Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-1

Single row radial ball bearings	67							68 78								
Double row radial ball bearings																
Cylindrical roller bearings									N28	N38	NN48					
Needle roller bearings											NA48					
Spherical roller bearings																

Nominal bearing bore diameter d		Diameter series 7						Diameter series 8								
		Nominal bearing outer diameter D	Dimension series					Nominal bearing outer diameter D	Dimension series							
Number	Dimension		17	27	37	47	17~47		08	18	28	38	48	58	68	08	18~68
			Nominal width B				Chamfer dimension r s min		Nominal width B							Chamfer dimension r s min	
—	0.6	2	0.8	—	—	—	0.05	2.5	—	1	—	1.4	—	—	—	—	0.05
1	1	2.5	1	—	—	—	0.05	3	—	1	—	1.5	—	—	—	—	0.05
—	1.5	3	1	—	1.8	—	0.05	4	—	1.2	—	2	—	—	—	—	0.05
2	2	4	1.2	—	2	—	0.05	5	—	1.5	—	2.3	—	—	—	—	0.08
—	2.5	5	1.5	1.8	2.3	—	0.08	6	—	1.8	—	2.6	—	—	—	—	0.08
3	3	6	2	2.5	3	—	0.08	7	—	2	—	3	—	—	—	—	0.1
4	4	7	2	2.5	3	—	0.08	9	—	2.5	3.5	4	—	—	—	—	0.1
5	5	8	2	2.5	3	—	0.08	11	—	3	4	5	—	—	—	—	0.15
6	6	10	2.5	3	3.5	—	0.1	13	—	3.5	5	6	—	—	—	—	0.15
7	7	11	2.5	3	3.5	—	0.1	14	—	3.5	5	6	—	—	—	—	0.15
8	8	12	2.5	—	3.5	—	0.1	16	—	4	5	6	8	—	—	—	0.2
9	9	14	3	—	4.5	—	0.1	17	—	4	5	6	8	—	—	—	0.2
00	10	15	3	—	4.5	—	0.1	19	—	5	6	7	9	—	—	—	0.3
01	12	18	4	—	5	—	0.2	21	—	5	6	7	9	—	—	—	0.3
02	15	21	4	—	5	—	0.2	24	—	5	6	7	9	—	—	—	0.3
03	17	23	4	—	5	—	0.2	26	—	5	6	7	9	—	—	—	0.3
04	20	27	4	—	5	7	0.2	32	4	7	8	10	12	16	22	0.3	0.3
/22	22	30	4	—	5	7	0.2	34	4	7	—	10	—	16	22	0.3	0.3
05	25	32	4	—	5	7	0.2	37	4	7	8	10	12	16	22	0.3	0.3
/28	28	35	4	—	5	7	0.2	40	4	7	—	10	—	16	22	0.3	0.3
06	30	37	4	—	5	7	0.2	42	4	7	8	10	12	16	22	0.3	0.3
/32	32	40	4	—	6	8	0.2	44	4	7	—	10	—	16	22	0.3	0.3
07	35	44	5	—	7	9	0.3	47	4	7	8	10	12	16	22	0.3	0.3
08	40	50	6	—	8	10	0.3	52	4	7	8	10	12	16	22	0.3	0.3
09	45	55	6	—	8	10	0.3	58	4	7	8	10	13	18	23	0.3	0.3
10	50	62	6	—	10	12	0.3	65	5	7	10	12	15	20	27	0.3	0.3
11	55	68	7	—	10	13	0.3	72	7	9	11	13	17	23	30	0.3	0.3
12	60	75	7	—	12	15	0.3	78	7	10	12	14	18	24	32	0.3	0.3
13	65	80	7	—	12	15	0.3	85	7	10	13	15	20	27	36	0.3	0.6
14	70	85	7	—	12	15	0.3	90	8	10	13	15	20	27	36	0.3	0.6
15	75	90	7	—	12	15	0.3	95	8	10	13	15	20	27	36	0.3	0.6
16	80	95	7	—	12	15	0.3	100	8	10	13	15	20	27	36	0.3	0.6
17	85	105	10	—	15	—	0.6	110	9	13	16	19	25	34	45	0.3	1
18	90	110	10	—	15	—	0.6	115	9	13	16	19	25	34	45	0.3	1
19	95	115	10	—	15	—	0.6	120	9	13	16	19	25	34	45	0.3	1
20	100	120	10	—	15	—	0.6	125	9	13	16	19	25	34	45	0.3	1
21	105	125	10	—	15	—	0.6	130	9	13	16	19	25	34	45	0.3	1
22	110	135	13	—	19	—	1	140	10	16	19	23	30	40	54	0.6	1
24	120	145	13	—	19	—	1	150	10	16	19	23	30	40	54	0.6	1
26	130	160	16	—	23	—	1	165	11	18	22	26	35	46	63	0.6	1.1
28	140	170	16	—	23	—	1	175	11	18	22	26	35	46	63	0.6	1.1
30	150	180	16	—	23	—	1	190	13	20	24	30	40	54	71	0.6	1.1
32	160	190	16	—	23	—	1	200	13	20	24	30	40	54	71	0.6	1.1
34	170	200	16	—	23	—	1	215	14	22	27	34	45	60	80	0.6	1.1

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-2 Unit: mm

Single row radial ball bearings		69 79										160	60 70						
Double row radial ball bearings																			
Cylindrical roller bearings		N19	N29	NN39	NN49								N10	N20	NN30	NN40			
Needle roller bearings					NA49	NA59	NA69												
Spherical roller bearings				239	249										230	240			

Nominal bearing bore diameter d		Diameter series 9										Diameter series 0									
		Nominal bearing outer diameter D	Dimension series									Nominal bearing outer diameter D	Dimension series								
Number	Dimension		09	19	29	39	49	59	69	09	19~39	49~69		00	10	20	30	40	50	60	00	10~60
			Nominal width B							Chamfer dimension r s min				Nominal width B							Chamfer dimension r s min	
—	0.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	1	4	—	1.6	—	2.3	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—	—
—	1.5	5	—	2	—	2.6	—	—	—	—	0.15	—	6	—	2.5	—	3	—	—	—	—	0.15
2	2	6	—	2.3	—	3	—	—	—	—	0.15	—	7	—	2.8	—	3.5	—	—	—	—	0.15
—	2.5	7	—	2.5	—	3.5	—	—	—	—	0.15	—	8	—	2.8	—	4	—	—	—	—	0.15
3	3	8	—	3	—	4	—	—	—	—	0.15	—	9	—	3	—	5	—	—	—	—	0.15
4	4	11	—	4	—	5	—	—	—	—	0.15	—	12	—	4	—	6	—	—	—	—	0.2
5	5	13	—	4	—	6	10	—	—	—	0.2	0.15	14	—	5	—	7	—	—	—	—	0.2
6	6	15	—	5	—	7	10	—	—	—	0.2	0.15	17	—	6	—	9	—	—	—	—	0.3
7	7	17	—	5	—	7	10	—	—	—	0.3	0.15	19	—	6	8	10	—	—	—	—	0.3
8	8	19	—	6	—	9	11	—	—	—	0.3	0.2	22	—	7	9	11	14	19	25	—	0.3
9	9	20	—	6	—	9	11	—	—	—	0.3	0.3	24	—	7	10	12	15	20	27	—	0.3
00	10	22	—	6	8	10	13	16	22	—	0.3	0.3	26	—	8	10	12	16	21	29	—	0.3
01	12	24	—	6	8	10	13	16	22	—	0.3	0.3	28	7	8	10	12	16	21	29	0.3	0.3
02	15	28	—	7	8.5	10	13	18	23	—	0.3	0.3	32	8	9	11	13	17	23	30	0.3	0.3
03	17	30	—	7	8.5	10	13	18	23	—	0.3	0.3	35	8	10	12	14	18	24	32	0.3	0.3
04	20	37	7	9	11	13	17	23	30	0.3	0.3	0.3	42	8	12	14	16	22	30	40	0.3	0.6
/22	22	39	7	9	11	13	17	23	30	0.3	0.3	0.3	44	8	12	14	16	22	30	40	0.3	0.6
05	25	42	7	9	11	13	17	23	30	0.3	0.3	0.3	47	8	12	14	16	22	30	40	0.3	0.6
/28	28	45	7	9	11	13	17	23	30	0.3	0.3	0.3	52	8	12	15	18	24	32	43	0.3	0.6
06	30	47	7	9	11	13	17	23	30	0.3	0.3	0.3	55	9	13	16	19	25	34	45	0.3	1
/32	32	52	7	10	13	15	20	27	36	0.3	0.6	0.6	58	9	13	16	20	26	35	47	0.3	1
07	35	55	7	10	13	15	20	27	36	0.3	0.6	0.6	62	9	14	17	20	27	36	48	0.3	1
08	40	62	8	12	14	16	22	30	40	0.3	0.6	0.6	68	9	15	18	21	28	38	50	0.3	1
09	45	68	8	12	14	16	22	30	40	0.3	0.6	0.6	75	10	16	19	23	30	40	54	0.3	1
10	50	72	8	12	14	16	22	30	40	0.3	0.6	0.6	80	10	16	19	23	30	40	54	0.6	1
11	55	80	9	13	16	19	25	34	45	0.3	1	1	90	11	18	22	26	35	46	63	0.6	1.1
12	60	85	9	13	16	19	25	34	45	0.3	1	1	95	11	18	22	26	35	46	63	0.6	1.1
13	65	90	9	13	16	19	25	34	45	0.6	1	1	100	11	18	22	26	35	46	63	0.6	1.1
14	70	100	10	16	19	23	30	40	54	0.6	1	1	110	13	20	24	30	40	54	71	0.6	1.1
15	75	105	10	16	19	23	30	40	54	0.6	1	1	115	13	20	24	30	40	54	71	0.6	1.1
16	80	110	10	16	19	23	30	40	54	0.6	1	1	125	14	22	27	34	45	60	80	0.6	1.1
17	85	120	11	18	22	26	35	46	63	0.6	1.1	1.1	130	14	22	27	34	45	60	80	0.6	1.1
18	90	125	11	18	22	26	35	46	63	0.6	1.1	1.1	140	16	24	30	37	50	67	90	1	1.5
19	95	130	11	18	22	26	35	46	63	0.6	1.1	1.1	145	16	24	30	37	50	67	90	1	1.5
20	100	140	13	20	24	30	40	54	71	0.6	1.1	1.1	150	16	24	30	37	50	67	100	1	1.5
21	105	145	13	20	24	30	40	54	71	0.6	1.1	1.1	160	18	26	33	41	56	75	109	1	2
22	110	150	13	20	24	30	40	54	71	0.6	1.1	1.1	170	19	28	36	45	60	80	109	1	2
24	120	165	14	22	27	34	45	60	80	0.6	1.1	1.1	180	19	28	36	46	60	80	109	1	2
26	130	180	16	24	30	37	50	67	90	1	1.5	1.5	200	22	33	42	52	69	95	125	1.1	2
28	140	190	16	24	30	37	50	67	90	1	1.5	1.5	210	22	33	42	53	69	95	125	1.1	2
30	150	210	19	28	36	45	60	80	109	1	2	2	225	24	35	45	56	75	100	136	1.1	2.1
32	160	220	19	28	36	45	60	80	109	1	2	2	240	25	38	48	60	80	109	145	1.5	2.1
34	170	230	19	28	36	45	60	80	109	1	2	2	260	28	42	54	67	90	122	160	1.5	2.1

