimensions (mm/inch)										Basic load ratings (N) (kgf)				Limiting speeds (min ⁻¹)		Bearing numbers		Abutment and fillet dimensions (mm)			Mass (g)		Basic bearing numbers	Actual size ⁽¹⁾								
	D	D ₁	B	B ₁	C	C ₁	C ₂	C ₃	r min.	C _r	C _{or}	C _r	C _{or}	Grease Open Z·ZZ	Oil Open Z	Open	Shielded	d _a min.	d _b max.	r _a max.	Open	Shielded approx.											
1.191	0.0469	3.967	0.1562	5.156	0.203	2.380	0.0937	3.175	0.1250	1.588	0.0625	2.380	0.0937	0.330	0.013	0.790	0.031	0.1	138	35	14	3.5	110 000	130 000	FRW 0	FRW 0 ZZ	2.0	1.9	0.1	0.14	0.19	FRW 0	
1.397	0.0550	4.762	0.1875	5.944	0.234	2.779	0.1094	3.571	0.1406	1.984	0.0781	2.779	0.1094	0.580	0.023	0.790	0.031	0.1	231	66	24	6.5	90 000	110 000	FRW 1	FRW 1 ZZ	2.2	2.3	0.1	0.24	0.32	FRW 1	
1.984	0.0781	6.350	0.2500	7.518	0.296	3.175	0.1250	4.366	0.1719	2.380	0.0937	3.571	0.1406	0.580	0.023	0.790	0.031	0.1	310	108	32	11	67 000	80 000	FRW 1-4	FRW 1-4 ZZ	2.8	3.9	0.1	0.59	0.59	FRW 1-4	
2.380	0.0937	4.762	0.1875	5.944	0.234	2.380	0.0937	—	—	1.588	0.0625	—	—	0.460	0.018	—	—	0.1	188	60	19	6	80 000	95 000	FRW 133	—	3.2	—	0.1	0.17	—	FRW 133	
		4.762	0.1875	5.944	0.234	—	—	3.175	0.1250	—	—	2.380	0.0937	—	—	0.790	0.031	0.1	143	52	15	5.5	80 000	95 000	—	FRW 133 ZZS	—	3.0	0.1	—	0.22	FRW 133	
		7.938	0.3125	9.119	0.359	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.15	550	175	56	18	60 000	71 000	FRW 1-5	FRW 1-5 ZZ	3.6	4.1	0.15	0.83	0.93	FRW 1-5	
3.175	0.1250	6.350	0.2500	7.518	0.296	3.175	0.1250	3.571	0.1406	2.380	0.0937	2.779	0.1094	0.580	0.023	0.790	0.031	0.1	283	95	29	9.5	67 000	80 000	FRW 144	FRW 144 ZZ	4.0	3.9	0.1	0.44	0.47	FRW 144	
		7.938	0.3125	9.119	0.359	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.1	560	179	57	18	60 000	67 000	FRW 2-5	FRW 2-5 ZZ	4.0	4.3	0.1	0.93	0.93	FRW 2-5	
		9.525	0.3750	10.719	0.422	3.571	0.1406	4.366	0.1719	2.779	0.1094	3.571	0.1406	0.580	0.023	0.790	0.031	0.15	640	225	65	23	53 000	63 000	FRW 2-6	FRW 2-6 ZZS	4.4	4.6	0.15	1.3	1.4	FRW 2-6	
		9.525	0.3750	11.176	0.440	4.762	0.1875	4.762	0.1875	3.967	0.1562	3.967	0.1562	0.760	0.030	0.760	0.030	0.3	630	218	64	22	56 000	67 000	FRW 2	FRW 2 ZZ	5.2	4.8	0.3	1.8	1.7	FRW 2	
3.967	0.1562	7.938	0.3125	9.119	0.359	3.571	0.1406	3.967	0.1562	2.779	0.1094	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	360	149	37	15	53 000	63 000	FRW 155	FRW 155 ZZS	4.8	5.5	0.1	0.73	0.79	FRW 155	
4.762	0.1875	7.938	0.3125	9.119	0.359	3.571	0.1406	3.967	0.1562	2.779	0.1094	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	360	149	37	15	53 000	63 000	FRW 156	FRW 156 ZZS	5.6	5.5	0.1	0.58	0.63	FRW 156	
		9.525	0.3750	10.719	0.422	3.967	0.1562	3.967	0.1562	3.175	0.1250	3.175	0.1250	0.580	0.023	0.790	0.031	0.1	710	270	73	28	50 000	60 000	FRW 166	FRW 166 Z	5.6	5.9	0.1	1.2	1.2	FRW 166	
		12.700	0.5000	14.351	0.565	4.762	0.1875	5.771	0.2272	3.967	0.1562	4.978	0.1960	1.070	0.042	1.070	0.042	0.3	1 300	485	133	49	43 000	53 000	FRW 3	FRW 3 ZZ	6.8	6.5	0.3	3.1	3.2	FRW 3	
6.350	0.2500	9.525	0.3750	10.719	0.422	3.967	0.1562	3.967	0.1562	3.175	0.1250	3.175	0.1250	0.580	0.023	0.910	0.036	0.1	420	204	43	21	48 000	56 000	FRW 168 B	FRW 168 BZZ	7.2	7.0	0.1	0.70	0.79	FRW 168 B	
		12.700	0.5000	13.894	0.547	3.967	0.1562	5.558	0.2188	3.175	0.1250	4.762	0.1875	0.580	0.023	1.140	0.045	0.15	1 080	440	110	45	40 000	50 000	FRW 188	FRW 188 ZZ	7.6	7.4	0.15	2.1	2.5	FRW 188	
		15.875	0.6250	17.526	0.690	5.771	0.2272	5.771	0.2272	4.978	0.1960	4.978	0.1960	1.070	0.042	1.070	0.042	0.3	1 610	660	164	68	38 000	45 000	FRW 4 B	FRW 4 BZZ	8.4	8.4	0.3	5.08	4.98	FRW 4 B	
7.938	0.3125	12.700	0.5000	13.894	0.547	4.762	0.1875	4.762	0.1875	3.967	0.1562	3.967	0.1562	0.790	0.031	0.790	0.031	0.15	540	276	55	28	40 000	48 000	FRW 1810	FRW 1810 ZZ	9.2	9.0	0.15	2.3	2.1	FRW 1810	

Note ⁽¹⁾ Actual dimensions of bore and outside diameter only.

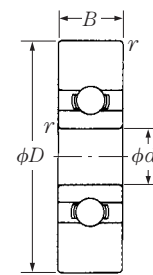
Remarks 1. When using bearings with a rotating outer ring, please contact NSK if they are shielded.
 2. Bearings with double shields (ZZ, ZZS) are also available with single shields (Z, ZS).

Inch series

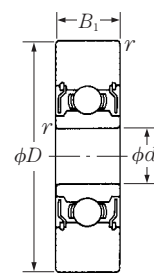
SR · · X

Bore diameter

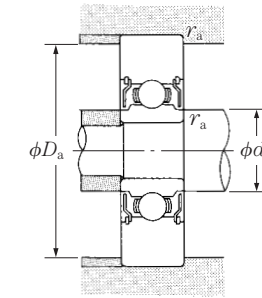
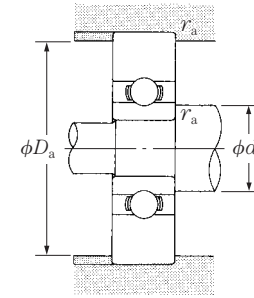
3.175 – 4.762 mm



Open type



Shielded type
ZZS



<i>d</i>	Boundary dimensions (mm/inch)				Basic load ratings (N) {kgf}				Limiting speeds (min ⁻¹)		Bearing numbers			Abutment and fillet dimensions (mm)				Mass (g) approx.			
	<i>D</i>	<i>B</i>	<i>B</i> ₁	<i>r</i> _{min.}	<i>C</i> _r	<i>C</i> _{or}	<i>C</i> _r	<i>C</i> _{or}	Grease Open ZS·ZZS	Oil Open ZS	Open	Single shielded	Double shielded	<i>d</i> _a min.	<i>d</i> _b max.	<i>D</i> _a max.	<i>r</i> _a max.				
3.175 0.1250	9.525	0.3750	—	—	2.779	0.1094	0.1	241	76	25	8.0	53 000	63 000	—	SR 2X52 ZS	SR 2X52 ZZS	3.9	3.9	8.7	0.1	1.0
	10.100	0.3976	—	—	2.380	0.0937	0.1	264	87	27	9.0	63 000	75 000	—	SR 144X100 ZS	SR 144X100 ZZS	3.9	3.9	9.3	0.1	1.2
	10.414	0.4100	—	—	2.380	0.0937	0.1	264	87	27	9.0	63 000	75 000	—	SR 174X5 ZS	SR 174X5 ZZS	3.9	3.9	9.6	0.1	1.2
4.762 0.1875	10.100	0.3976	—	—	2.779	0.1094	0.1	305	119	31	12	53 000	63 000	—	SR 156X100 ZS	SR 156X100 ZZS	5.5	5.5	9.3	0.1	1.0
	10.414	0.4100	—	—	2.779	0.1094	0.1	305	119	31	12	53 000	63 000	—	SR 156X101 ZS	SR 156X101 ZZS	5.5	5.5	9.6	0.1	1.1
	12.700	0.5000	2.779	0.1094	—	—	0.1	605	216	62	22	50 000	60 000	SR 186X1	—	—	5.6	—	11.9	0.1	1.8
	12.700	0.5000	—	—	3.967	0.1562	0.1	605	216	62	22	50 000	60 000	—	SR 186X2 ZS	SR 186X2 ZZS	5.6	5.9	11.9	0.1	2.6
	14.463	0.5694	4.978	0.1960	4.978	0.1960	0.3	1 110	385	113	40	43 000	53 000	SR 3X31	SR 3X31 ZS	SR 3X31 ZZS	6.5	6.5	12.9	0.3	4.0
	22.225	0.8750	4.978	0.1960	4.978	0.1960	0.3	1 260	495	128	50	43 000	53 000	SR 3X23	SR 3X23 ZS	SR 3X23 ZZS	6.8	8.4	20.6	0.3	13

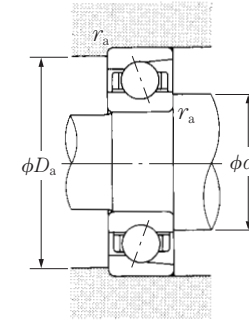
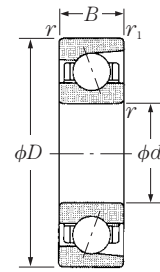
Remark These bearings are made of stainless steel.

Metric series

700C

Bore diameter

4 – 9 mm



d	Boundary dimensions (mm)				(N) Basic load ratings {kgf}				Limiting speeds (min ⁻¹)		Bearing numbers	Abutment and fillet dimensions (mm)			Mass (g) approx.
	D	B	r min.	r ₁ min.	C _r	C _{or}	C _r	C _{or}	Grease	Oil		d _a min.	D _a max.	r _a max.	
4	16	5	0.3	0.15	1 700	660	174	67	53 000	71 000	734C	6.5	13.5	0.3	5.3
5	16	5	0.3	0.15	1 700	660	174	66	53 000	71 000	725C	7.5	13.5	0.3	4.5
6	17	6	0.3	0.15	2 030	795	204	81	50 000	67 000	706C	8.5	14.5	0.3	5.5
	19	6	0.3	0.15	2 390	1 000	243	102	48 000	63 000	726C	8.5	16.5	0.3	7.8
7	19	6	0.3	0.15	2 390	1 000	243	102	48 000	63 000	707C	9.5	16.5	0.3	7.4
8	22	7	0.3	0.15	3 550	1 540	360	157	43 000	56 000	708C	10.5	19.5	0.3	12
	24	8	0.3	0.15	3 600	1 600	365	164	40 000	53 000	728C	10.5	21.5	0.3	16
9	24	7	0.3	0.15	3 600	1 600	365	164	40 000	53 000	709C	11.5	21.5	0.3	14

Remarks 1. The tolerance classes for this type of bearing are classes 5 and 4.
2. Please contact NSK regarding separable bearings or inch series bearings.

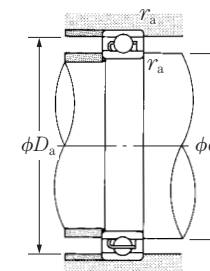
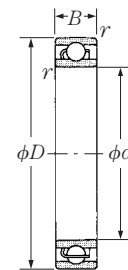
Extra-thin-section deep groove ball bearings

Metric series

SMT

Bore diameter

10 – 15 mm



d	Boundary dimensions (mm)			(N) Basic load ratings {kgf}				Limiting speeds (min ⁻¹)		Bearing numbers	Abutment and fillet dimensions (mm)			Mass (g) approx.
	D	B	r min.	C _r	C _{or}	C _r	C _{or}	Grease	Oil		d _a min.	D _a max.	r _a max.	
10	15	3	0.15	815	410	83	42	36 000	43 000	SMT 1510	11.2	13.8	0.15	1.4
15	20	3.5	0.15	800	470	82	48	30 000	36 000	SMT 2015	16.2	18.8	0.15	2.2

Remarks 1. These bearings are made of stainless steel.
2. The tolerance classes for this type of bearing are normal and class 6.
3. The radial internal clearance for this type of bearing is specified by ISO 5593 Rolling bearings-Radial internal clearance.

Appendices

	Page
Appendix Table 1 Conversion from SI (International Units) system	54 – 55
Appendix Table 2 N – kgf Force conversion table	56
Appendix Table 3 Kg – lb Mass conversion table	57
Appendix Table 4 °C – °F Temperature conversion table	58
Appendix Table 5 Viscosity conversion table	59
Appendix Table 6 Inch-mm Dimension conversion table	60
Appendix Table 7 Hardness conversion table	61
Appendix Table 8 Values of standard tolerance grades IT ...	62 – 63
Appendix Table 9 Physical and mechanical properties of materials	64

Appendix Table 1 Conversion from SI (International Units) System

Comparison of SI, CGS, and Engineering Units

Unit System	Units				Acceleration	Force	Stress	Pressure	Energy	Power
	Length	Mass	Time	Temp.						
SI	m	kg	s	K	m/s ²	N	Pa	Pa	J	W
CGS System	cm	g	s	°C	Gal	dyn	dyn/cm ²	dyn/cm ²	erg	erg/s
Engineering Unit System	m	kgf·s ² /m	s	°C	m/s ²	kgf	kgf/m ²	kgf/m ²	kgf·m	kgf·m/s

Prefixes Used In SI System

Multiples			Multiples		
Prefix	Symbols		Prefix	Symbols	
10 ¹⁸	Exa	E	10 ⁻¹	Deci	d
10 ¹⁵	Peta	P	10 ⁻²	Centi	c
10 ¹²	Tera	T	10 ⁻³	Milli	m
10 ⁹	Giga	G	10 ⁻⁶	Micro	μ
10 ⁶	Mega	M	10 ⁻⁹	Nano	n
10 ³	Kilo	k	10 ⁻¹²	Pico	p
10 ²	Hecto	h	10 ⁻¹⁵	Femto	f
10	Deca	da	10 ⁻¹⁸	Ato	a

Conversion Factors from SI Units

Parameter	SI Units		Units other than SI		Conversion Factors from SI Units
	Names of Units	Symbols	Name of Units	Symbols	
Angle	Radian	rad	Degree	°	180/π
			Minute	'	10 800/π
			Second	"	648 000/π
Length	Meter	m	Micron	μ	10 ⁶
			Angstrom	Å	10 ¹⁰
Area	Square meter	m ²	Are	a	10 ⁻²
			Hectare	ha	10 ⁻⁴
Volume	Cubic meter	m ³	Liter	l, L	10 ³
			Deciliter	dl, dL	10 ⁴
Time	Second	s	Minute	min	1/60
			Hour	h	1/3 600
			Day	d	1/86 400
Frequency	Hertz	Hz	Cycle	s ⁻¹	1
Speed of Rotation	Revolution per second	s ⁻¹	Revolution per minute	rpm	60
Speed	Meter per second	m/s	Kilometer per hour	km/h	3 600/1 000
			Knot	kn	3 600/1 852
Acceleration	Meter per second per second	m/s ²	Gal	Gal	10 ²
			g	g	1/9.806 65
Mass	Kilogram	kg	Ton	t	10 ⁻³
Force	Newton	N	Kilogram-force	kgf	1/9.806 65
			Ton-force	tf	1/(9.806 65 × 10 ³)
			Dyne	dyn	10 ⁵
Torque or Moment	Newton · meter	N · m	Kilogram-force meter	kgf · m	1/9.806 65
Stress	Pascal	Pa (N/m ²)	Kilogram-force per square centimeter	kgf/cm ²	1/(9.806 65 × 10 ⁴)
			Kilogram-force per square millimeter	kgf/mm ²	1/(9.806 65 × 10 ⁶)

Conversion Factors from SI Units (Continued)

Parameter	SI Units		Units other than SI		Conversion factors from SI Units
	Names of Units	Symbols	Names of Units	Units	
Pressure	Pascal (Newton per square meter)	Pa (N/m ²)	Kilogram-force per square meter	kgf/m ²	1/9.806 65
			Water Column	mH ₂ O	1/(9.806 65 × 10 ³)
			Mercury Column	mmHg	760/(1.013 25 × 10 ⁵)
			Torr	Torr	760/(1.013 25 × 10 ⁵)
			Bar	bar	10 ⁵
			Atmosphere	atm	1/(1.013 25 × 10 ⁵)
Energy	Joule (Newton · meter)	J (N·m)	Erg	erg	10 ⁷
			Calorie (International)	cal _{IT}	1/4.186 8
			Kilogram-force meter	kgf·m	1/9.806 65
			Kilowatt hour	kW·h	1/(3.6 × 10 ⁶)
French horse power hour	PS·h	≈ 3.776 72 × 10 ⁻⁷			
Work	Watt (Joule per second)	W (J/s)	Kilogram-force meter per second	kgf·m/s	1/9.806 65
			Kilocalorie per hour	kcal/h	1/1.163
			French horse power	PS	≈ 1/735.498 8
Viscosity, Viscosity Index	Pascal second	Pa·s	Poise	P	10
			Kinematic Viscosity, Kinematic Viscosity Index	Square meter per second	m ² /s
			Centistokes	cSt	10 ⁶
Temperature	Kelvin, Degree celsius	K, °C	Degree	°C	(See Note ⁽¹⁾)
Electric Current, Magnetomotive Force	Ampere	A	Ampere	A	1
Voltage, Electromotive Force	Volt	V	(Watts per ampere)	(W/A)	1
Magnetic Field Strength	Ampere per meter	A/m	Oersted	Oe	4π/10 ³
Magnetic Flux Density	Tesla	T	Gauss	Gs	10 ⁴
			Gamma	γ	10 ⁹
Electrical Resistance	Ohm	Ω	(Volts per ampere)	(V/A)	1

Note ⁽¹⁾ The conversion from TK into θ °C is θ = T-273.15 but for a temperature difference, it is ΔT = Δθ. However, ΔT and Δθ represent temperature differences measured using the Kelvin and Celsius scales respectively.

Remarks The names and symbols in () are equivalent to those directly above them or on their left. Example of conversion 1 N = 1/9.806 65 kgf

Appendix Table 2 N - kgf Conversion Table

How to use this table

For example, to convert 10 N into kgf, read the figure in the right kgf column adjacent to the 10 in the center column in the 1st block. This means that 10 N is 1.01997 kgf. To convert 10 kgf into N, read the figure in the left N column of the same row, which indicates that the answer is 98.066 N.