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-3

Single row radial ball bearings		67							68 78							
Double row radial ball bearings																
Cylindrical roller bearings										N28	N38	NN48				
Needle roller bearings												NA48				
Spherical roller bearings																
Nominal bearing bore diameter d		Diameter series 7						Diameter series 8								
		Nominal bearing outer diameter D	Dimension series					Nominal bearing outer diameter D	Dimension series							
Number	Dimension		17	27	37	47	17~47		08	18	28	38	48	58	68	08	18~68
			Nominal width B				Chamfer dimension r s min		Nominal width B							Chamfer dimension r s min	
36	180	215	18	—	26	—	1.1	225	14	22	27	34	45	60	80	0.6	1.1
38	190	230	20	—	30	—	1.1	240	16	24	30	37	50	67	90	1	1.5
40	200	240	20	—	30	—	1.1	250	16	24	30	37	50	67	90	1	1.5
44	220	—	—	—	—	—	—	270	16	24	30	37	50	67	90	1	1.5
48	240	—	—	—	—	—	—	300	19	28	36	45	60	80	100	1	2
52	260	—	—	—	—	—	—	320	19	28	36	45	60	80	100	1	2
56	280	—	—	—	—	—	—	350	22	33	42	52	69	95	125	1.1	2
60	300	—	—	—	—	—	—	380	25	38	48	60	80	109	145	1.5	2.1
64	320	—	—	—	—	—	—	400	25	38	48	60	80	109	145	1.5	2.1
68	340	—	—	—	—	—	—	420	25	38	48	60	80	109	145	1.5	2.1
72	360	—	—	—	—	—	—	440	25	38	48	60	80	109	145	1.5	2.1
76	380	—	—	—	—	—	—	480	31	46	60	75	100	136	180	2	2.1
80	400	—	—	—	—	—	—	500	31	46	60	75	100	136	180	2	2.1
84	420	—	—	—	—	—	—	520	31	46	60	75	100	136	180	2	2.1
88	440	—	—	—	—	—	—	540	31	46	60	75	100	136	180	2	2.1
92	460	—	—	—	—	—	—	580	37	56	72	90	118	160	218	2.1	3
96	480	—	—	—	—	—	—	600	37	56	72	90	118	160	218	2.1	3
/500	500	—	—	—	—	—	—	620	37	56	72	90	118	160	218	2.1	3
/530	530	—	—	—	—	—	—	650	37	56	72	90	118	160	218	2.1	3
/560	560	—	—	—	—	—	—	680	37	56	72	90	118	160	218	2.1	3
/600	600	—	—	—	—	—	—	730	42	60	78	98	128	175	236	3	3
/630	630	—	—	—	—	—	—	780	48	69	88	112	150	200	272	3	4
/670	670	—	—	—	—	—	—	820	48	69	88	112	150	200	272	3	4
/710	710	—	—	—	—	—	—	870	50	74	95	118	160	218	290	4	4
/750	750	—	—	—	—	—	—	920	54	78	100	128	170	230	308	4	5
/800	800	—	—	—	—	—	—	980	57	82	106	136	180	243	325	4	5
/850	850	—	—	—	—	—	—	1030	57	82	106	136	180	243	325	4	5
/900	900	—	—	—	—	—	—	1090	60	85	112	140	190	258	345	5	5
/950	950	—	—	—	—	—	—	1150	63	90	118	150	200	272	355	5	5
/1000	1000	—	—	—	—	—	—	1220	71	100	128	165	218	300	400	5	6
/1060	1060	—	—	—	—	—	—	1280	71	100	128	165	218	300	400	5	6
/1120	1120	—	—	—	—	—	—	1360	78	106	140	180	243	325	438	5	6
/1180	1180	—	—	—	—	—	—	1420	78	106	140	180	243	325	438	5	6
/1250	1250	—	—	—	—	—	—	1500	80	112	145	185	250	335	450	6	6
/1320	1320	—	—	—	—	—	—	1600	88	122	165	206	280	375	500	6	6
/1400	1400	—	—	—	—	—	—	1700	95	132	175	224	300	400	545	6	7.5
/1500	1500	—	—	—	—	—	—	1820	—	140	185	243	315	—	—	—	7.5
/1600	1600	—	—	—	—	—	—	1950	—	155	200	265	345	—	—	—	7.5
/1700	1700	—	—	—	—	—	—	2060	—	160	206	272	355	—	—	—	7.5
/1800	1800	—	—	—	—	—	—	2180	—	165	218	290	375	—	—	—	9.5
/1900	1900	—	—	—	—	—	—	2300	—	175	230	300	400	—	—	—	9.5
/2000	2000	—	—	—	—	—	—	2430	—	190	250	325	425	—	—	—	9.5

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-4 Unit: mm

Single row radial ball bearings			69 79									160	60 70						
Double row radial ball bearings																			
Cylindrical roller bearings			N19	N29	NN39	NN49							N10	N20	NN30	NN40			
Needle roller bearings						NA49	NA59	NA69											
Spherical roller bearings					239	249									230	240			
Nominal bearing bore diameter d		Diameter series 9										Diameter series 0							
		Nominal bearing outer diameter D	Dimension series									Nominal bearing outer diameter D	Dimension series						
Number	Dimension		09	19	29	39	49	59	69	09	19~39	49~69		00	10	20	30	40	50	60	00	10~60
			Nominal width B							Chamfer dimension r s min				Nominal width B							Chamfer dimension r s min	
36	180	250	22	33	42	52	69	95	125	1.1	2	2	280	31	46	60	74	100	136	180	2	2.1
38	190	260	22	33	42	52	69	95	125	1.1	2	2	290	31	46	60	75	100	136	180	2	2.1
40	200	280	25	38	48	60	80	109	145	1.5	2.1	2.1	310	34	51	66	82	109	150	200	2	2.1
44	220	300	25	38	48	60	80	109	145	1.5	2.1	2.1	340	37	56	72	90	118	160	218	2.1	3
48	240	320	25	38	48	60	80	109	145	1.5	2.1	2.1	360	37	56	72	92	118	160	218	2.1	3
52	260	360	31	46	60	75	100	136	180	2	2.1	2.1	400	44	65	82	104	140	190	250	3	4
56	280	380	31	46	60	75	100	136	180	2	2.1	2.1	420	44	65	82	106	140	190	250	3	4
60	300	420	37	56	72	90	118	160	218	2.1	3	3	460	50	74	95	118	160	218	290	4	4
64	320	440	37	56	72	90	118	160	218	2.1	3	3	480	50	74	95	121	160	218	290	4	4
68	340	460	37	56	72	90	118	160	218	2.1	3	3	520	57	82	106	133	180	243	325	4	5
72	360	480	37	56	72	90	118	160	218	2.1	3	3	540	57	82	106	134	180	243	325	4	5
76	380	520	44	65	82	106	140	190	250	3	4	4	560	57	82	106	135	180	243	325	4	5
80	400	540	44	65	82	106	140	190	250	3	4	4	600	63	90	118	148	200	272	355	5	5
84	420	560	44	65	82	106	140	190	250	3	4	4	620	63	90	118	150	200	272	355	5	5
88	440	600	50	74	95	118	160	218	290	4	4	4	650	67	94	122	157	212	280	375	5	6
92	460	620	50	74	95	118	160	218	290	4	4	4	680	71	100	128	163	218	300	400	5	6
96	480	650	54	78	100	128	170	230	308	4	5	5	700	71	100	128	165	218	300	400	5	6
/500	500	670	54	78	100	128	170	230	308	4	5	5	720	71	100	128	167	218	300	400	5	6
/530	530	710	57	82	106	136	180	243	325	4	5	5	780	80	112	145	185	250	335	450	6	6
/560	560	750	60	85	112	140	190	258	345	5	5	5	820	82	115	150	195	258	355	462	6	6
/600	600	800	63	90	118	150	200	272	355	5	5	5	870	85	118	155	200	272	365	488	6	6
/630	630	850	71	100	128	165	218	300	400	5	6	6	920	92	128	170	212	290	388	515	6	7.5
/670	670	900	73	103	136	170	230	308	412	5	6	6	980	100	136	180	230	308	425	560	6	7.5
/710	710	950	78	106	140	180	243	325	438	5	6	6	1030	103	140	185	236	315	438	580	6	7.5
/750	750	1000	80	112	145	185	250	335	450	6	6	6	1090	109	150	195	250	335	462	615	7.5	7.5
/800	800	1060	82	115	150	195	258	355	462	6	6	6	1150	112	155	200	258	345	475	630	7.5	7.5
/850	850	1120	85	118	155	200	272	365	488	6	6	6	1220	118	165	212	272	365	500	670	7.5	7.5
/900	900	1180	88	122	165	206	280	375	500	6	6	6	1280	122	170	218	280	375	515	690	7.5	7.5
/950	950	1250	95	132	175	224	300	400	545	6	7.5	7.5	1360	132	180	236	300	412	560	730	7.5	7.5
/1000	1000	1320	103	140	185	236	315	438	580	6	7.5	7.5	1420	136	185	243	308	412	560	750	7.5	7.5
/1060	1060	1400	109	150	195	250	335	462	615	7.5	7.5	7.5	1500	140	195	250	325	438	600	800	9.5	9.5
/1120	1120	1460	109	150	195	250	335	462	615	7.5	7.5	7.5	1580	145	200	265	345	462	615	825	9.5	9.5
/1180	1180	1540	115	160	206	272	355	488	650	7.5	7.5	7.5	1660	155	212	272	355	475	650	875	9.5	9.5
/1250	1250	1630	122	170	218	280	375	515	690	7.5	7.5	7.5	1750	—	218	290	375	500	—	—	—	9.5
/1320	1320	1720	128	175	230	300	400	545	710	7.5	7.5	7.5	1850	—	230	300	400	530	—	—	—	12
/1400	1400	1820	—	185	243	315	425	—	—	—	9.5	9.5	1950	—	243	315	412	545	—	—	—	12
/1500	1500	1950	—	195	258	335	450	—	—	—	9.5	9.5	2120	—	272	355	462	615	—	—	—	12
/1600	1600	2060	—	200	265	345	462	—	—	—	9.5	9.5	2240	—	280	365	475	630	—	—	—	12
/1700	1700	2180	—	212	280	355	475	—	—	—	9.5	9.5	2360	—	290	375	500	650	—	—	—	15
/1800	1800	2300	—	218	290	375	500	—	—	—	12	12	2500	—	308	400	530	690	—	—	—	15
/1900	1900	2430	—	230	308	400	530	—	—	—	12	12	—	—	—	—	—	—	—	—	—	—
/2000	2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-5

Single row radial ball bearings														62 72		622	632					
Double row radial ball bearings														12		42 22	52 32					
Cylindrical roller bearings					NN31									N2		N22	N32					
Needle roller bearings																						
Spherical roller bearings					231	241										222	232					