1 N=0.1019716 kgf
1 kgf=9.80665 N

N		kgf	N		kgf	N		kgf
9.8066	1	0.1020	333.43	34	3.4670	657.05	67	6.8321
19.613	2	0.2039	343.23	35	3.5690	666.85	68	6.9341
29.420	3	0.3059	353.04	36	3.6710	676.66	69	7.0360
39.227	4	0.4079	362.85	37	3.7729	686.47	70	7.1380
49.033	5	0.5099	372.65	38	3.8749	696.27	71	7.2400
58.840	6	0.6118	382.46	39	3.9769	706.08	72	7.3420
68.647	7	0.7138	392.27	40	4.0789	715.89	73	7.4439
78.453	8	0.8158	402.07	41	4.1808	725.69	74	7.5459
88.260	9	0.9177	411.88	42	4.2828	735.50	75	7.6479
98.066	10	1.0197	421.69	43	4.3848	745.31	76	7.7498
107.87	11	1.1217	431.49	44	4.4868	755.11	77	7.8518
117.68	12	1.2237	441.30	45	4.5887	764.92	78	7.9538
127.49	13	1.3256	451.11	46	4.6907	774.73	79	8.0558
137.29	14	1.4276	460.91	47	4.7927	784.53	80	8.1577
147.10	15	1.5296	470.72	48	4.8946	794.34	81	8.2597
156.91	16	1.6315	480.53	49	4.9966	804.15	82	8.3617
166.71	17	1.7335	490.33	50	5.0986	813.95	83	8.4636
176.52	18	1.8355	500.14	51	5.2006	823.76	84	8.5656
186.33	19	1.9375	509.95	52	5.3025	833.57	85	8.6676
196.13	20	2.0394	519.75	53	5.4045	843.37	86	8.7696
205.94	21	2.1414	529.56	54	5.5065	853.18	87	8.8715
215.75	22	2.2434	539.37	55	5.6084	862.99	88	8.9735
225.55	23	2.3453	549.17	56	5.7104	872.79	89	9.0755
235.36	24	2.4473	558.98	57	5.8124	882.60	90	9.1774
245.17	25	2.5493	568.79	58	5.9144	892.41	91	9.2794
254.97	26	2.6513	578.59	59	6.0163	902.21	92	9.3814
264.78	27	2.7532	588.40	60	6.1183	912.02	93	9.4834
274.59	28	2.8552	598.21	61	6.2203	921.83	94	9.5853
284.39	29	2.9572	608.01	62	6.3222	931.63	95	9.6873
294.20	30	3.0591	617.82	63	6.4242	941.44	96	9.7893
304.01	31	3.1611	627.63	64	6.5262	951.25	97	9.8912
313.81	32	3.2631	637.43	65	6.6282	961.05	98	9.9932
323.62	33	3.3651	647.24	66	6.7301	970.86	99	10.095

Appendix Table 3 kg-lb Conversion Table

How to use this table

For example, to convert 10 kg into lb, read the figure in the right lb column adjacent to the 10 in the center column in the 1st block. This means that 10 kg is 22.046 lb. To convert 10 lb into kg, read the figure in the left kg column of the same row, which indicates that the answer is 4.536 kg.

1 kg=2.2046226 lb
1 lb=0.45359237 kg

kg		lb	kg		lb	kg		lb
0.454	1	2.205	15.422	34	74.957	30.391	67	147.71
0.907	2	4.409	15.876	35	77.162	30.844	68	149.91
1.361	3	6.614	16.329	36	79.366	31.298	69	152.12
1.814	4	8.818	16.783	37	81.571	31.751	70	154.32
2.268	5	11.023	17.237	38	83.776	32.205	71	156.53
2.722	6	13.228	17.690	39	85.980	32.659	72	158.73
3.175	7	15.432	18.144	40	88.185	33.112	73	160.94
3.629	8	17.637	18.597	41	90.390	33.566	74	163.14
4.082	9	19.842	19.051	42	92.594	34.019	75	165.35
4.536	10	22.046	19.504	43	94.799	34.473	76	167.55
4.990	11	24.251	19.958	44	97.003	34.927	77	169.76
5.443	12	26.455	20.412	45	99.208	35.380	78	171.96
5.897	13	28.660	20.865	46	101.41	35.834	79	174.17
6.350	14	30.865	21.319	47	103.62	36.287	80	176.37
6.804	15	33.069	21.772	48	105.82	36.741	81	178.57
7.257	16	35.274	22.226	49	108.03	37.195	82	180.78
7.711	17	37.479	22.680	50	110.23	37.648	83	182.98
8.165	18	39.683	23.133	51	112.44	38.102	84	185.19
8.618	19	41.888	23.587	52	114.64	38.555	85	187.39
9.072	20	44.092	24.040	53	116.84	39.009	86	189.60
9.525	21	46.297	24.494	54	119.05	39.463	87	191.80
9.979	22	48.502	24.948	55	121.25	39.916	88	194.01
10.433	23	50.706	25.401	56	123.46	40.370	89	196.21
10.886	24	52.911	25.855	57	125.66	40.823	90	198.42
11.340	25	55.116	26.308	58	127.87	41.277	91	200.62
11.793	26	57.320	26.762	59	130.07	41.730	92	202.83
12.247	27	59.525	27.216	60	132.28	42.184	93	205.03
12.701	28	61.729	27.669	61	134.48	42.638	94	207.23
13.154	29	63.934	28.123	62	136.69	43.091	95	209.44
13.608	30	66.139	28.576	63	138.89	43.545	96	211.64
14.061	31	68.343	29.030	64	141.10	43.998	97	213.85
14.515	32	70.548	29.484	65	143.30	44.452	98	216.05
14.969	33	72.753	29.937	66	145.51	44.906	99	218.26

Appendix Table 4 °C - °F Conversion Table

How to use this table

For example, to convert 38 °C into °F, read the figure in the right °F column adjacent to the 38 in the center column in the 2nd block. This means that 38 °C is 100.4 °F. To convert 38 °F into °C, read the figure in the left °C column of the same row, which indicates that the answer is 3.3 °C.

$$C = \frac{5}{9}(F - 32)$$

$$F = 32 + \frac{9}{5}C$$

°C		°F	°C		°F	°C		°F	°C		°F
-73.3	-100	-148.0	0.0	32	89.6	21.7	71	159.8	43.3	110	230
-62.2	80	-112.0	0.6	33	91.4	22.2	72	161.6	46.1	115	239
-51.1	60	-76.0	1.1	34	93.2	22.8	73	163.4	48.9	120	248
-40.0	40	-40.0	1.7	35	95.0	23.3	74	165.2	51.7	125	257
-34.4	30	-22.0	2.2	36	96.8	23.9	75	167.0	54.4	130	266
-28.9	20	-4.0	2.8	37	98.6	24.4	76	168.8	57.2	135	275
-23.3	10	14.0	3.3	38	100.4	25.0	77	170.6	60.0	140	284
-17.8	0	32.0	3.9	39	102.2	25.6	78	172.4	65.6	150	302
-17.2	1	33.8	4.4	40	104.0	26.1	79	174.2	71.1	160	320
-16.7	2	35.6	5.0	41	105.8	26.7	80	176.0	76.7	170	338
-16.1	3	37.4	5.6	42	107.6	27.2	81	177.8	82.2	180	356
-15.6	4	39.2	6.1	43	109.4	27.8	82	179.6	87.8	190	374
-15.0	5	41.0	6.7	44	111.2	28.3	83	181.4	93.3	200	392
-14.4	6	42.8	7.2	45	113.0	28.9	84	183.2	98.9	210	410
-13.9	7	44.6	7.8	46	114.8	29.4	85	185.0	104.4	220	428
-13.3	8	46.4	8.3	47	116.6	30.0	86	186.8	110.0	230	446
-12.8	9	48.2	8.9	48	118.4	30.6	87	188.6	115.6	240	464
-12.2	10	50.0	9.4	49	120.2	31.1	88	190.4	121.1	250	482
-11.7	11	51.8	10.0	50	122.0	31.7	89	192.2	148.9	300	572
-11.1	12	53.6	10.6	51	123.8	32.2	90	194.0	176.7	350	662
-10.6	13	55.4	11.1	52	125.6	32.8	91	195.8	204	400	752
-10.0	14	57.2	11.7	53	127.4	33.3	92	197.6	232	450	842
-9.4	15	59.0	12.2	54	129.2	33.9	93	199.4	260	500	932
-8.9	16	60.8	12.8	55	131.0	34.4	94	201.2	288	550	1022
-8.3	17	62.6	13.3	56	132.8	35.0	95	203.0	316	600	1112
-7.8	18	64.4	13.9	57	134.6	35.6	96	204.8	343	650	1202
-7.2	19	66.2	14.4	58	136.4	36.1	97	206.6	371	700	1292
-6.7	20	68.0	15.0	59	138.2	36.7	98	208.4	399	750	1382
-6.1	21	69.8	15.6	60	140.0	37.2	99	210.2	427	800	1472
-5.6	22	71.6	16.1	61	141.8	37.8	100	212.0	454	850	1562
-5.0	23	73.4	16.7	62	143.6	38.3	101	213.8	482	900	1652
-4.4	24	75.2	17.2	63	145.4	38.9	102	215.6	510	950	1742
-3.9	25	77.0	17.8	64	147.2	39.4	103	217.4	538	1 000	1832
-3.3	26	78.8	18.3	65	149.0	40.0	104	219.2	593	1 100	2012
-2.8	27	80.6	18.9	66	150.8	40.6	105	221.0	649	1 200	2192
-2.2	28	82.4	19.4	67	152.6	41.1	106	222.8	704	1 300	2372
-1.7	29	84.2	20.0	68	154.4	41.7	107	224.6	760	1 400	2552
-1.1	30	86.0	20.6	69	156.2	42.2	108	226.4	816	1 500	2732
-0.6	31	87.8	21.1	70	158.0	42.8	109	228.2	871	1 600	2912

Appendix Table 5 Viscosity Conversion Table

Kinematic Viscosity mm ² /s	Saybolt Universal SUS (sec)		No.1 Type Redwood R (sec)		Engler E (degree)	Kinematic Viscosity mm ² /s	Saybolt Universal SUS (sec)		No.1 Type Redwood R (sec)		Engler E (degree)
	100 °F	210 °F	50 °C	100 °C			100 °F	210 °F	50 °C	100 °C	
2	32.6	32.8	30.8	31.2	1.14	35	163	164	144	147	4.70
3	36.0	36.3	33.3	33.7	1.22	36	168	170	148	151	4.83
4	39.1	39.4	35.9	36.5	1.31	37	172	173	153	155	4.96
5	42.3	42.6	38.5	39.1	1.40	38	177	178	156	159	5.08
6	45.5	45.8	41.1	41.7	1.48	39	181	183	160	164	5.21
7	48.7	49.0	43.7	44.3	1.56	40	186	187	164	168	5.34
8	52.0	52.4	46.3	47.0	1.65	41	190	192	168	172	5.47
9	55.4	55.8	49.1	50.0	1.75	42	195	196	172	176	5.59
10	58.8	59.2	52.1	52.9	1.84	43	199	201	176	180	5.72
11	62.3	62.7	55.1	56.0	1.93	44	204	205	180	185	5.85
12	65.9	66.4	58.2	59.1	2.02	45	208	210	184	189	5.98
13	69.6	70.1	61.4	62.3	2.12	46	213	215	188	193	6.11
14	73.4	73.9	64.7	65.6	2.22	47	218	219	193	197	6.24
15	77.2	77.7	68.0	69.1	2.32	48	222	224	197	202	6.37
16	81.1	81.7	71.5	72.6	2.43	49	227	228	201	206	6.50
17	85.1	85.7	75.0	76.1	2.54	50	231	233	205	210	6.63
18	89.2	89.8	78.6	79.7	2.64	55	254	256	225	231	7.24
19	93.3	94.0	82.1	83.6	2.76	60	277	279	245	252	7.90
20	97.5	98.2	85.8	87.4	2.87	65	300	302	266	273	8.55
21	102	102	89.5	91.3	2.98	70	323	326	286	294	9.21
22	106	107	93.3	95.1	3.10	75	346	349	306	315	9.89
23	110	111	97.1	98.9	3.22	80	371	373	326	336	10.5
24	115	115	101	103	3.34	85	394	397	347	357	11.2
25	119	120	105	107	3.46	90	417	420	367	378	11.8
26	123	124	109	111	3.58	95	440	443	387	399	12.5
27	128	129	112	115	3.70	100	464	467	408	420	13.2
28	132	133	116	119	3.82	120	556	560	490	504	15.8
29	137	138	120	123	3.95	140	649	653	571	588	18.4
30	141	142	124	127	4.07	160	742	747	653	672	21.1
31	145	146	128	131	4.20	180	834	840	734	757	23.7
32	150	150	132	135	4.32	200	927	933	816	841	26.3
33	154	155	136	139	4.45	250	1 159	1 167	1 020	1 051	32.9
34	159	160	140	143	4.57	300	1 391	1 400	1 224	1 241	39.5

Remarks 1 mm²/s=1 cSt

Appendix Table 6 inch – mm Conversion Table

1" = 25.4 mm

Conversion table with columns for inch (Fraction, Decimal) and mm (0-10). Rows list equivalent values for various inch fractions like 1/64, 1/32, 1/16, etc.

Appendix Table 7 Hardness Conversion Table (Reference)

Hardness conversion table with columns for Rockwell C Scale Hardness, Vickers Hardness, Brinell Hardness (Standard Ball, Tungsten Carbide Ball), Rockwell Hardness (A Scale, B Scale), and Shore Hardness. Rows list conversion values for various hardness scales.

Appendix Table 8 Values of Standard Tolerance Grades IT

Basic Size (mm)		Standard											Grades								Basic Size (mm)	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18			
over	incl.	Tolerances (μm)											Tolerances (mm)								over	incl.
—	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.10	0.14	0.25	0.40	0.60	1.00	1.40	—	3	
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.30	0.48	0.75	1.20	1.80	3	6	
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.90	1.50	2.20	6	10	
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.70	1.10	1.80	2.70	10	18	
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.30	2.10	3.30	18	30	
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1.00	1.60	2.50	3.90	30	50	
50	80	2	3	5	8	13	19	30	46	74	120	190	0.30	0.46	0.74	1.20	1.90	3.00	4.60	50	80	
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.40	2.20	3.50	5.40	80	120	
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.40	0.63	1.00	1.60	2.50	4.00	6.30	120	180	
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.90	4.60	7.20	180	250	
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.30	2.10	3.20	5.20	8.10	250	315	
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.40	2.30	3.60	5.70	8.90	315	400	
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.50	4.00	6.30	9.70	400	500	
500	630	9	11	16	22	32	44	70	110	175	280	440	0.70	1.10	1.75	2.80	4.40	7.00	11.00	500	630	
630	800	10	13	18	25	36	50	80	125	200	320	500	0.80	1.25	2.00	3.20	5.00	8.00	12.50	630	800	
800	1 000	11	15	21	28	40	56	90	140	230	360	560	0.90	1.40	2.30	3.60	5.60	9.00	14.00	800	1 000	
1 000	1 250	13	18	24	33	47	66	105	165	260	420	660	1.05	1.65	2.60	4.20	6.60	10.50	16.50	1 000	1 250	
1 250	1 600	15	21	29	39	55	78	125	195	310	500	780	1.25	1.95	3.10	5.00	7.80	12.50	19.50	1 250	1 600	
1 600	2 000	18	25	35	46	65	92	150	230	370	600	920	1.50	2.30	3.70	6.00	9.20	15.00	23.00	1 600	2 000	
2 000	2 500	22	30	41	55	78	110	175	280	440	700	1 100	1.75	2.80	4.40	7.00	11.00	17.50	28.00	2 000	2 500	
2 500	3 150	26	36	50	68	96	135	210	330	540	860	1 350	2.10	3.30	5.40	8.60	13.50	21.00	33.00	2 500	3 150	

Remarks 1. Standard tolerance grades IT14 to IT18 shall not be used for basic sizes less than or equal to 1 mm.
 2. Values for standard tolerance grades IT1 to IT5 for basic sizes over 500 mm are included for experimental use.

Appendix Table 9 Physical and Mechanical Properties of Materials

Materials	Specific Gravity	Coefficient of Linear Expansion (0 to 100 °C) (K ⁻¹)	Hardness (Brinell)	Modulus of Direct Elasticity (MPa) {kgf/mm ² }	Tensile Strength (MPa) {kgf/mm ² }	Yield Point (MPa) {kgf/mm ² }	Elongation (%)
Bearing Steel (hardened)	7.83	12.5 × 10 ⁻⁶	650 to 740	208 000 {21 200}	1 570 to 1 960 {160 to 200}	—	—
Martensitic Stainless Steel SUS 440C	7.68	10.1 × 10 ⁻⁶	580	200 000 {20 400}	1 960 {200}	1 860 {190}	—
Mild Steel (C=0.12 to 0.20 %)	7.86	11.6 × 10 ⁻⁶	100 to 130	206 000 {21 000}	373 to 471 {38 to 48}	216 to 294 {22 to 30}	24 to 36
Hard Steel (C=0.3 to 0.5 %)	7.84	11.3 × 10 ⁻⁶	160 to 200	206 000 {21 000}	539 to 686 {55 to 70}	333 to 451 {34 to 46}	14 to 26
Austenitic Stainless Steel SUS 304	8.03	16.3 × 10 ⁻⁶	150	193 000 {19 700}	588 {60}	245 {25}	60
Cast Iron	Gray Iron FC200	7.3	223	98 100 {10 000}	More than 200 {20}	—	—
	Spheroidal graphite Iron FCD400	7.0	Less than 201		More than 400 {41}	—	More than 12
Aluminum	2.69	23.7 × 10 ⁻⁶	15 to 26	70 600 {7 200}	78 {8}	34 {3.5}	35
Zinc	7.14	31 × 10 ⁻⁶	30 to 60	92 200 {9 400}	147 {15}	—	30 to 40
Copper	8.93	16.2 × 10 ⁻⁶	50	123 000 {12 500}	196 {20}	69 {7}	15 to 20
Brass	(Annealed)	8.5	45	103 000 {10 500}	294 to 343 {30 to 35}	—	65 to 75
	(Machined)		85 to 130		363 to 539 {37 to 55}		15 to 50

Remarks The hardness of hardened bearing steel and martensitic stainless steel is usually expressed using the Rockwell C Scale, but for comparison, it is converted into Brinell hardness.

Bearing Conversion Tables

	Page
Conversion Table 1 Deep groove ball bearings open type (Metric series)	66
Conversion Table 2 Deep groove ball bearings shielded type (Metric series)	67
Conversion Table 3 Deep groove ball bearings with flanged outer ring open type (Metric series)	68
Conversion Table 4 Deep groove ball bearings with flanged outer ring shielded type (Metric series)	69
Conversion Table 5 Deep groove ball bearings open type (Inch series)	70
Conversion Table 6 Deep groove ball bearings shielded type (Inch series)	70
Conversion Table 7 Deep groove ball bearings with flanged outer ring open type (Inch series)	71
Conversion Table 8 Deep groove ball bearings with flanged outer ring shielded type (Inch series)	71
Conversion Table 9 Deep groove ball bearings with extended inner ring open type (Inch series)	72
Conversion Table 10 Deep groove ball bearings with extended inner ring shielded type (Inch series)	72
Conversion Table 11 Deep groove ball bearings with extended inner ring, flanged open type (Inch series)	73
Conversion Table 12 Deep groove ball bearings with extended inner ring, flanged shielded type (Inch series)	73
Conversion Table 13 Ball bearings for synchros (Inch series)	74