Nominal bearing bore diameter d		Diameter series 1										Diameter series 2									
		Nominal bearing outer diameter D	Dimension series									Nominal bearing outer diameter D	Dimension series								
			01	11	21	31	41	51	61	01	11~61		82	02	12	22	32	42	52	62	82	02~62
Number	Dimension		Nominal width B								Chamfer dimension r s min		Nominal width B								Chamfer dimension r s min	
—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			—	—
1	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			—	—
—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			—	—
2	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			—	—
—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			—	—
3	3	—	—	—	—	—	—			—	—	10	2.5	4	—	—	5	—	—	—	0.1	0.15
4	4	—	—	—	—	—	7	—	—	—	—	13	3	5	—	—	7	—	—	—	0.15	0.2
5	5	15	—	—	—	7	—	—	—	—	0.3	16	3.5	5	—	—	8	—	—	—	0.15	0.3
6	6	18	—	—	8	10	—	—	—	—	0.3	19	4	6	—	—	10	—	18	23	0.2	0.3
7	7	21	—	—	9	11	14	19	25	—	0.3	22	5	7	—	—	11	—	20	27	0.3	0.3
8	8	23	—	—	10	12	15	20	27	—	0.3	24	5	8	—	—	12	—	21	29	0.3	0.3
9	9	25	—	—	10	12	16	21	29	—	0.3	26	6	8	—	—	13	—	23	30	0.3	0.3
00	10	28	—	—	12	14	18	24	32	—	0.3	30	7	9	—	14	14.3	—	27	36	0.3	0.6
01	12	30	—	—	12	14	18	24	32	—	0.3	32	7	10	—	14	15.9	—	27	36	0.3	0.6
02	15	33	—	—	12	14	18	24	32	—	0.3	35	8	11	—	14	15.9	20	27	36	0.3	0.6
03	17	37	—	—	13	15	20	27	36	—	0.6	40	8	12	—	16	17.5	22	30	40	0.3	0.6
04	20	44	—	—	15	18	24	32	43	—	0.6	47	9	14	—	18	20.6	27	36	48	0.3	1
/22	22	47	—	—	16	19	25	34	45	—	1	50	9	14	—	18	20.6	27	36	48	0.3	1
05	25	50	—	—	16	19	25	34	45	—	1	52	10	15	—	18	20.6	27	36	48	0.3	1
/28	28	55	—	—	17	20	27	36	48	—	1	58	10	16	—	19	23	30	40	54	0.6	1
06	30	58	—	—	18	21	28	38	50	—	1	62	10	16	—	20	23.8	32	43	58	0.6	1
/32	32	62	—	—	19	23	30	40	54	—	1	65	11	17	—	21	25	33	43	60	0.6	1
07	35	68	—	—	21	25	33	43	60	—	1.1	72	12	17	—	23	27	37	50	67	0.6	1.1
08	40	75	—	—	22	26	35	46	63	—	1.1	80	13	18	—	23	30.2	40	54	71	0.6	1.1
09	45	80	—	—	22	26	35	46	63	—	1.1	85	13	19	—	23	30.2	40	54	71	0.6	1.1
10	50	85	—	—	22	26	35	46	63	—	1.1	90	13	20	—	23	30.2	40	54	71	0.6	1.1
11	55	95	—	—	24	30	40	54	71	—	1.1	100	14	21	—	25	33.3	45	60	80	0.6	1.5
12	60	100	—	—	24	30	40	54	71	—	1.1	110	16	22	—	28	36.5	50	67	90	1	1.5
13	65	110	—	—	27	34	45	60	80	—	1.5	120	18	23	—	31	38.1	56	75	100	1	1.5
14	70	115	—	—	27	34	45	60	80	—	1.5	125	18	24	—	31	39.7	56	75	100	1	1.5
15	75	125	—	—	30	37	50	67	90	—	1.5	130	18	25	—	31	41.3	56	75	100	1	1.5
16	80	130	—	—	30	37	50	67	90	—	1.5	140	19	26	—	33	44.4	60	80	109	1	2
17	85	140	—	—	31	41	56	75	100	—	1.5	150	21	28	—	36	49.2	65	88	118	1.1	2
18	90	150	—	—	33	45	60	80	109	—	2	160	22	30	—	40	52.4	69	95	125	1.1	2
19	95	160	—	—	39	52	65	88	118	—	2	170	24	32	—	43	55.6	75	100	136	1.1	2.1
20	100	165	21	30	39	52	65	88	118	1.1	2	180	25	34	—	46	60.3	80	109	145	1.5	2.1
21	105	175	22	33	42	56	69	95	125	1.1	2	190	27	36	—	50	65.1	85	115	155	1.5	2.1
22	110	180	22	33	42	56	69	95	125	1.1	2	200	28	38	—	53	69.8	90	122	160	1.5	2.1
24	120	200	25	38	48	62	80	109	145	1.5	2	215	—	40	42	58	76	95	128	170	—	2.1
26	130	210	25	38	48	64	80	109	145	1.5	2	230	—	40	46	64	80	100	136	180	—	3
28	140	225	27	40	50	68	85	115	155	1.5	2.1	250	—	42	50	68	88	109	150	200	—	3

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-6 Unit: mm

Single row radial ball bearings				63 73		623	633				64 74		
Double row radial ball bearings				13		43 23	53 33						
Cylindrical roller bearings				N3		N23	N33				N4		
Needle roller bearings													
Spherical roller bearings				213		223							

Nominal bearing bore diameter d		Diameter series 3									Diameter series 4			
		Nominal bearing outer diameter D	Nominal bearing outer diameter D	Dimension series							Nominal bearing outer diameter D	Dimension series		
				83	03	13	23	33	83	03~33		04	24	
Number	Dimension			Nominal width B					Chamfer dimension r s min			Nominal width B		Chamfer dimension r s min
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	3	—	13	—	5	—	—	7	—	0.2	—	—	—	—
4	4	—	16	—	5	—	—	9	—	0.3	—	—	—	—
5	5	15	19	—	6	—	—	10	—	0.3	—	—	—	—
6	6	18	22	—	7	—	11	13	—	0.3	—	—	—	—
7	7	21	26	—	9	—	13	15	—	0.3	—	—	—	—
8	8	23	28	—	9	—	13	15	—	0.3	30	10	14	0.6
9	9	25	30	—	10	—	14	16	—	0.6	32	11	15	0.6
00	10	28	35	9	11	—	17	19	0.3	0.6	37	12	16	0.6
01	12	30	37	9	12	—	17	19	0.3	1	42	13	19	1
02	15	33	42	9	13	—	17	19	0.3	1	52	15	24	1.1
03	17	37	47	10	14	—	19	22.2	0.6	1	62	17	29	1.1
04	20	44	52	10	15	—	21	22.2	0.6	1.1	72	19	33	1.1
/22	22	47	56	11	16	—	21	25	0.6	1.1	—	—	—	—
05	25	50	62	12	17	—	24	25.4	0.6	1.1	80	21	36	1.5
/28	28	55	68	13	18	—	24	30	0.6	1.1	—	—	—	—
06	30	58	72	13	19	—	27	30.2	0.6	1.1	90	23	40	1.5
/32	32	62	75	14	20	—	28	32	0.6	1.1	—	—	—	—
07	35	68	80	14	21	—	31	34.9	0.6	1.5	100	25	43	1.5
08	40	75	90	16	23	—	33	36.5	1	1.5	110	27	46	2
09	45	80	100	17	25	—	36	39.7	1	1.5	120	29	50	2
10	50	85	110	19	27	—	40	44.4	1	2	130	31	53	2.1
11	55	95	120	21	29	—	43	49.2	1.1	2	140	33	57	2.1
12	60	100	130	22	31	—	46	54	1.1	2.1	150	35	60	2.1
13	65	110	140	24	33	—	48	58.7	1.1	2.1	160	37	64	2.1
14	70	115	150	25	35	—	51	63.5	1.5	2.1	180	42	74	3
15	75	125	160	27	37	—	55	68.3	1.5	2.1	190	45	77	3
16	80	130	170	28	39	—	58	68.3	1.5	2.1	200	48	80	3
17	85	140	180	30	41	—	60	73	2	3	210	52	86	4
18	90	150	190	30	43	—	64	73	2	3	225	54	90	4
19	95	160	200	33	45	—	67	77.8	2	3	240	55	95	4
20	100	165	215	36	47	51	73	82.6	2.1	3	250	58	98	4
21	105	175	225	37	49	53	77	87.3	2.1	3	260	60	100	4
22	110	180	240	42	50	57	80	92.1	3	3	280	65	108	4
24	120	200	260	44	55	62	86	106	3	3	310	72	118	5
26	130	210	280	48	58	66	93	112	3	4	340	78	128	5
28	140	225	300	50	62	70	102	118	4	4	360	82	132	5

Appendix Tables

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-7

Single row radial ball bearings														62 72		622	632					
Double row radial ball bearings														12		42 22	52 32					
Cylindrical roller bearings					NN31									N2		N22	N32					
Needle roller bearings																						
Spherical roller bearings					231	241										222	232					
Nominal bearing bore diameter d		Diameter series 1										Diameter series 2										
		Nominal bearing outer diameter D	Dimension series									Nominal bearing outer diameter D	Dimension series									
Number	Dimension		01	11	21	31	41	51	61	01	11~61		82	02	12	22	32	42	52	62	82	02~62
			Nominal width B								Chamfer dimension rs min		Nominal width B								Chamfer dimension rs min	
30	150	250	31	46	60	80	100	136	180	2	2.1	270	—	45	54	73	96	118	160	218	—	3
32	160	270	34	51	66	86	109	150	200	2	2.1	290	—	48	58	80	104	128	175	236	—	3
34	170	280	34	51	66	88	109	150	200	2	2.1	310	—	52	62	86	110	140	190	250	—	4
36	180	300	37	56	72	96	118	160	218	2.1	3	320	—	52	62	86	112	140	190	250	—	4
38	190	320	42	60	78	104	128	175	236	3	3	340	—	55	65	92	120	150	200	272	—	4
40	200	340	44	65	82	112	140	190	250	3	3	360	—	58	70	98	128	160	218	290	—	4
44	220	370	48	69	88	120	150	200	272	3	4	400	—	65	78	108	144	180	243	325	—	4
48	240	400	50	74	95	128	160	218	290	4	4	440	—	72	85	120	160	200	272	355	—	4
52	260	440	57	82	106	144	180	243	325	4	4	480	—	80	90	130	174	218	300	400	—	5
56	280	460	57	82	106	146	180	243	325	4	5	500	—	80	90	130	176	218	300	400	—	5
60	300	500	63	90	118	160	200	272	355	5	5	540	—	85	98	140	192	243	325	438	—	5
64	320	540	71	100	128	176	218	300	400	5	5	580	—	92	105	150	208	258	355	462	—	5
68	340	580	78	106	140	190	243	325	438	5	5	620	—	92	118	165	224	280	375	500	—	6
72	360	600	78	106	140	192	243	325	438	5	5	650	—	95	122	170	232	290	388	515	—	6
76	380	620	78	106	140	194	243	325	438	5	5	680	—	95	132	175	240	300	400	545	—	6
80	400	650	80	112	145	200	250	335	450	6	6	720	—	103	140	185	256	315	438	580	—	6
84	420	700	88	122	165	224	280	375	500	6	6	760	—	109	150	195	272	335	462	615	—	7.5
88	440	720	88	122	165	226	280	375	500	6	6	790	—	112	155	200	280	345	475	630	—	7.5
92	460	760	95	132	175	240	300	400	545	6	7.5	830	—	118	165	212	296	365	500	670	—	7.5
96	480	790	100	136	180	248	308	425	560	6	7.5	870	—	125	170	224	310	388	530	710	—	7.5
/500	500	830	106	145	190	264	325	450	600	7.5	7.5	920	—	136	185	243	336	412	560	750	—	7.5
/530	530	870	109	150	195	272	335	462	615	7.5	7.5	980	—	145	200	258	355	450	600	—	—	9.5
/560	560	920	115	160	206	280	355	488	650	7.5	7.5	1030	—	150	206	272	365	475	630	—	—	9.5
/600	600	980	122	170	218	300	375	515	690	7.5	7.5	1090	—	155	212	280	388	488	670	—	—	9.5
/630	630	1030	128	175	230	315	400	545	710	7.5	7.5	1150	—	165	230	300	412	515	710	—	—	12
/670	670	1090	136	185	243	336	412	560	750	7.5	7.5	1220	—	175	243	315	438	545	750	—	—	12
/710	710	1150	140	195	250	345	438	600	800	9.5	9.5	1280	—	180	250	325	450	560	775	—	—	12
/750	750	1220	150	206	272	365	475	630	—	9.5	9.5	1360	—	195	265	345	475	615	825	—	—	15
/800	800	1280	155	212	272	375	475	650	—	9.5	9.5	1420	—	200	272	355	488	615	—	—	—	15
/850	850	1360	165	224	290	400	500	690	—	12	12	1500	—	206	280	375	515	650	—	—	—	15
/900	900	1420	165	230	300	412	515	710	—	12	12	1580	—	218	300	388	515	670	—	—	—	15
/950	950	1500	175	243	315	438	545	750	—	12	12	1660	—	230	315	412	530	710	—	—	—	15
/1000	1000	1580	185	258	335	462	580	775	—	12	12	1750	—	243	330	425	560	750	—	—	—	15
/1060	1060	1660	190	265	345	475	600	800	—	12	15	—	—	—	—	—	—	—			—	—
/1120	1120	1750	—	280	365	475	630	—	—	—	15	—	—	—	—	—	—	—			—	—
/1180	1180	1850	—	290	388	500	670	—	—	—	15	—	—	—	—	—	—	—			—	—
/1250	1250	1950	—	308	400	530	710	—	—	—	15	—	—	—	—	—	—	—			—	—
/1320	1320	2060	—	325	425	560	750	—	—	—	15	—	—	—	—	—	—	—			—	—
/1400	1400	2180	—	345	450	580	775	—	—	—	19	—	—	—	—	—	—	—			—	—
/1500	1500	2300	—	355	462	600	800	—	—	—	19	—	—	—	—	—	—	—			—	—