Conversion Table 1
Deep groove ball bearings
Open type (Metric series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1	0.0394	681 MR31 691	AX1 — —	— — —	681 — 691	UL103 — —	— — —	— — —	L-310 L-310W51 R-410	681 — 691
1.2	0.0472	MR41X	—	—	—	—	—	—	R-412	BC1.2-4
1.5	0.0591	681X 691X 601X	AX1.5 619/1.5 —	— MR69/1.5 —	68/1.5 69/1.5 —	UL154 R1550 —	— 19M1-5Y1 —	EL1.5C — —	R-415 R-515 R-615	68/1.5 69/1.5 60/1.5
2	0.0787	682 MR52B 692 MR62 MR72 602	BX2 — AX2 — —	MR682 — MR619/2 — —	682 — 692 — —	UL205 — R2060 — —	— — 19M2Y1 — —	UL20C — EL2C — —	L-520 L-520W02 R-620 R-620W52 R-720Y52 R-720	682 BC2-5 692 BC2-6 BC2-7 602
2.5	0.0984	682X 692X MR82X 602X	AX2.5 X2.5 — 60/2.5	— — — MR60/2.5	68/2.5 69/2.5 — 60/2.5	UL256 — — R2580	18M2-5 19M2-5Y1 — —	— — — —	L-625 R-725 R-825Y52 R-825	68/2.5 69/2.5 BC2.5-8 60/2.5
3	0.1181	MR63 683A MR83 693 MR93 603 623 633	617/3 AX3 X3 619/3 — — 623 —	— MR618/3 — — — MR623 —	— 683 693/003 693 — — 623 —	UL307 — — — — R3100 —	— — — — — 2M3Y1 —	— UL30C — — — EL-3R —	L-630 L-730 R-830Y52 R-830 R-930Y52 R-930 R-1030 —	673 683 BC3-8 693 BC3-9 603 623 633
4	0.1575	MR74 MR84 684A MR104B 694 604 624 634	617/4 — AX4 X4 AY4 604 624 634	— MR618/4 — — — MR624 MR634	— 684 — — 694 604 624 634	UL409 — — — — R4130 R4160	— — — — — 2M4 34	— UL40C — — — EL4R —	L-740 L-840 L-940 L-1040 R-1140 R-1240 R-1340 R-1640	674 BC4-8 684 BC4-10 694 604 624 634
5	0.1969	MR85 MR95 MR105 685 695 605 625 635	617/5 — — X5 AY5 — 625 635	— — — MR618/5 — — MR625 MR635	— — — 685 695 605 625 635	UL511 — — — — R5160 R5190	— — — — — 34-5 35	— UL50C — — — EL5R —	L-850 L-950 L-1050 L-1150 R-1350 R-1450 R-1650 R-1950	675 BC5-9 BC5-10 685 695 605 625 635
6	0.2362	MR106 MR126 686A 696 606 626 636	617/6 X6 AX6 AY6 — 626 —	— MR618/6 — — — MR626 —	— 686 — — 696 — 626 —	UL613 — — — — U6190 —	— — — — — 36 —	— UL60C — — — EL6R —	L-1060 L-1260 L-1360 R-1560 R-1760 R-1960 —	676 BC6-12 686 696 606 626 636
7	0.2756	MR117 MR137 687 697 607 627 637	617/7 — AX7 AY7 607 627 —	— — 618/7 — — MR607 MR627 —	— — 687 — — 697 607 627 —	UL714 — — — — R7220 —	— — — — — 37 —	— UL70C — — — EL7R —	L-1170 L-1370 L-1470 — R-1970 R-2270 —	677 BC7-13 687 697 607 627 637
8	0.3150	MR128 MR148 688A 698 608 628 638	617/8 — X8 AY8 608 — —	— MR618/8 — — — MR608 —	— 688 — — 698 608 — —	UL816 — — — — R8220 —	— — — — — 19M8 38	— EL8R — — — — —	L-1280 L-1480 L-1680 R-1980 R-2280 — —	678 BC8-14 688 698 608 628 638
9	0.3543	689 699 609 629 639	X9 AY9 609 629 —	— — 609 MR629 —	689 699 609 629 —	UL917 — 609 — —	— — 19M9 — 39 —	— — — — — — —	L-1790 L-2090 — — — — —	689 699 609 629 639
In case of stainless steel		h S	W	S	S	X	S	S	SS	F

Conversion Table 2
Deep groove ball bearings
Shielded type (Metric series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.5	0.0591	681XZZ 691XZZ 601XZZS	AX1.5ZZ X1.5ZZ —	— — —	68/1.5-2Z 69/1.5-2Z —	ULZ154 — —	— — —	UL15CHH — —	L-415ZZ R-515ZZ R-615ZZ	W68/1.5ZZA W69/1.5ZZA W60/1.5ZZA
2	0.0787	682ZZ MR52BZZ 692ZZ MR62ZZ MR72ZZ 602ZZ	BX2ZZ — AX2ZZ — — —	— — — — — —	682-2Z — — — — —	ULZ205 — — — — —	38M2SS — — — — —	UL20CHH — — — — —	L-520ZZ L-520ZZW52 R-620ZZ R-620ZZY52 R-720ZZY03 R-720ZZ	W682ZZA WBC2-5ZZA W692ZZA — WBC2-7ZZA W602ZZA
2.5	0.0984	682XZZ 692XZZ 602XZZ	AX2.5ZZ — —	— — —	68/2.5-2Z 69/2.5-2Z —	ULZ256 — —	38M2-5SS — —	— — —	L-625ZZ R-725ZZ R-825ZZ	W68/2.5ZZA W69/2.5ZZA W60/2.5ZZA
3	0.1181	MR63ZZ 683AZZ 693ZZ MR93ZZ 623ZZ 633ZZ	— AX3ZZ — — 623ZZ —	— — — — 623.27 —	— 683-2Z 693-2Z — — 623-2Z —	— ULZ307 — — — RF310 —	— 38M3SS — — — 2M3SSY1 —	— UL30CHH — — — EL3RHH —	L-630ZZ R-730ZZ R-830ZZ R-930ZZY04 R-1030ZZ —	WA673ZZA W683ZZA W693ZZA WBC3-9ZZA 623ZZ 633ZZ
4	0.1575	MR74ZZ MR84ZZ 684AZZ MR104BZZ 694ZZ 604ZZ 624ZZ 634ZZ1	— — 638/4ZZ X4ZZ AY4ZZ 604ZZ 624ZZ 634ZZ	— — — — — — 624.2Z MR634.2Z	— 684-2Z — — 694-2Z 604-2Z 624-2Z 634-2Z	— ULZ409 — — — RF413 RV416	— 38M455 — — — 2M4SS 34SS	— UL40CHH — — — EL4RHH 34RHH	L-740XZZ L-840ZZ L-940ZZ L-1040ZZ R-1140ZZ R-1240ZZ R-1340ZZ R-1640ZZ	WA674ZZA WBC4-8ZZA W684ZZA WBC4-10ZZA 694ZZ 604ZZ 624ZZ 634ZZ
5	0.1969	MR85ZZ MR95ZZ1 MR105ZZ 685ZZ 695ZZ 605ZZ 625ZZ1 635ZZ1	— — — 638/5ZZ AY5ZZ — 625ZZ 635ZZ	— — — — — — 625.2Z MR635.2Z	— 685-2Z 695-2Z 605-2Z 625-2Z 635-2Z	— ULZ511 — — — RV516 RV519	— — — — — 34-5SS 35SS	— UL50CHH — — — EL5RHH —	L-850ZZ L-950XZZ L-1050ZZ L-1150ZZ R-1350ZZ R-1450ZZ R-1650ZZ R-1950ZZ	WA675ZZA WBC5-9ZZA WBC5-10ZZA W685ZZ 695ZZ 605ZZ 625ZZ 635ZZ
6	0.2362	MR106ZZ1 MR126ZZ 686AZZ 696ZZ1 606ZZ 626ZZ1 636ZZ	— X6ZZ 628/6ZZ ZY6ZZ — 626ZZ —	— — — — MR626.2Z — — —	— 686-2Z — — 696-2Z — 626-2Z —	— ULZ613 — — — RV619 —	— — — — — 36SS —	— UL60CHH — — — EL6RHH —	L-1060ZZ L-1260ZZ L-1360ZZ R-1560ZZ R-1760ZZ R-1960ZZ —	WA676ZZA WBC6-12ZZA W686ZZ 696ZZ 606ZZ 626ZZ 636ZZ
7	0.2756	MR117ZZ MR137ZZ 687ZZ1 697ZZ1 607ZZ1 627ZZ 637ZZ	— — AX7ZZ AY7ZZ 607ZZ 627ZZ —	— — — — — — 607.2Z MR627.2Z	— 687-2Z — — 697-2Z 607-2Z 627-2Z —	— ULZ714 — — — RV722 —	— — — — — 37SS —	— UL70CH — — — EL7RHH —	L-1170ZZ L-1370ZZ L-1470ZZ — R-1970ZZ R-2270ZZ —	WA677ZZA WBC7-13ZZA W687ZZ 697ZZ 607ZZ 627ZZ 637ZZ
8	0.3150	MR128ZZ1 MR148ZZ 688AZZ1 698ZZ 608ZZ 628ZZ 638ZZ	— — X8ZZ AY8ZZ 608ZZ 628ZZ 638ZZ	— — — — — — 609.2Z MR629.2Z	— 698-2Z 608-2Z — — — — —	— ULZ816 — — — RV822 —	— — — — — 19M8SS 38SS —	— — — — — EL8RHH —	L-1280ZZ L-1480ZZ L-1680ZZ R-1980ZZ R-2280ZZ — —	W678ZZA WBC8-14ZZ W688ZZ 698ZZ 608ZZ 628ZZ 638ZZ
9	0.3543	689ZZ1 699ZZ1 609ZZ 629ZZ 639ZZ	X9ZZ AY9ZZ 609ZZ 629ZZ —	— — 609.2Z MR629.2Z —	— 699-2Z 609-2Z 629-2Z —	— ULZ917 — — — — 39SS —	— — — — — — — —	— — — — — — — —	L-1790ZZ L-2090ZZ — — — — — —	W689ZZ 699ZZ 609ZZ 629ZZ 639ZZ
In case of stainless steel		h S	W	S	S	X	S	S	SS	F

Conversion Table 3
Deep groove ball bearings with flanged outer ring
Open type (Metric series)