Appendix table-1: Boundary dimensions of radial bearings (Tapered roller bearings not included)-8 Unit: mm

Single row radial ball bearings					63 73		623	633								64 74						
Double row radial ball bearings					13		43 23	53 33														
Cylindrical roller bearings					N3		N23	N33								N4						
Needle roller bearings																						
Spherical roller bearings					213		223															
Nominal bearing bore diameter d		Diameter series 3													Diameter series 4							
		Nominal bearing outer diameter D	Nominal bearing outer diameter D	Dimension series											Nominal bearing outer diameter D	Dimension series						
Number	Dimension			83	03	13	23	33	83	03~33						04	24					
				Nominal width B					Chamfer dimension rs min							Nominal width B		Chamfer dimension rs min				
30	150	250	320	—	65	75	108	128	—	4					380	85	138	5				
32	160	270	340	—	68	79	114	136	—	4					400	88	142	5				
34	170	280	360	—	72	84	120	140	—	4					420	92	145	5				
36	180	300	380	—	75	88	126	150	—	4					440	95	150	6				
38	190	320	400	—	78	92	132	155	—	5					460	98	155	6				
40	200	340	420	—	80	97	138	165	—	5					480	102	160	6				
44	220	370	460	—	88	106	145	180	—	5					540	115	180	6				
48	240	400	500	—	95	114	155	195	—	5					580	122	190	6				
52	260	440	540	—	102	123	165	206	—	6					620	132	206	7.5				
56	280	460	580	—	108	132	175	224	—	6					670	140	224	7.5				
60	300	500	620	—	109	140	185	236	—	7.5					710	150	236	7.5				
64	320	540	670	—	112	155	200	258	—	7.5					750	155	250	9.5				
68	340	580	710	—	118	165	212	272	—	7.5					800	164	265	9.5				
72	360	600	750	—	125	170	224	290	—	7.5					850	180	280	9.5				
76	380	620	780	—	128	175	230	300	—	7.5					900	190	300	9.5				
80	400	650	820	—	136	185	243	308	—	7.5					950	200	315	12				
84	420	700	850	—	136	190	250	315	—	9.5					980	206	325	12				
88	440	720	900	—	145	200	265	345	—	9.5					1030	212	335	12				
92	460	760	950	—	155	212	280	365	—	9.5					1060	218	345	12				
96	480	790	980	—	160	218	290	375	—	9.5					1120	230	365	15				
/500	500	830	1030	—	170	230	300	388	—	12					1150	236	375	15				
/530	530	870	1090	—	180	243	325	412	—	12					1220	250	400	15				
/560	560	920	1150	—	190	258	335	438	—	12					1280	258	412	15				
/600	600	980	1220	—	200	272	355	462	—	15					1360	272	438	15				
/630	630	1030	1280	—	206	280	375	488	—	15					1420	280	450	15				
/670	670	1090	1360	—	218	300	400	515	—	15					1500	290	475	15				
/710	710	1150	1420	—	224	308	412	530	—	15					—	—	—	—				
/750	750	1220	1500	—	236	325	438	560	—	15					—	—	—	—				
/800	800	1280	1600	—	258	355	462	600	—	15					—	—	—	—				
/850	850	1360	1700	—	272	375	488	630	—	19					—	—	—	—				
/900	900	1420	1780	—	280	388	500	650	—	19					—	—	—	—				
/950	950	1500	1850	—	290	400	515	670	—	19					—	—	—	—				
/1000	1000	1580	1950	—	300	412	545	710	—	19					—	—	—	—				
/1060	1060	1660	—	—	—	—	—	—	—	—					—	—	—	—				
/1120	1120	1750	—	—	—	—	—	—	—	—					—	—	—	—				
/1180	1180	1850	—	—	—	—	—	—	—	—					—	—	—	—				
/1250	1250	1950	—	—	—	—	—	—	—	—					—	—	—	—				
/1320	1320	2060	—	—	—	—	—	—	—	—					—	—	—	—				
/1400	1400	2180	—	—	—	—	—	—	—	—					—	—	—	—				
/1500	1500	2300	—	—	—	—	—	—	—	—					—	—	—	—				

Appendix table-2: Boundary dimensions of tapered roller bearing-1

Tapered roller bearings		329						320X						330					
Bore diameter No.	Bearing bore diameter	Bearing outer diameter	Diameter series 9					Bearing outer diameter	Diameter series 0					Bearing outer diameter	Diameter series 0				
			Dimension series 29						Dimension series 20						Dimension series 30				
			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension	
						Inner ring	Outer ring					Inner ring	Outer ring					Inner ring	Outer ring
	d	D	T	B	C	r(min.)		D	T	B	C	r(min.)		D	T	B	C	r(min.)	
02	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
03	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
04	20	—	—	—	—	—	—	42	15	15	12	0.6	0.6	—	—	—	—	—	—
/22	22	—	—	—	—	—	—	44	15	15	11.5	0.6	0.6	—	—	—	—	—	—
05	25	—	—	—	—	—	—	47	15	15	11.5	0.6	0.6	47	17	17	14	0.6	0.6
/28	28	—	—	—	—	—	—	52	16	16	12	1	1	—	—	—	—	—	—
06	30	47	12	12	9	0.3	0.3	55	17	17	13	1	1	55	20	20	16	1	1
/32	32	—	—	—	—	—	—	58	17	17	13	1	1	—	—	—	—	—	—
07	35	55	14	14	11.5	0.6	0.6	62	18	18	14	1	1	62	21	21	17	1	1
08	40	62	15	15	12	0.6	0.6	68	19	19	14.5	1	1	68	22	22	18	1	1
09	45	68	15	15	12	0.6	0.6	75	20	20	15.5	1	1	75	24	24	19	1	1
10	50	72	15	15	12	0.6	0.6	80	20	20	15.5	1	1	80	24	24	19	1	1
11	55	80	17	17	14	1	1	90	23	23	17.5	1.5	1.5	90	27	27	21	1.5	1.5
12	60	85	17	17	14	1	1	95	23	23	17.5	1.5	1.5	95	27	27	21	1.5	1.5
13	65	90	17	17	14	1	1	100	23	23	17.5	1.5	1.5	100	27	27	21	1.5	1.5
14	70	100	20	20	16	1	1	110	25	25	19	1.5	1.5	110	31	31	25.5	1.5	1.5
15	75	105	20	20	16	1	1	115	25	25	19	1.5	1.5	115	31	31	25.5	1.5	1.5
16	80	110	20	20	16	1	1	125	29	29	22	1.5	1.5	125	36	36	29.5	1.5	1.5
17	85	120	23	23	18	1.5	1.5	130	29	29	22	1.5	1.5	130	36	36	29.5	1.5	1.5
18	90	125	23	23	18	1.5	1.5	140	32	32	24	2	1.5	140	39	39	32.5	2	1.5
19	95	130	23	23	18	1.5	1.5	145	32	32	24	2	1.5	145	39	39	32.5	2	1.5
20	100	140	25	25	20	1.5	1.5	150	32	32	24	2	1.5	150	39	39	32.5	2	1.5
21	105	145	25	25	20	1.5	1.5	160	35	35	26	2.5	2	160	43	43	34	2.5	2
22	110	150	25	25	20	1.5	1.5	170	38	38	29	2.5	2	170	47	47	37	2.5	2
24	120	165	29	29	23	1.5	1.5	180	38	38	29	2.5	2	180	48	48	38	2.5	2
26	130	180	32	32	25	2	1.5	200	45	45	34	2.5	2	200	55	55	43	2.5	2
28	140	190	32	32	25	2	1.5	210	45	45	34	2.5	2	210	56	56	44	2.5	2
30	150	210	38	38	30	2.5	2	225	48	48	36	3	2.5	225	59	59	46	3	2.5
32	160	220	38	38	30	2.5	2	240	51	51	38	3	2.5	—	—	—	—	—	—
34	170	230	38	38	30	2.5	2	260	57	57	43	3	2.5	—	—	—	—	—	—
36	180	250	45	45	34	2.5	2	280	64	64	48	3	2.5	—	—	—	—	—	—
38	190	260	45	45	34	2.5	2	290	64	64	48	3	2.5	—	—	—	—	—	—
40	200	280	51	51	39	3	2.5	310	70	70	53	3	2.5	—	—	—	—	—	—
44	220	300	51	51	39	3	2.5	340	76	76	57	4	3	—	—	—	—	—	—
48	240	320	51	51	39	3	2.5	360	76	76	57	4	3	—	—	—	—	—	—
52	260	360	63.5	63.5	48	3	2.5	400	87	87	65	5	4	—	—	—	—	—	—
56	280	380	63.5	63.5	48	3	2.5	420	87	87	65	5	4	—	—	—	—	—	—
60	300	420	76	76	57	4	3	460	100	100	74	5	4	—	—	—	—	—	—
64	320	440	76	76	57	4	3	480	100	100	74	5	4	—	—	—	—	—	—
68	340	460	76	76	57	4	3	—	—	—	—	—	—	—	—	—	—	—	—
72	360	480	76	76	57	4	3	—	—	—	—	—	—	—	—	—	—	—	—