Bore diameter d		NSK	ADR	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch								
1	0.0394	F681 F691	—	—	—	—	—	LF-310 RF-410	FL681 FL691
1.2	0.0472	MF41X	—	—	—	—	—	RF-412	FLBC1.2-4
1.5	0.0591	F681X F691X F601X	FAX1.5 F619/1.5	F68/1.5 F69/1.5	ULK154	— F19M1-5Y1	—	LF-415 RF-515 RF-615	FL68/1.5 FL69/1.5 EL60/1.5
2	0.0787	F682 MF52B F692	FBX2 FAX2	F682 F692	ULK205 RK2060	F682 F692	UL20FC	LF-520 RF-620	FL682 FL692
		MF62 MF72 F602	—	—	—	—	—	RF-620W52 RF-720Y52 RF-720	FLBC2-6 FL602
2.5	0.0984	F682X F692X MF82X F602X	FAX2.5 FX2.5	F68/2.5 F69/2.5	ULK256	F68/2.5 F19M2-5Y1	—	LF-625 RF-725 RF-825Y52 RF-825	FL68/2.5 FL69/2.5 FLBC2.5-8 FL60/2.5
3	0.1181	MF63 F683A MF83	— FAX3	— F683	— ULK307	— F683	— UL30FC	LF-630 LF-730 RF-830Y52	FL673 FL683 FLBC3-8
		F693 MF93 F603	— FX3	— F693	— —	— F693	— —	RF-830 RF-930Y52 RF-930	FL693 FLBC3-9 FL603
		F623	F623	F623	RK3100	F623	—	RF-1030	FL623
4	0.1575	MF74 MF84 F684A	— FAX4	— F684	— ULK409	— F684	— UL40FC	LF-740 LF-840 LF-940	FL674 FLBC4-8 FL684
		MF104B F694 F604	— —	— F694	— —	— F694	— —	LF-1040 RF-1140 RF-1240	FLBC4-10 FL694 FL604
		F624 F634	F624	F624 F634	— —	F624 F634	— —	RF-1340 RF-1640	FL624
5	0.1969	MF85 MF95 MF105	— — —	— — —	— — —	— — —	— — —	LF-850 LF-950 LF-1050	FL675 FLBC5-9 FLBC5-10
		F685 F695 F605	FX5	F685 F695 F605	ULK511	F685 F695	UL50FC	LF-1150 RF-1350 RF-1450	FL685 FL695 FL605
		F625 F635	—	F625 F635	—	F625 F635	—	RF-1650 RF-1950	FL625
6	0.2362	MF106 MF126 F686A	— FAX6	— F686	— —	— F686	— UL60FC	LF-1060 LF-1260 LF-1360	FL676 FLBC6-12 FL686
		F696 F606 F626	— —	F696 F626	— —	F696 F626	— —	RF-1560 RF-1760 RF-1960	FL696 FL606 FL626
7	0.2756	MF117 MF137 F687	— FAX7	— F687	— ULK714	— F687	— UL70FC	LF-1170 LF-1370 LF-1470	FL677 FLBC7-13 FL687
		F697 F607 F627	— F607	F697 F607	— —	F697 F607	— —	— RF-2270	FL697
8	0.3150	MF128 MF148 F688A	— FX8	— F688	— ULK816	— F688	— —	LF-1280 LF-1480 LF-1680	FL678 FLBC8-14 FL688
		F698 F608	— F608	F698 F608	— —	F698	— —	RF-1980 RF-2280	FL698 FL608
9	0.3543	F689 F699	FX9	F689	—	—	—	LF-1790	FL689
In case of stainless steel		h	W	S	X	S	S	SS	F

Conversion Table 4
Deep groove ball bearings with flanged outer ring
Shielded type (Metric series)

Bore diameter d		NSK	ADR	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch								
1.5	0.591	F691XZZ F601XZZ	FX1.5ZZ	F69/1.5-2Z	—	—	—	RF-515ZZ RF-615ZZ	FLW69/1.5ZZA FLW60/1.5ZZA
2	0.0787	F682ZZ MF52BZZ F692ZZ MF72ZZ F602ZZ	FBX2ZZ FAX2ZZ	F682-2Z	ULKZ205	F682SS F692SS	UL20FCHH	LF-520ZZ RF-620ZZ RF-720ZZY03 RF-720ZZ	FLW682ZZA — FLW692ZZA FLWBC2-7ZZA FLW602ZZA
2.5	0.0984	F682XZZ F692XZZ F602XZZ	FAX2.5ZZ FX2.5ZZ	F68/2.5-2Z F69/2.5-2Z	ULKZ256	F68/2.5SS F69/2.5SS	—	LF-625ZZ RF-725ZZ RF-825ZZ	FLW68/2.5ZZA FLW69/2.5ZZA FLW60/2.5ZZA
3	0.1181	MF63ZZ F683AZZ F693ZZ	— FAX3ZZ FX3ZZ	— F683-2Z F693-2Z	— ULKZ307 RKF308	— F683SS	UL30FCHH	FL-630ZZ LF-730ZZ RF-830ZZ	FLWA673ZZA FLW683ZZA FLW693ZZA
		MF93ZZ F623ZZ	— F623ZZ	— F623-2Z	— RKF310	— F623SS	—	RF-930ZZY04 RF-1030ZZ	FLWBC3-9ZZA FL623ZZA
4	0.1575	MF74ZZ MF84ZZ F684AZZ	— — F638/4ZZ	— — F684-2Z	— — ULKZ409	— — F684SS	— — UL40FCHH	LF-740ZZ LF-840ZZ LF-940ZZ	FLWA674ZZA FLWBC4-8ZZA FLW684ZZA
		MF104BZZ F694ZZ F604ZZ	— — —	— F694-2Z	— —	— F694SS	— —	LF-1040ZZ RF-1140ZZ RF-1240ZZ	FLAWBC4-10ZZA FL694ZZA FL604ZZ
		F624ZZ F634ZZ1	F624ZZ	F624-2Z F634-2Z	— —	— F624SS F634SS	— —	RF-1340ZZ RF-1640ZZ	FL624ZZ FL634ZZ
5	0.1969	MF85ZZ MF95ZZ1 MF105ZZ	— — —	— — —	— — —	— — —	— — —	LF-850ZZ LF-950ZZ LF-1050ZZ	FLWA675ZZA FLWBC5-9ZZA FLAWBC5-10ZZA
		F685ZZ F695ZZ F605ZZ	F638/5ZZ	F685-2Z F695-2Z F605-2Z	ULKZ511	F685SS F695SS	UL50FCHH	LF-1150ZZ RF-1350ZZ RF-1450ZZ	FLW685ZZA FL695ZZ FL605ZZ
		F625ZZ1 F635ZZ1	—	F625-2Z F635-2Z	—	— F625SS F635SS	—	RF-1650ZZ RF-1950ZZ	FL625ZZ FL635ZZ
6	0.2362	MF106ZZ1 MF126ZZ F686AZZ	— F628/6ZZ	— F686-2Z	— ULKZ613	— F686SS	— UL60FCHH	LF-1060ZZ UF-1260ZZ LF-1360ZZ	FLWA676ZZA FLWBC6-12ZZA FLW686ZZA
		F696ZZ1 F606ZZ1 F626ZZ1	— — —	F696-2Z — F626-2Z	— — —	— F696SS F626SS	— — —	RF-1560ZZ RF-1760ZZ	FL696ZZ FL606ZZ FL626ZZ
7	0.2756	MF117ZZ MF137ZZ F687ZZ1	— FAX7ZZ	— F687-2Z	— ULKZ714	— F687SS	— UL70FCHH	LF-1170ZZ LF-1370ZZ LF-1470ZZ	FLWA677ZZA FLWBC7-13ZZA FLW687ZZA
		F697ZZ1 F607ZZ1 F627ZZ	— F607ZZ	F697-2Z F607-2Z F627-2Z	— — —	— F697SS F607SS F627SS	— — —	— RF-2270ZZ	FL697ZZ FL607ZZ FL627ZZ
8	0.3150	MF128ZZ1 MF148ZZ F688AZZ1	— — —	— — —	— — —	— — F688SS	— — —	LF-1280ZZ UF-1480ZZ UF-1680ZZ	FLWA678ZZA FLWBC8-14ZZA FLW688ZZ
		F698ZZ F608ZZ	— F608ZZ	F698-2Z F608-2Z	— —	— F698SS F608SS	— —	— RF-2280ZZ	FL698ZZ FL608ZZ
9	0.3543	F689ZZ1 F699ZZ1	— —	— —	— —	— F689SS	— —	LF-1790ZZ	FLW689ZZ FL699ZZ
In case of stainless steel		h	W	S	X	S	S	SS	F

Conversion Table 5
Deep groove ball bearings
Open type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.016	0.0400	R09	R09	R0308	1016	UL1304	—	2C	R1-2	R01
1.191	0.0469	R0	X3/64	R0310	1191	UL1505	R0	2½C	RI-2½	R0
1.397	0.0550	R1	R1	R0412	1397	R1706	R1	3C	RI-3	R1
1.984	0.0781	R1-4	X5/64	R0516	BR5/64	R2508	R1-4	4C	RI-4	R1-4
2.380	0.0937	R133 R1-5	AX3/32 X3/32	R0612 R620	2380 BR3/32	UL3006 R3010	R133 R1-5	3332C 5C	RI-3332 RI-5	R133 R1-5
3.175	0.1250	R144 R2-5 R2-6 R2 R2A	AX1/8 X1/8 — R2 R2A	R0816 R820 R824 R2 R2A	3175 BR1/8A BR1/8A/6 BR1/8B BR1/8B/083	UL4008 R4010 — R4012 —	R144 R2-5 R2-6 R2 R2A	418C 518C 618C R2C R2AC	RI-418 RI-518 RI-618 R-2 —	R144 R2-5 R2-6 R2 RA2
3.967	0.1562	R155	X5/32	R1020	3967	UL5010	R155	5532C	RI-5532	R155
4.762	0.1875	R156 R166 R3	AX3/16 X3/16 Y3/16	R1220 R1224 R3	4763A 4763B BR3/16	UL6010 UL6012 R6016	R156 R166 R3	5632C 6316C R3C	RI-5632 RI-6632 R-3	R156 R166 R3
6.350	0.2500	R168 R188 R4B R4AA	X1/4 R188 Y1/4 R4A	R1624 R1632 R4 R4A	6350A 6350B BR1/4A BR1/4	UL8012 UL8016 R8020 —	R168 R188 R4 R4A	614C 814C R4C R4AR	RI-614 RI-814 R-4 RI-1214	R168 R188 R4 —
7.938	0.3125	R1810	—	R2032	7938	—	R1810	8516C	RI-8516	—
9.525	0.3750	R6	Y3/8	R6	BR3/8	—	R6	R6R	RI-1438	—
In case of stainless steel		S ———	W ———	S ———	S ———	——— X	S ———	S ———	SS ———	F ———