Appendix table-2: Boundary dimensions of tapered roller bearing-2

Unit: mm

Tapered roller bearings		331						302						322					
Bore diameter No.	Bearing bore diameter	Bearing outer diameter	Diameter series 1					Bearing outer diameter	Diameter series 2					Bearing outer diameter	Diameter series 2				
			Dimension series 31						Dimension series 02						Dimension series 22				
			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension	
						Inner ring	Outer ring					Inner ring	Outer ring					Inner ring	Outer ring
	d	D	T	B	C	r(min.)		D	T	B	C	r(min.)		D	T	B	C	r(min.)	
02	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
03	17	—	—	—	—	—	—	40	13.25	12	11	1	1	40	17.25	16	14	1	1
04	20	—	—	—	—	—	—	47	15.25	14	12	1	1	47	19.25	18	15	1	1
/22	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
05	25	—	—	—	—	—	—	52	16.25	15	13	1	1	52	19.25	18	16	1	1
/28	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
06	30	—	—	—	—	—	—	62	17.25	16	14	1	1	62	21.25	20	17	1	1
/32	32	—	—	—	—	—	—	65	18.25	17	15	1	1	—	—	—	—	—	—
07	35	—	—	—	—	—	—	72	18.25	17	15	1.5	1.5	72	24.25	23	19	1.5	1.5
08	40	75	26	26	20.5	1.5	1.5	80	19.75	18	16	1.5	1.5	80	24.75	23	19	1.5	1.5
09	45	80	26	26	20.5	1.5	1.5	85	20.75	19	16	1.5	1.5	85	24.75	23	19	1.5	1.5
10	50	85	26	26	20	1.5	1.5	90	21.75	20	17	1.5	1.5	90	24.75	23	19	1.5	1.5
11	55	95	30	30	23	1.5	1.5	100	22.75	21	18	2	1.5	100	26.75	25	21	2	1.5
12	60	100	30	30	23	1.5	1.5	110	23.75	22	19	2	1.5	110	29.75	28	24	2	1.5
13	65	110	34	34	26.5	1.5	1.5	120	24.75	23	20	2	1.5	120	32.75	31	27	2	1.5
14	70	120	37	37	29	2	1.5	125	26.25	24	21	2	1.5	125	33.25	31	27	2	1.5
15	75	125	37	37	29	2	1.5	130	27.25	25	22	2	1.5	130	33.25	31	27	2	1.5
16	80	130	37	37	29	2	1.5	140	28.25	26	22	2.5	2	140	35.25	33	28	2.5	2
17	85	140	41	41	32	2.5	2	150	30.5	28	24	2.5	2	150	38.5	36	30	2.5	2
18	90	150	45	45	35	2.5	2	160	32.5	30	26	2.5	2	160	42.5	40	34	2.5	2
19	95	160	49	49	38	2.5	2	170	34.5	32	27	3	2.5	170	45.5	43	37	3	2.5
20	100	165	52	52	40	2.5	2	180	37	34	29	3	2.5	180	49	46	39	3	2.5
21	105	—	—	—	—	—	—	190	39	36	30	3	2.5	190	53	50	43	3	2.5
22	110	180	56	56	43	2.5	2	200	41	38	32	3	2.5	200	56	53	46	3	2.5
24	120	200	62	62	48	2.5	2	215	43.5	40	34	3	2.5	215	61.5	58	50	3	2.5
26	130	—	—	—	—	—	—	230	43.75	40	34	4	3	230	67.75	64	54	4	3
28	140	—	—	—	—	—	—	250	45.75	42	36	4	3	250	71.75	68	58	4	3
30	150	—	—	—	—	—	—	270	49	45	38	4	3	270	77	73	60	4	3
32	160	—	—	—	—	—	—	290	52	48	40	4	3	290	84	80	67	4	3
34	170	—	—	—	—	—	—	310	57	52	43	5	4	310	91	86	71	5	4
36	180	—	—	—	—	—	—	320	57	52	43	5	4	320	91	86	71	5	4
38	190	—	—	—	—	—	—	340	60	55	46	5	4	340	97	92	75	5	4
40	200	—	—	—	—	—	—	360	64	58	48	5	4	360	104	98	82	5	4
44	220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
48	240	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
52	260	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
56	280	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	320	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
68	340	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
72	360	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix table-2: Boundary dimensions of tapered roller bearing-3

Tapered roller bearings		332						303						303D					
Bore diameter No.	Bearing bore diameter	Bearing outer diameter	Diameter series 2					Bearing outer diameter	Diameter series 3					Bearing outer diameter	Diameter series 3				
			Dimension series 32						Dimension series 03						Dimension series 03				
			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension	
						Inner ring	Outer ring					Inner ring	Outer ring					Inner ring	Outer ring
	d	D	T	B	C	r(min.)		D	T	B	C	r(min.)		D	T	B	C	r(min.)	
02	15	—	—	—	—	—	—	42	14.25	13	11	1	1	—	—	—	—	—	—
03	17	—	—	—	—	—	—	47	15.25	14	12	1	1	—	—	—	—	—	—
04	20	—	—	—	—	—	—	52	16.25	15	13	1.5	1.5	—	—	—	—	—	—
/22	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
05	25	52	22	22	18	1	1	62	18.25	17	15	1.5	1.5	62	18.25	17	13	1.5	1.5
/28	28	58	24	24	19	1	1	—	—	—	—	—	—	—	—	—	—	—	—
06	30	62	25	25	19.5	1	1	72	20.75	19	16	1.5	1.5	72	20.75	19	14	1.5	1.5
/32	32	65	26	26	20.5	1	1	—	—	—	—	—	—	—	—	—	—	—	—
07	35	72	28	28	22	1.5	1.5	80	22.75	21	18	2	1.5	80	22.75	21	15	2	1.5
08	40	80	32	32	25	1.5	1.5	90	25.25	23	20	2	1.5	90	25.25	23	17	2	1.5
09	45	85	32	32	25	1.5	1.5	100	27.25	25	22	2	1.5	100	27.25	25	18	2	1.5
10	50	90	32	32	24.5	1.5	1.5	110	29.25	27	23	2.5	2	110	29.25	27	19	2.5	2
11	55	100	35	35	27	2	1.5	120	31.5	29	25	2.5	2	120	31.5	29	21	2.5	2
12	60	110	38	38	29	2	1.5	130	33.5	31	26	3	2.5	130	33.5	31	22	3	2.5
13	65	120	41	41	32	2	1.5	140	36	33	28	3	2.5	140	36	33	23	3	2.5
14	70	125	41	41	32	2	1.5	150	38	35	30	3	2.5	150	38	35	25	3	2.5
15	75	130	41	41	31	2	1.5	160	40	37	31	3	2.5	160	40	37	26	3	2.5
16	80	140	46	46	35	2.5	2	170	42.5	39	33	3	2.5	170	42.5	39	27	3	2.5
17	85	150	49	49	37	2.5	2	180	44.5	41	34	4	3	180	44.5	41	28	4	3
18	90	160	55	55	42	2.5	2	190	46.5	43	36	4	3	190	46.5	43	30	4	3
19	95	170	58	58	44	3	2.5	200	49.5	45	38	4	3	200	49.5	45	32	4	3
20	100	180	63	63	48	3	2.5	215	51.5	47	39	4	3	—	—	—	—	—	—
21	105	190	68	68	52	3	2.5	225	53.5	49	41	4	3	—	—	—	—	—	—
22	110	—	—	—	—	—	—	240	54.5	50	42	4	3	—	—	—	—	—	—
24	120	—	—	—	—	—	—	260	59.5	55	46	4	3	—	—	—	—	—	—
26	130	—	—	—	—	—	—	280	63.75	58	49	5	4	—	—	—	—	—	—
28	140	—	—	—	—	—	—	300	67.75	62	53	5	4	—	—	—	—	—	—
30	150	—	—	—	—	—	—	320	72	65	55	5	4	—	—	—	—	—	—
32	160	—	—	—	—	—	—	340	75	68	58	5	4	—	—	—	—	—	—
34	170	—	—	—	—	—	—	360	80	72	62	5	4	—	—	—	—	—	—
36	180	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
38	190	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40	200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
44	220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
48	240	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
52	260	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
56	280	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	320	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
68	340	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
72	360	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix table-2: Boundary dimensions of tapered roller bearing-4

Unit: mm

Tapered roller bearings		313						323					
Bore diameter No.	Bearing bore diameter	Bearing outer diameter	Diameter series 3					Bearing outer diameter	Diameter series 3				
			Dimension series 13						Dimension series 23				
			Assembly width	Inner ring width	Outer ring width	Chamfer dimension			Assembly width	Inner ring width	Outer ring width	Chamfer dimension	
						Inner ring	Outer ring					Inner ring	Outer ring
	d	D	T	B	C	r(min.)		D	T	B	C	r(min.)	
02	15	—	—	—	—	—	—	—	—	—	—	—	—
03	17	—	—	—	—	—	—	47	20.25	19	16	1	1
04	20	—	—	—	—	—	—	52	22.25	21	18	1.5	1.5
/22	22	—	—	—	—	—	—	—	—	—	—	—	—
05	25	—	—	—	—	—	—	62	25.25	24	20	1.5	1.5
/28	28	—	—	—	—	—	—	—	—	—	—	—	—
06	30	—	—	—	—	—	—	72	28.75	27	23	1.5	1.5
/32	32	—	—	—	—	—	—	—	—	—	—	—	—
07	35	—	—	—	—	—	—	80	32.75	31	25	2	1.5
08	40	—	—	—	—	—	—	90	35.25	33	27	2	1.5
09	45	—	—	—	—	—	—	100	38.25	36	30	2	1.5
10	50	—	—	—	—	—	—	110	42.25	40	33	2.5	2
11	55	—	—	—	—	—	—	120	45.5	43	35	2.5	2
12	60	—	—	—	—	—	—	130	48.5	46	37	3	2.5
13	65	—	—	—	—	—	—	140	51	48	39	3	2.5
14	70	—	—	—	—	—	—	150	54	51	42	3	2.5
15	75	—	—	—	—	—	—	160	58	55	45	3	2.5
16	80	—	—	—	—	—	—	170	61.5	58	48	3	2.5
17	85	—	—	—	—	—	—	180	63.5	60	49	4	3
18	90	—	—	—	—	—	—	190	67.5	64	53	4	3
19	95	—	—	—	—	—	—	200	71.5	67	55	4	3
20	100	215	56.5	51	35	4	3	215	77.5	73	60	4	3
21	105	225	58	53	36	4	3	225	81.5	77	63	4	3
22	110	240	63	57	38	4	3	240	84.5	80	65	4	3
24	120	260	68	62	42	4	3	260	90.5	86	69	4	3
26	130	280	72	66	44	5	4	—	—	—	—	—	—
28	140	300	77	70	47	5	4	—	—	—	—	—	—
30	150	320	82	75	50	5	4	—	—	—	—	—	—
32	160	—	—	—	—	—	—	—	—	—	—	—	—
34	170	—	—	—	—	—	—	—	—	—	—	—	—
36	180	—	—	—	—	—	—	—	—	—	—	—	—
38	190	—	—	—	—	—	—	—	—	—	—	—	—
40	200	—	—	—	—	—	—	—	—	—	—	—	—
44	220	—	—	—	—	—	—	—	—	—	—	—	—
48	240	—	—	—	—	—	—	—	—	—	—	—	—
52	260	—	—	—	—	—	—	—	—	—	—	—	—
56	280	—	—	—	—	—	—	—	—	—	—	—	—
60	300	—	—	—	—	—	—	—	—	—	—	—	—
64	320	—	—	—	—	—	—	—	—	—	—	—	—
68	340	—	—	—	—	—	—	—	—	—	—	—	—
72	360	—	—	—	—	—	—	—	—	—	—	—	—

Appendix table-3: Boundary dimensions of single direction thrust bearings-1

Thrust ball bearings										511					512	522			
Spherical roller thrust bearings														292					
		Diameter series 0					Diameter series 1						Diameter series 2						
			Dimension series					Dimension series					Dimension series						
Bore diameter code	Nominal bearing bore diameter	Nominal bearing outer diameter	70	90	10	Chamfer dimension	Nominal bearing outer diameter	71	91	11	Chamfer dimension	Nominal bearing outer diameter	72	92	12	22	22	Chamfer dimension	Chamfer dimension
			Nominal height					Nominal height					Nominal height				Central raceway washer		
																	Nominal bore diameter	Nominal height	
	d	D	T			r (min.)	D	T			r (min.)	D	T				d_2	B	r (min.)	r_1 (min.)
4	4	12	4	—	6	0.3	—	—	—	—	—	16	6	—	8	—	—	—	0.3	—
6	6	16	5	—	7	0.3	—	—	—	—	—	20	6	—	9	—	—	—	0.3	—
8	8	18	5	—	7	0.3	—	—	—	—	—	22	6	—	9	—	—	—	0.3	—
00	10	20	5	—	7	0.3	24	6	—	9	0.3	26	7	—	11	—	—	—	0.6	—
01	12	22	5	—	7	0.3	26	6	—	9	0.3	28	7	—	11	—	—	—	0.6	—
02	15	26	5	—	7	0.3	28	6	—	9	0.3	32	8	—	12	22	10	5	0.6	0.3
03	17	28	5	—	7	0.3	30	6	—	9	0.3	35	8	—	12	—	—	—	0.6	—
04	20	32	6	—	8	0.3	35	7	—	10	0.3	40	9	—	14	26	15	6	0.6	0.3
05	25	37	6	—	8	0.3	42	8	—	11	0.6	47	10	—	15	28	20	7	0.6	0.3
06	30	42	6	—	8	0.3	47	8	—	11	0.6	52	10	—	16	29	25	7	0.6	0.3
07	35	47	6	—	8	0.3	52	8	—	12	0.6	62	12	—	18	34	30	8	1	0.3
08	40	52	6	—	9	0.3	60	9	—	13	0.6	68	13	—	19	36	30	9	1	0.6
09	45	60	7	—	10	0.3	65	9	—	14	0.6	73	13	—	20	37	35	9	1	0.6
10	50	65	7	—	10	0.3	70	9	—	14	0.6	78	13	—	22	39	40	9	1	0.6
11	55	70	7	—	10	0.3	78	10	—	16	0.6	90	16	21	25	45	45	10	1	0.6
12	60	75	7	—	10	0.3	85	11	—	17	1	95	16	21	26	46	50	10	1	0.6
13	65	80	7	—	10	0.3	90	11	—	18	1	100	16	21	27	47	55	10	1	0.6
14	70	85	7	—	10	0.3	95	11	—	18	1	105	16	21	27	47	55	10	1	1
15	75	90	7	—	10	0.3	100	11	—	19	1	110	16	21	27	47	60	10	1	1
16	80	95	7	—	10	0.3	105	11	—	19	1	115	16	21	28	48	65	10	1	1
17	85	100	7	—	10	0.3	110	11	—	19	1	125	18	24	31	55	70	12	1	1
18	90	105	7	—	10	0.3	120	14	—	22	1	135	20	27	35	62	75	14	1.1	1
20	100	120	9	—	14	0.6	135	16	21	25	1	150	23	30	38	67	85	15	1.1	1
22	110	130	9	—	14	0.6	145	16	21	25	1	160	23	30	38	67	95	15	1.1	1
24	120	140	9	—	14	0.6	155	16	21	25	1	170	23	30	39	68	100	15	1.1	1.1
26	130	150	9	—	14	0.6	170	18	24	30	1	190	27	36	45	80	110	18	1.5	1.1
28	140	160	9	—	14	0.6	180	18	24	31	1	200	27	36	46	81	120	18	1.5	1.1
30	150	170	9	—	14	0.6	190	18	24	31	1	215	29	39	50	89	130	20	1.5	1.1
32	160	180	9	—	14	0.6	200	18	24	31	1	225	29	39	51	90	140	20	1.5	1.1
34	170	190	9	—	14	0.6	215	20	27	34	1.1	240	32	42	55	97	150	21	1.5	1.1
36	180	200	9	—	14	0.6	225	20	27	34	1.1	250	32	42	56	98	150	21	1.5	2
38	190	215	11	—	17	1	240	23	30	37	1.1	270	36	48	62	109	160	24	2	2
40	200	225	11	—	17	1	250	23	30	37	1.1	280	36	48	62	109	170	24	2	2
44	220	250	14	—	22	1	270	23	30	37	1.1	300	36	48	63	110	190	24	2	2
48	240	270	14	—	22	1	300	27	36	45	1.5	340	45	60	78	—	—	—	2.1	—
52	260	290	14	—	22	1	320	27	36	45	1.5	360	45	60	79	—	—	—	2.1	—
56	280	310	14	—	22	1	350	32	42	53	1.5	380	45	60	80	—	—	—	2.1	—
60	300	340	18	24	30	1	380	36	48	62	2	420	54	73	95	—	—	—	3	—
64	320	360	18	24	30	1	400	36	48	63	2	440	54	73	95	—	—	—	3	—

Note: 1. Dimension series 22, 23, and 24 are double row bearing series. For double row bearings, d2 becomes the nominal bearing bore diameter.
2. For the outer diameter of the shaft raceway washer and the inner diameter of the housing raceway washer, see the dimension table of thrust bearings.

Appendix table-3: Boundary dimensions of single direction thrust bearings-2

Unit: mm

			513	523					514	524						Thrust ball bearings
		293						294								Spherical roller thrust bearings
		Diameter series 3						Diameter series 4						Diameter series 5		
			Dimension series						Dimension series						Dimension series	
Nominal bearing outer diameter		73	93	13	23	23	Chamfer dimension	Chamfer dimension	74	94	14	24	24	Chamfer dimension	95	Chamfer dimension
		Nominal height				Central raceway washer			Nominal height				Central raceway washer		Nominal height	
						Nominal bore diameter	Nominal height						Nominal bore diameter	Nominal height		
D		T				d_2	B	r (min.)	r_1 (min.)	D	T			d_2	B	r (min.)	r_1 (min.)
20	7	—	11	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
24	8	—	12	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
26	8	—	12	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
30	9	—	14	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
32	9	—	14	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
37	10	—	15	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
40	10	—	16	—	—	—	—	0.6	—	—	—	—	—	—	—	—	—
47	12	—	18	—	—	—	—	1	—	—	—	—	—	—	—	—	—
52	12	—	18	34	20	8	1	0.3	60	16	21	24	45	15	11	1	0.6
60	14	—	21	38	25	9	1	0.3	70	18	24	28	52	20	12	1	0.6
68	15	—	24	44	30	10	1	0.3	80	20	27	32	59	25	14	1.1	0.6
78	17	22	26	49	30	12	1	0.6	90	23	30	36	65	30	15	1.1	0.6
85	18	24	28	52	35	12	1	0.6	100	25	34	39	72	35	17	1.1	0.6
95	20	27	31	58	40	14	1.1	0.6	110	27	36	43	78	40	18	1.5	0.6
105	23	30	35	64	45	15	1.1	0.6	120	29	39	48	87	45	20	1.5	0.6
110	23	30	35	64	50	15	1.1	0.6	130	32	42	51	93	50	21	1.5	0.6
115	23	30	36	65	55	15	1.1	0.6	140	34	45	56	101	50	23	2	1
125	25	34	40	72	55	16	1.1	1	150	36	48	60	107	55	24	2	1
135	27	36	44	79	60	18	1.5	1	160	38	51	65	115	60	26	2	1
140	27	36	44	79	65	18	1.5	1	170	41	54	68	120	65	27	2.1	1
150	29	39	49	87	70	19	1.5	1	180	42	58	72	128	65	29	2.1	1.1
155	29	39	50	88	75	19	1.5	1	190	45	60	77	135	70	30	2.1	1.1
170	32	42	55	97	85	21	1.5	1	210	50	67	85	150	80	33	3	1.1
190	36	48	63	110	95	24	2	1	230	54	73	95	166	90	37	3	1.1
210	41	54	70	123	100	27	2.1	1.1	250	58	78	102	177	95	40	4	1.5
225	42	58	75	130	110	30	2.1	1.1	270	63	85	110	192	100	42	4	2
240	45	60	80	140	120	31	2.1	1.1	280	63	85	112	196	110	44	4	2
250	45	60	80	140	130	31	2.1	1.1	300	67	90	120	209	120	46	4	2
270	50	67	87	153	140	33	3	1.1	320	73	95	130	226	130	50	5	2
280	50	67	87	153	150	33	3	1.1	340	78	103	135	236	135	50	5	2.1
300	54	73	95	165	150	37	3	2	360	82	109	140	245	140	52	5	3
320	58	78	105	183	160	40	4	2	380	85	115	150	—	—	—	5	—
340	63	85	110	192	170	42	4	2	400	90	122	155	—	—	—	5	—
360	63	85	112	—	—	—	4	—	420	90	122	160	—	—	—	6	—
380	63	85	112	—	—	—	4	—	440	90	122	160	—	—	—	6	—
420	73	95	130	—	—	—	5	—	480	100	132	175	—	—	—	6	—
440	73	95	130	—	—	—	5	—	520	109	145	190	—	—	—	6	—
480	82	109	140	—	—	—	5	—	540	109	145	190	—	—	—	6	—
500	82	109	140	—	—	—	5	—	580	118	155	205	—	—	—	7.5	—

Nominal bearing outer diameter		Dimension series		Chamfer dimension	Bore diameter code
		95			
		Nominal height			
D		T		r (min.)	d
20	7	11		0.3	4
24	8	12		0.3	6
26	8	12		0.3	8
30	9	14		0.3	00
32	9	14		0.3	01
37	10	15		0.3	02
40	10	16		0.3	03
47	12	18		0.3	04
52	12	18		0.3	05
60	14	21		0.3	06
68	15	24		0.3	07
78	17	26		0.3	08
85	18	28		0.3	09
95	20	31		0.3	10
105	23	31		0.3	11
110	23	31		0.3	12
115	23	31		0.3	13
125	25	34		0.3	14
135	27	35		0.3	15
140	27	35		0.3	16
150	29	39		0.3	17
155	29	39		0.3	18
170	32	42		0.3	20
190	36	45		0.3	22
210	41	52		0.3	24
225	42	52		0.3	26
240	45	55		0.3	28
250	45	55		0.3	30
270	50	60		0.3	32
280	50	60		0.3	34
300	54	63		0.3	36
320	58	65		0.3	38
340	63	68		0.3	40
360	63	68		0.3	44
380	63	68		0.3	48
420	73	78		0.3	52
440	73	78		0.3	56
480	82	85		0.3	60
500	82	85		0.3	64