Conversion Table 6
Deep groove ball bearings
Shielded type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	R0ZZ	X3/64ZZ	R0310.2Z	1191-2Z	ULZ1505	R0SS	2½CHH	RI-2½ZZ	RA0ZZA
1.397	0.0550	R1ZZ	R1ZZ	R0412.2Z	1397-2Z	RF1706	R1S	3CHH	RI-3ZZ	RA1ZZ1
1.984	0.0781	R1-4ZZ	X5/64ZZ	R0516.2Z	BR5/64-2Z	RF2508	R1-4SS	4CHH	RI-4ZZ	RA1-4ZZ1
2.380	0.0937	R133ZZS R1-5ZZ	AX3/32ZZ X3/32ZZ	R0612.2Z R620.2Z	2380-2Z BR3/32ZZ	ULZ3006 RF3010	R133SS R1-5SS	3332CHH 5CHH	RI-3332ZZ RI-5ZZ	RA133ZZA RA1-5ZZA
3.175	0.1250	R144ZZ R2-5ZZ R2-6ZZS R2ZZ R2AZZ	AX1/8ZZ X1/8ZZ — R2ZZ R2AZZ	R0816.2Z R820.2Z R824.2Z R2.2Z R2A.2Z	3175-2Z BR1/8A-2Z BR1/8A/6-2Z BR1/8B-2Z BR1/8B/083-2Z	ULZ4008 RF4010 — RF4012 —	R144SS R2-5SS R2-6SS R2SS R2ASS	418CHH 518CHH 618CHH R2CHH R2ACHH	RI-418ZZ RI-518ZZ RI-618ZZ R-2ZZ —	RA144ZZA RA2-5ZZA RA2-6ZZA R2ZZA RA2ZZA
3.967	0.1562	R155ZZS	X5/32ZZ	R1020.2Z	3967-2Z	ULZ5010	R155SS	5532CHH	RI-5532ZZ	RA155ZZA
4.762	0.1875	R156ZZS R166ZZ R3ZZ	AX3/16ZZ X3/16ZZ Y3/16ZZ	R1220.2Z R1224.2Z R3.2Z	4763A-2Z 4763B-2Z BR3/16-2Z	ULZ6010 ULZ6012 RF6016	R156SS R166SS R3SS	5632CHH 6316CHH R3CHH	RI-5632ZZ RI-6632ZZ R-3ZZ	RA156ZZA RA166ZZA RA3ZZA
6.350	0.2500	R168ZZ R188ZZ R4BZZ R4AAZZ	X1/4ZZ R188ZZ Y1/4ZZ R4AZZ	R1624.2Z R1632.2Z R4.2Z R4A.2Z	6350A-2Z 6350B-2Z BR1/4A-2Z BR1/4-2Z	ULZ8012 ULZ8016 RF8020 —	R168SS R188SS R4SS R4ASS	614CHH 814CHH R4CHH R4ARHH	RI-614ZZ RI-814ZZ R-4ZZ RI-1214ZZ	R168ZZA RA188ZZA R4ZZ RA4ZZ
7.938	0.3125	R1810ZZ	—	R2032.2Z	7938-2Z	—	R1810SS	8516CHH	RI-8516ZZ	—
9.525	0.3750	R6ZZ	Y3/8ZZ	R6.2Z	BR3/8-2Z	—	R6SS	R6RHH	RI-1438ZZ	R6ZZ
In case of stainless steel		S ———	W ———	S ———	S ———	——— X	S ———	S ———	SS ———	F ———

Conversion Table 7
Deep groove ball bearings with flanged outer ring
Open type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	FR0	FX3/64	RF0310	F1191	ULK1505	FR0	2½FC	RIF-2½	FLR0
1.397	0.0550	FR1	FR1	RF0412	F1397	RK1706	FR1	3FC	RIF-3	FLR1
1.984	0.0781	FR1-4	FX5/64	RF0516	F5/64	RK2508	FR1-4	4FC	RIF-4	FLR1-4
2.380	0.0937	FR133 FR1-5	FAX3/32 FX3/32	RF0612 RF620	F2380 F3/32	ULK3006 RK3010	FR133 FR1-5	3332FC 5FC	RIF-3332 RIF-5	FLR133 FLR1-5
3.175	0.1250	FR144 FR2-5 FR2-6 FR2	FAX1/8 FX1/8 — FR2	RF0816 RF820 RF824 RF2	F3175 F1/8A F1/8A/6 F1/88	ULK4008 RK4010 — RK4012	FR144 FR2-5 FR2-6 FR2	418FC 518FC 618FC R2FC	RIF-418 RIF-518 RIF-618 RF-2	RIF-144 FLR2-5 FLR2-6 FLR2
3.967	0.1562	FR155	FX5/32	RF1020	F3967	ULK5010	FR155	5532FC	RIF-5532	FLR155
4.762	0.1875	FR156 FR166 FR3	FAX3/16 FX3/16 FY3/16	RF1220 RF1224 RF3	F4763A F4763B —	ULK6010 ULK6012 RK6016	FR156 FR166 FR3	5632FC 6316FC —	RIF-5632 RIF-6632 —	FLR156 FLR166 FLR3
6.350	0.2500	FR168 FR188 FR4B	FX1/4 FR188 FY1/4	RF1624 RF1632 RF4	F6350A F6350B F1/4A	ULK8012 ULK8016 RK8020	FR168 FR188 FR4	614FC 814FC R4FC	RIF-614 RIF-814 RF-4	FLR168 FLR188 FLR4
7.938	0.3125	FR1810	—	RF2032	F7938	—	FR1810	8516FC	RIF-8516	—
9.525	0.3750	FR6	—	—	—	—	—	—	—	—
In case of stainless steel		S ———	W ———	S ———	S ———	——— X	S ———	S ———	SS ———	F ———

Conversion Table 8
Deep groove ball bearings with flanged outer ring
Shielded type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	FR0ZZ	FX3/64ZZ	RF0310.2Z	F1191-2Z	ULKZ1505	FR0SS	2½FCHH	RIF-2½ZZ	FLRA0ZZA
1.397	0.0550	FR1ZZ	FR1ZZ	RF0412.2Z	F1397-2Z	RKF1706	FR1SS	3FCHH	RIF-3ZZ	FLRA1ZZA
1.984	0.0781	FR1-4ZZ	FX5/64ZZ	RF0516.2Z	F5/64-2Z	RKF2508	FR1-4SS	4FCHH	RIF-4ZZ	FLRA1-4ZZA
2.380	0.0937	FR133ZZS FR1-5ZZ	FAX3/32ZZ FX3/32ZZ	RF0612.2Z RF620.2Z	F2380-2Z F3/32-2Z	ULKZ3006 RKF3010	FR133SS FR1-5SS	3332FCHH 5FCHH	RIF-3332ZZ RIF-5ZZ	FLRA133ZZAS FLRA1-5ZZA
3.175	0.1250	FR144ZZ FR2-5ZZ FR2-6ZZS FR2ZZ	FAX1/8ZZ FX1/8ZZ — FR2ZZ	RF0816.2Z RF820.2Z RF824.2Z RF2.2Z	F3175-2Z F1/8A-2Z F1/8A/6-2Z F1/88-2Z	ULKZ4008 RKF4010 — RKF4012	FR144SS FR2-5SS FR2-6SS FR2SS	418FCHH 518FCHH 618FCHH R2FCHH	RIF-418ZZ RIF-518ZZ RIF-618ZZ RF-2ZZ	FLRA144ZZA FLRA2-5ZZA FLRA2-6ZZAS FLR2ZZA
3.967	0.1562	FR155ZZS	FX5/32ZZ	RF1020.2Z	F3967-2Z	ULKZ5010	FR155SS	5532FCHH	RIF-5532ZZ	FLRA155ZZAS
4.762	0.1875	FR156ZZS FR166ZZ FR3ZZ	FAX3/16ZZ FX3/16ZZ FY3/16ZZ	RF1220.2Z RF1224.2Z RF3.2Z	F4763A-2Z F4763B-2Z F3/16-2Z	ULKZ6010 ULKZ6012 RKF6016	FR156SS FR166SS FR3SS	5632FCHH 6316FCHH R3FCHH	RIF-5632ZZ RIF-6632ZZ RF-3ZZ	FLRA156ZZAS FLRA166ZZA FLRA3ZZA
6.350	0.2500	FR168ZZ FR188ZZ FR4BZZ	FX1/4ZZ FR188ZZ FY1/4ZZ	RF1624.2Z RF1632.2Z RF4.2Z	F6350A-2Z F6350B-2Z F1/4A-2Z	ULKZ8012 ULKZ8016 RKF8020	FR168SS FR188SS FR4SS	614FCHH 814FCHH R4FCHH	RIF-614ZZ RIF-814ZZ RF-4ZZ	FLRA168ZZA FLRA188ZZA FLR4ZZA
7.938	0.3125	FR1810ZZ	—	RF2032.2Z	F7938-2Z	—	FR1810SS	8516FCHH	RIF-8516ZZ	—
9.525	0.3750	FR6ZZ	FY3/8ZZ	RF6.2Z	—	—	FR6SS	R6FRHH	RIF-1438ZZ	FLR6ZZ
In case of stainless steel		S ———	W ———	S ———	S ———	——— X	S ———	S ———	F ———	SS ———

Conversion Table 9
Deep groove ball bearings with extended inner ring
Open type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	RW0	LX3/64	RE0310	E1191	ULU1505	RW0	2½CE	RI-2½EE	RW0
1.397	0.0550	RW1	LR1	RE0412	E1397	RU1706	RW1	3CE	RI-3EE	RW1
1.984	0.0781	RW1-4	LX5/64	RE0516	E5/64	—	RW1-4	4CE	RI-4EE	RW1-4
2.380	0.0937	RW133 RW1-5	LAX3/32 LX3/32	RE0612 RE620	E2380 E3/32	ULU3006 RU3010	RW133 RW1-5	3332CE 5CE	RI-3332EE RI-5EE	RW133 RW1-5
3.175	0.1250	RW144 RW2-5 RW2-6 RW2	LAX1/8 LX1/8 — LR2	RE0816 RE820 RE824 RE2	E3175 E1/8A E1/8A/6 E1/8B	ULU4008 RU4010 — —	RW144 RW2-5 RW2-6 RW2	418CE 518CE 618CE R2CE	RI-418EE RI-518EE RI-618EE R-2EE	RW144 RW2-5 RW2-6 RW2
3.967	0.1562	RW155	LX5/32	RE1020	E3967	—	RW155	5532CE	RI-5532EE	RW155
4.762	0.1875	RW156 RW166	LAX3/16 LX3/16	RE1220 RE1224	E4763A E4763B	ULU6010 ULU6012	RW156 RW166	5632CE 6316CE	RI-5632EE RI-6632EE	RW156 RW166
6.350	0.2500	RW168 RW188	LX1/4 LR188	RE1624 RE1632	E6350A E6350B	ULU8012 —	RW168 RW188	614CE 814CE	RI-614EE RI-814EE	RW168 RW188
7.938	0.3125	RW1810	—	RE2032	E7938	—	RW1810	8516CE	RI-8516EE	—
In case of stainless steel		S	W	S	S	X	S	S	SS	F

Conversion Table 10
Deep groove ball bearings with extended inner ring
Shielded type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	RW0ZZ	LX3/64ZZ	RE0310.2Z	E1191-2Z	—	—	2½CHHE	RI-2½ZZEE	RAW0ZZA
1.397	0.0550	RW1ZZ	LR1ZZ	RE0412.2Z	E1397-2Z	—	—	3CHHE	RI-3ZZEE	RAW1ZZA
1.984	0.0781	RW1-4ZZ	LX5/64ZZ	RE0516.2Z	E5/64-2Z	—	RW1-4SS	4CHHE	RI-4ZZEE	RAW1-4ZZA
2.380	0.0937	RW133ZZS RW1-5ZZ	LAX3/32ZZ LX3/32ZZ	RE0612.2Z RE620.2Z	E2380-2Z E3/32-2Z	—	RW133SS RW1-5SS	3332CHHE 5CHHE	RI-3332ZZEE RI-5ZZEE	RAW133ZZA RAW1-5ZZA
3.175	0.1250	RW144ZZ RW2-5ZZ RW2-6ZZ RW2ZZ	LAX1/8ZZ LX1/8ZZ — LR2ZZ	RE0816.2Z RE820.2Z RE824.2Z RE2.2Z	E3175-2Z E1/8A-2Z E1/8A/6-2Z E1/8B-2Z	ULUZ4008 — — —	RW144SS RW2-5SS RW2-6SS RW2SS	418CHHE 518CHHE 618CHHE R2CHHE	RI-418ZZEE RI-518ZZEE RI-618ZZEE R-2ZZEE	RAW144ZZA RAW2-5ZZA RAW2-6ZZA RAW2ZZA
3.967	0.1562	RW155ZZS	LX5/32ZZ	RE1020.2Z	E3967-2Z	ULUZ5010	RW155SS	5532CHHE	RI-5532ZZEE	RAW155ZZA
4.762	0.1875	RW156ZZS RW166ZZ	LAX3/16ZZ LX3/16ZZ	RE1220.2Z RE1224.2Z	E4763A-2Z E4763B-2Z	ULUZ6010 ULUZ6012	RW156SS RW166SS	5632CHHE 6316CHHE	RI-5632ZZEE RI-6632ZZEE	RAW156ZZA RAW166ZZA
6.350	0.2500	RW168ZZ RW188ZZ	LX1/4ZZ LR188ZZ	RE1624.2Z RE1632.2Z	E6350A-2Z E6350B-2Z	ULUZ8012 —	RW168SS RW188SS	614CHHE 814CHHE	RI-614ZZEE RI-814ZZEE	RAW168ZZA RAW188ZZA
7.938	0.3125	RW1810ZZ	—	RE2032.2Z	E7938-2Z	—	RW1810SS	8516CHHE	RI-8516ZZEE	—
In case of stainless steel		S	W	S	S	X	S	S	SS	F

Conversion Table 11
Deep groove ball bearings with extended inner ring,
Flanged, open type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	FRW0	FLX3/64	RFE0310	FE1191	ULKU1505	FRW0	2½FCE	RIF-2½EE	FLRW0
1.397	0.0550	FRW1	FLR1	RFE0412	FE1397	RKU1706	FRW1	3FCE	RIF-3EE	FLRW1
1.984	0.0781	FRW1-4	FLX5/64	RFE0516	FE5/64	—	FRW1-4	4FCE	RIF-4EE	FLRW1-4
2.380	0.0937	FRW133 FRW1-5	FLAX3/32 FLX3/32	RFE0612 RFE620	FE2380 FE3/32	ULKU3006 RKU3010	FRW133 FRW1-5	3332FCE 5FCE	RIF-3332EE RIF-5EE	FLRW133 FLRW1-5
3.175	0.1250	FRW144 FRW2-5 FRW2-6 FRW2	FLAX1/8 FLX1/8 — FLR2	RFE0816 RFE820 RFE824 RFE2	FE3175 FE1/8A FE1/8A/6 FE1/8B	ULKU4008 RKU4010 — —	FRW144 FRW2-5 FRW2-6 FRW2	418FCE 518FCE 618FCE R2FCE	RIF-418EE RIF-518EE RIF-618EE RIF-2EE	FLRW144 FLRW2-5 FLRW2-6 FLRW2
3.967	0.1562	FRW155	FLX5/32	RFE1020	FE3967	—	FRW155	5532FCE	RIF-5532EE	FLRW155
4.762	0.1875	FRW156 FRW166	FLAX3/16 FLX3/16	RFE1220 RFE1224	FE4763A FE4763B	ULKU6010 ULKU6012	FRW156 FRW166	5632FCE 6316FCE	RIF-5632EE RIF-6632EE	FLRW156 FLRW166
6.350	0.2500	FRW168 FRW188	FLX1/4 FLR188	RFE1624 RFE1632	FE6350A FE6350B	ULKU8012 —	FRW168 FRW188	614FCE 814FCE	RIF-614EE RIF-814EE	FLRW168 FLRW188
7.938	0.3125	FRW1810	—	RFE2032	FE7938	—	FRW1810	8516FCE	RIF-8516EE	—
In case of stainless steel		S	W	S	S	X	S	S	SS	F

Conversion Table 12
Deep groove ball bearings with extended inner ring,
Flanged, shielded type (Inch series)

Bore diameter d		NSK	ADR	FAG	GRW	RMB	BARDEN	MPB	NMB	NTN
mm	inch									
1.191	0.0469	FRW0ZZ	FLX3/64ZZ	RFE0310.2Z	FE1191-2Z	—	—	2½FCHHE	RIF-2½ZZEE	FLRAW0ZZA
1.397	0.0550	FRW1ZZ	FLR1ZZ	RFE0412.2Z	FE1397-2Z	—	—	3FCHHE	RIF-3ZZEE	FLRAW1ZZA
1.984	0.0781	FRW1-4ZZ	FLX5/64ZZ	RFE0516.2Z	FE5/64-2Z	—	FRW1-4SS	4FCHHE	RIF-4ZZEE	FLRAW1-4ZZA
2.380	0.0937	FRW133ZZS FRW1-5ZZ	FLAX3/32ZZ FLX3/32ZZ	RFE0612.2Z RFE620.2Z	FE2380-2Z FE3/32-2Z	—	FRW133SS FRW1-5SS	3332FCHHE 5FCHHE	RIF-3332ZZEE RIF-5ZZEE	FLRAW133ZZA FLRAW1-5ZZA
3.175	0.1250	FRW144ZZ FRW2-5ZZ FRW2-6ZZ FRW2ZZ	FLAX1/8ZZ FLX1/8ZZ — FLR2ZZ	RFE0816.2Z RFE820.2Z RFE824.2Z RFE2.2Z	FE3175-2Z FE1/8A-2Z FE1/8A/6-2Z FE1/8B-2Z	ULKUZ4008 — — —	FRW144SS FRW2-5SS FRW2-6SS FRW2SS	418FCHHE 518FCHHE 618FCHHE R2FCHHE	RIF-418ZZEE RIF-518ZZEE RIF-618ZZEE RIF-2ZZEE	FLRAW144ZZA FLRAW2-5ZZA FLRAW2-6ZZA FLRAW2ZZA
3.967	0.1562	FRW155ZZS	FLX5/32ZZ	RFE1020.2Z	FE3967-2Z	ULKUZ5010	FRW155SS	5532FCHHE	RIF-5532ZZEE	FLRAW155ZZA
4.762	0.1875	FRW156ZZS FRW166ZZ	FLAX3/16ZZ FLX3/16ZZ	RFE1220.2Z RFE1224.2Z	FE4763A-2Z FE4763B-2Z	ULKUZ6010 ULKUZ6012	FRW156SS FRW166SS	5632FCHHE 6316FCHHE	RIF-5632ZZEE RIF-6632ZZEE	FLRAW156ZZA FLRAW166ZZA
6.350	0.2500	FRW168ZZ FRW188ZZ	FLX1/4ZZ FLR188ZZ	RFE1624.2Z RFE1632.2Z	FE6350A-2Z FE6350B-2Z	ULKUZ8012 —	FRW168SS FRW188SS	614FCHHE 814FCHHE	RIF-614ZZEE RIF-814ZZEE	FLRAW168ZZA FLRAW188ZZA
7.938	0.3125	FRW1810ZZ	—	RFE2032.2Z	FE7938-2Z	—	FRW1810SS	8516FCHHE	RIF-8516ZZEE	—
In case of stainless steel		S	W	S	S	X	S	S	SS	F