Appendix table-3: Boundary dimensions of single direction thrust bearings-3

Thrust ball bearings					511					511	
Spherical roller thrust bearings											
Bore diameter code	Nominal bearing bore diameter d	Diameter series 0: Nominal bearing outer diameter D	Dimension series 70: Nominal height T	Dimension series 90: Nominal height T	Dimension series 10: Nominal height T	Chamfer dimension r (min.)	Diameter series 1: Nominal bearing outer diameter D	Dimension series 71: Nominal height T	Dimension series 91: Nominal height T	Dimension series 11: Nominal height T	Chamfer dimension r (min.)
68	340	380	18	24	30	1	420	36	48	64	2
72	360	400	18	24	30	1	440	36	48	65	2
76	380	420	18	24	30	1	460	36	48	65	2
80	400	440	18	24	30	1	480	36	48	65	2
84	420	460	18	24	30	1	500	36	48	65	2
88	440	480	18	24	30	1	540	45	60	80	2.1
92	460	500	18	24	30	1	560	45	60	80	2.1
96	480	520	18	24	30	1	580	45	60	80	2.1
/500	500	540	18	24	30	1	600	45	60	80	2.1
/530	530	580	23	30	38	1.1	640	50	67	85	3
/560	560	610	23	30	38	1.1	670	50	67	85	3
/600	600	650	23	30	38	1.1	710	50	67	85	3
/630	630	680	23	30	38	1.1	750	54	73	95	3
/670	670	730	27	36	45	1.5	800	58	78	105	4
/710	710	780	32	42	53	1.5	850	63	85	112	4
/750	750	820	32	42	53	1.5	900	67	90	120	4
/800	800	870	32	42	53	1.5	950	67	90	120	4
/850	850	920	32	42	53	1.5	1000	67	90	120	4
/900	900	980	36	48	63	2	1060	73	95	130	5
/950	950	1030	36	48	63	2	1120	78	103	135	5
/1000	1000	1090	41	54	70	2.1	1180	82	109	140	5
/1060	1060	1150	41	54	70	2.1	1250	85	115	150	5
/1120	1120	1220	45	60	80	2.1	1320	90	122	160	5
/1180	1180	1280	45	60	80	2.1	1400	100	132	175	6
/1250	1250	1360	50	67	85	3	1460	—	—	175	6
/1320	1320	1440	—	—	95	3	1540	—	—	175	6
/1400	1400	1520	—	—	95	3	1630	—	—	180	6
/1500	1500	1630	—	—	105	4	1750	—	—	195	6
/1600	1600	1730	—	—	105	4	1850	—	—	195	6
/1700	1700	1840	—	—	112	4	1970	—	—	212	7.5
/1800	1800	1950	—	—	120	4	2080	—	—	220	7.5
/1900	1900	2060	—	—	130	5	2180	—	—	220	7.5
/2000	2000	2160	—	—	130	5	2300	—	—	236	7.5
/2120	2120	2300	—	—	140	5	2430	—	—	243	7.5
/2240	2240	2430	—	—	150	5	2670	—	—	258	9.5
/2360	2360	2550	—	—	150	5	2700	—	—	265	9.5
/2500	2500	2700	—	—	160	5	2850	—	—	272	9.5

Note: 1. Dimension series 22, 23, and 24 are double row bearing series.
2. For the outer diameter of the shaft raceway washer and the inner diameter of the housing raceway washer, see the dimension table of thrust bearings.

Appendix table-3: Boundary dimensions of single direction thrust bearings-4

Unit: mm

Thrust ball bearings				512	522					
Spherical roller thrust bearings			292							
Bore diameter code	Nominal bearing bore diameter d	Nominal bearing outer diameter D	Diameter series 2: Dimension series 72: Nominal height T	Dimension series 92: Nominal height T	Dimension series 12: Nominal height T	Dimension series 22: Nominal height T	Dimension series 22: Central raceway washer: Nominal bore diameter d_2	Dimension series 22: Central raceway washer: Nominal height B	Chamfer dimension r (min.)	Chamfer dimension r_1 (min.)
68	340	460	54	73	96	—	—	—	3	—
72	360	500	63	85	110	—	—	—	4	—
76	380	520	63	85	112	—	—	—	4	—
80	400	540	63	85	112	—	—	—	4	—
84	420	580	73	95	130	—	—	—	5	—
88	440	600	73	95	130	—	—	—	5	—
92	460	620	73	95	130	—	—	—	5	—
96	480	650	78	103	135	—	—	—	5	—
/500	500	670	78	103	135	—	—	—	5	—
/530	530	710	82	109	140	—	—	—	5	—
/560	560	750	85	115	150	—	—	—	5	—
/600	600	800	90	122	160	—	—	—	5	—
/630	630	850	100	132	175	—	—	—	6	—
/670	670	900	103	140	180	—	—	—	6	—
/710	710	950	109	145	190	—	—	—	6	—
/750	750	1000	112	150	195	—	—	—	6	—
/800	800	1060	118	155	205	—	—	—	7.5	—
/850	850	1120	122	160	212	—	—	—	7.5	—
/900	900	1180	125	170	220	—	—	—	7.5	—
/950	950	1250	136	180	236	—	—	—	7.5	—
/1000	1000	1320	145	190	250	—	—	—	9.5	—
/1060	1060	1400	155	206	265	—	—	—	9.5	—
/1120	1120	1460	—	206	—	—	—	—	9.5	—
/1180	1180	1520	—	206	—	—	—	—	9.5	—
/1250	1250	1610	—	216	—	—	—	—	9.5	—
/1320	1320	1700	—	228	—	—	—	—	9.5	—
/1400	1400	1790	—	234	—	—	—	—	12	—
/1500	1500	1920	—	252	—	—	—	—	12	—
/1600	1600	2040	—	264	—	—	—	—	15	—
/1700	1700	2160	—	276	—	—	—	—	15	—
/1800	1800	2280	—	288	—	—	—	—	15	—
/1900	1900	—	—	—	—	—	—	—	—	—
/2000	2000	—	—	—	—	—	—	—	—	—
/2120	2120	—	—	—	—	—	—	—	—	—
/2240	2240	—	—	—	—	—	—	—	—	—
/2360	2360	—	—	—	—	—	—	—	—	—
/2500	2500	—	—	—	—	—	—	—	—	—

Appendix table-3: Boundary dimensions of single direction thrust bearings-5 Unit: mm

Thrust ball bearings					513		523				
Spherical roller thrust bearings				293							
Bore diameter code	Nominal bearing bore diameter d	Diameter series 3									
		Nominal bearing outer diameter D	Dimension series							Chamfer dimension r (min.)	Chamfer dimension r_1 (min.)
			73	93	13	23	23				
			Nominal height T				Central raceway washer				
							Nominal bore diameter d_2	Nominal height B			
68	340	540	90	122	160	—	—	—	5	—	
72	360	560	90	122	160	—	—	—	5	—	
76	380	600	100	132	175	—	—	—	6	—	
80	400	620	100	132	175	—	—	—	6	—	
84	420	650	103	140	180	—	—	—	6	—	
88	440	680	109	145	190	—	—	—	6	—	
92	460	710	112	150	195	—	—	—	6	—	
96	480	730	112	150	195	—	—	—	6	—	
/500	500	750	112	150	195	—	—	—	6	—	
/530	530	800	122	160	212	—	—	—	7.5	—	
/560	560	850	132	175	224	—	—	—	7.5	—	
/600	600	900	136	180	236	—	—	—	7.5	—	
/630	630	950	145	190	250	—	—	—	9.5	—	
/670	670	1000	150	200	258	—	—	—	9.5	—	
/710	710	1060	160	212	272	—	—	—	9.5	—	
/750	750	1120	165	224	290	—	—	—	9.5	—	
/800	800	1180	170	230	300	—	—	—	9.5	—	
/850	850	1250	180	243	315	—	—	—	12	—	
/900	900	1320	190	250	335	—	—	—	12	—	
/950	950	1400	200	272	355	—	—	—	12	—	
/1000	1000	1460	—	276	—	—	—	—	12	—	
/1060	1060	1540	—	288	—	—	—	—	15	—	
/1120	1120	1630	—	306	—	—	—	—	15	—	
/1180	1180	1710	—	318	—	—	—	—	15	—	
/1250	1250	1800	—	330	—	—	—	—	19	—	
/1320	1320	1900	—	348	—	—	—	—	19	—	
/1400	1400	2000	—	360	—	—	—	—	19	—	
/1500	1500	2140	—	384	—	—	—	—	19	—	
/1600	1600	2270	—	402	—	—	—	—	19	—	
/1700	1700	—	—	—	—	—	—	—	—	—	
/1800	1800	—	—	—	—	—	—	—	—	—	
/1900	1900	—	—	—	—	—	—	—	—	—	
/2000	2000	—	—	—	—	—	—	—	—	—	
/2120	2120	—	—	—	—	—	—	—	—	—	
/2240	2240	—	—	—	—	—	—	—	—	—	
/2360	2360	—	—	—	—	—	—	—	—	—	
/2500	2500	—	—	—	—	—	—	—	—	—	

Note: 1. Dimension series 22, 23, and 24 are double row bearing series.
2. For the outer diameter of the shaft raceway washer and the inner diameter of the housing raceway washer, see the dimension table of thrust bearings.

Appendix table-3: Boundary dimensions of single direction thrust bearings-6 Unit: mm

Thrust ball bearings					514		524						
Spherical roller thrust bearings				294									
Bore diameter code	Nominal bearing bore diameter d	Diameter series 4									Diameter series 5		
		Nominal bearing outer diameter D	Dimension series						Chamfer dimension r (min.)	Chamfer dimension r_1 (min.)	Nominal bearing outer diameter D	Dimension series 95 Nominal height T	Chamfer dimension r (min.)
			74	94	14	24	24						
			Nominal height T				Central raceway washer						
							Nominal bore diameter d_2	Nominal height B					
68	340	620	125	170	220	—	—	—	7.5	—	750	243	12
72	360	640	125	170	220	—	—	—	7.5	—	780	250	12
76	380	670	132	175	224	—	—	—	7.5	—	820	265	12
80	400	710	140	185	243	—	—	—	7.5	—	850	272	12
84	420	730	140	185	243	—	—	—	7.5	—	900	290	15
88	440	780	155	206	265	—	—	—	9.5	—	950	308	15
92	460	800	155	206	265	—	—	—	9.5	—	980	315	15
96	480	850	165	224	290	—	—	—	9.5	—	1000	315	15
/500	500	870	165	224	290	—	—	—	9.5	—	1060	335	15
/530	530	920	175	236	308	—	—	—	9.5	—	1090	335	15
/560	560	980	190	250	335	—	—	—	12	—	1150	355	15
/600	600	1030	195	258	335	—	—	—	12	—	1220	375	15
/630	630	1090	206	280	365	—	—	—	12	—	1280	388	15
/670	670	1150	218	290	375	—	—	—	15	—	1320	388	15
/710	710	1220	230	308	400	—	—	—	15	—	1400	412	15
/750	750	1280	236	315	412	—	—	—	15	—	—	—	—
/800	800	1360	250	335	438	—	—	—	15	—	—	—	—
/850	850	1440	—	354	—	—	—	—	15	—	—	—	—
/900	900	1520	—	372	—	—	—	—	15	—	—	—	—
/950	950	1600	—	390	—	—	—	—	15	—	—	—	—
/1000	1000	1670	—	402	—	—	—	—	15	—	—	—	—
/1060	1060	1770	—	426	—	—	—	—	15	—	—	—	—
/1120	1120	1860	—	444	—	—	—	—	15	—	—	—	—
/1180	1180	1950	—	462	—	—	—	—	19	—	—	—	—
/1250	1250	2050	—	480	—	—	—	—	19	—	—	—	—
/1320	1320	2160	—	505	—	—	—	—	19	—	—	—	—
/1400	1400	2280	—	530	—	—	—	—	19	—	—	—	—
/1500	1500	—	—	—	—	—	—	—	—	—	—	—	—
/1600	1600	—	—	—	—	—	—	—	—	—	—	—	—
/1700	1700	—	—	—	—	—	—	—	—	—	—	—	—
/1800	1800	—	—	—	—	—	—	—	—	—	—	—	—
/1900	1900	—	—	—	—	—	—	—	—	—	—	—	—
/2000	2000	—	—	—	—	—	—	—	—	—	—	—	—
/2120	2120	—	—	—	—	—	—	—	—	—	—	—	—
/2240	2240	—	—	—	—	—	—	—	—	—	—	—	—
/2360	2360	—	—	—	—	—	—	—	—	—	—	—	—
/2500	2500	—	—	—	—	—	—	—	—	—	—	—	—

Appendix Tables

Appendix table-4: Comparison table of SI and CGS series gravity units-1

Unit system \ Quantity	Length L	Mass M	Time T	Acceleration	Force	Stress	Pressure	Energy
SI	m	kg	s	m/s^2	N	Pa	Pa	J
CGS system	cm	g	s	Gal	dyn	dyn/cm^2	dyn/cm^2	erg
Gravitation system	m	$kgf \cdot s^2/m$	s	m/s^2	kgf	kgf/m^2	kgf/m^2	$kgf \cdot m$

Appendix table-5: SI-customary unit conversion table-1

Quantity	Unit designation	Code	Conversion rate to SI	SI unit designation	Code
Angle	Degree	°	$\pi/180$	Radian	rad
	Minute	′	$\pi/10\ 800$		
	Second	″ (sec)	$\pi/648\ 000$		
Length	Meter	m	1	Meter	m
	Micron	μ	10^{-6}		
	Angstrom	Å	10^{-10}		
Area	Square meter	m^2	1	Square meter	m^2
	Are	a	10^2		
	Hectare	ha	10^4		
Volume	Cubic meter	m^3	1	Cubic meter	m^3
	Liter	ℓ.L	10^{-3}		
Mass	Kilogram	kg	1	Kilogram	kg
	Ton	t	10^3		
	Kilogram force / square second per meter	$kgf \cdot s^2/m$	9.806 65		
Time	Second	s	1	Second	s
	Minute	min	60		
	Hour	h	3 600		
	Day	d	86 400		
Speed	Meters per second	m/s	1	Meters per second	m/s
	Knot	kn	1 852/3 600		
Frequency and vibration	Cycle	s^{-1}(pps)	1	Hertz	Hz
Revolutions (rotational speed)	Revolutions per minute (rpm)	rpm(r/min)	1/60	Per second	s^{-1}
Angular velocity	Radians per second	rad/s	1	Radians per second	rad/s
Acceleration	Meters per square second	m/s^2	1	Radians per second	m/s^2
	G	G	9.806 65		
Force	Kilogram force	kgf	9.806 65	Newton	N
	Ton force	tf	9 806.65		
	Dyne	dyn	10^{-5}		
Force moment	Kilogram force / meter	$kgf \cdot m$	9.806 65	Newton meter	$N \cdot m$
Inertia moment	Kilogram force / meter / square second	$kgf \cdot m \cdot s^2$	9.806 65	Kilogram / square meter	$kg \cdot m^2$
Stress	Kilogram force per square meter	kgf/m^2	9.806 65	Pascal or newton per square meter	Pa or N/m^2
Pressure	Kilogram force per square meter	kgf/m^2	9.806 65	Pascal	Pa
	Meter water column	mH_2O	9 806.65		
	Meter of mercury	mHg	101 325/0.76		
	Torr	Torr	101 325/760		
	Atmosphere	atm	101 325		
	Bar	bar	10^5		
Energy	Erg	erg	10^{-7}	Joule	J
	IT calorie	cal_{IT}	4.186 8		
	Kilogram force / meter	$kgf \cdot m$	9.806 65		
	Kilowatt hour	$kW \cdot h$	3.600×10^6		
	Metric horsepower per hour	$PS \cdot h$	$2.647\ 79\times10^6$		
Power rate and power	Watt	W	1	Watt	W
	Metric horsepower	PS	735.5		
	Kilogram force / meter per second	$kgf \cdot m/s$	9.806 65		

Appendix table-4: Comparison table of SI and CGS series gravity units-2

Unit system \ Quantity	Power rate	Temperature	Viscosity	Dynamic viscosity	Flux	Flux density	Magnetic field strength
SI	W	K	$Pa \cdot s$	m^2/s	Wb	T	A/m
CGS system	erg/s	°C	P	St	Mx	Gs	Oe
Gravitation system	$kgf \cdot m/s$	°C	$kgf \cdot s/m^2$	m^2/s	—	—	—

Appendix table-5: SI-customary unit conversion table-2

Quantity	Unit designation	Code	Conversion rate to SI	SI unit designation	Code
Viscosity	Poise	P	10^{-1}	Pascal second	$Pa \cdot s$
	Centipoise	cP	10^{-3}		
	Kilogram force / square second per meter	$kgf \cdot s/m^2$	9.806 65		
Dynamic viscosity	Stoke	St	10^{-4}	Square meter per second	m^2/s
	Centistoke	cSt	10^{-6}		
Temperature	Degree	°C	+273.15	Kelvin	K
Radioactivity	Curie	Ci	3.7×10^{10}	Becquerel	Bq
Dosage	Roentgen	R	2.58×10^{-4}	Coulombs per kilogram	C/kg
Absorption dosage	Rad	rad	10^{-2}	Gray	Gy
Dosage equivalent	Rem	rem	10^{-2}	Sievert	Sv
Dosage equivalent	Maxwell	Mx	10^{-8}	Weber	Wb
Flux density	Gamma	γ	10^{-9}	Tesla	T
	Gauss	Gs	10^{-4}		
Magnetic field strength	Oersted	Oe	$10^3/4\pi$	Amperes per meter	A/m
Magnetic field strength	Coulomb	C	1	Coulomb	C
Potential difference	Volt	V	1	Volt	V
Electric resistance	Ohm	Ω	1	Ohm	Ω
Curren	Ampere	A	1	Ampere	A

Appendix table-6: Tenth power multiples of SI unit

Multiples of unit	Prefix		Multiples of unit	Prefix	
	Designation	Code		Designation	Code
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}	Atto	a

Appendix table-7: Dimensional tolerance for shafts

Unit: μm

Diameter division mm Over	Incl.	a13 Upper	a13 Lower	c12 Upper	c12 Lower	d6 Upper	d6 Lower	e6 Upper	e6 Lower	e13 Upper	e13 Lower	f5 Upper	f5 Lower	f6 Upper	f6 Lower	g5 Upper	g5 Lower	g6 Upper	g6 Lower
–	3[1]	– 270	– 410	– 60	– 160	– 20	– 26	– 14	– 20	– 14	– 154	– 6	–10	– 6	– 12	– 2	– 6	– 2	– 8
3	6	– 270	– 450	– 70	– 190	– 30	– 38	– 20	– 28	– 20	– 200	–10	–15	– 10	– 18	– 4	– 9	– 4	– 12
6	10	– 280	– 500	– 80	– 230	– 40	– 49	– 25	– 34	– 25	– 245	–13	–19	– 13	– 22	– 5	–11	– 5	– 14
10	18	– 290	– 560	– 95	– 275	– 50	– 61	– 32	– 43	– 32	– 302	–16	–24	– 16	– 27	– 6	–14	– 6	– 17
18	30	– 300	– 630	–110	– 320	– 65	– 78	– 40	– 53	– 40	– 370	–20	–29	– 20	– 33	– 7	–16	– 7	– 20
30	40	– 310	– 700	–120	– 370	– 80	– 96	– 50	– 66	– 50	– 440	–25	–36	– 25	– 41	– 9	–20	– 9	– 25
40	50	– 320	– 710	–130	– 380														
50	65	– 340	– 800	–140	– 440	–100	–119	– 60	– 79	– 60	– 520	–30	–43	– 30	– 49	–10	–23	–10	– 29
65	80	– 360	– 820	–150	– 450														
80	100	– 380	– 920	–170	– 520	–120	–142	– 72	– 94	– 72	– 612	–36	–51	– 36	– 58	–12	–27	–12	– 34
100	120	– 410	– 950	–180	– 530														
120	140	– 460	–1 090	–200	– 600	–145	–170	– 85	–110	– 85	– 715	–43	–61	– 43	– 68	–14	–32	–14	– 39
140	160	– 520	–1 150	–210	– 610														
160	180	– 580	–1 210	–230	– 630														
180	200	– 660	–1 380	–240	– 700	–170	–199	–100	–129	–100	– 820	–50	–70	– 50	– 79	–15	–35	–15	– 44
200	225	– 740	–1 460	–260	– 720														
225	250	– 820	–1 540	–280	– 740														
250	280	– 920	–1 730	–300	– 820	–190	–222	–110	–142	–110	– 920	–56	–79	– 56	– 88	–17	–40	–17	– 49
280	315	–1 050	–1 860	–330	– 850														
315	355	–1 200	–2 090	–360	– 930	–210	–246	–125	–161	–125	–1 015	–62	–87	– 62	– 98	–18	–43	–18	– 54
355	400	–1 350	–2 240	–400	– 970														
400	450	–1 500	–2 470	–440	–1 070	–230	–270	–135	–175	–135	–1 105	–68	–95	– 68	–108	–20	–47	–20	– 60
450	500	–1 650	–2 620	–480	–1 110														
500	560	–	–	–	–	–260	–304	–145	–189	–145	–1 245	–	–	–	76 –120	–	–	–22	– 66
560	630																		
630	710	–	–	–	–	–290	–340	–160	–210	–160	–1 410	–	–	–	80 –130	–	–	–24	– 74
710	800																		
800	900	–	–	–	–	–320	–376	–170	–226	–170	–1 570	–	–	–	86 –142	–	–	–26	– 82
900	1 000																		
1 000	1 120	–	–	–	–	–350	–416	–195	–261	–195	–1 845	–	–	–	98 –164	–	–	–28	– 94
1 120	1 250																		
1 250	1 400	–	–	–	–	–390	–468	–220	–298	–220	–2 170	–	–	–110	–188	–	–	–30	–108
1 400	1 600																		
1 600	1 800	–	–	–	–	–	–	–240	–332	–240	–2 540	–	–	–120	–212	–	–	–32	–124
1 800	2 000																		
2 000	2 240	–	–	–	–	–	–	–260	–370	–260	–3 060	–	–	–130	–240	–	–	–34	–144
2 240	2 500																		
2 500	2 800	–	–	–	–	–	–	–290	–425	–290	–3 590	–	–	–145	–280	–	–	–38	–173
2 800	3 150																		

1) Basic tolerance **a** is not used for the basic size tolerance with respect to the size of 1 mm or below shown in drawings.

Diameter division mm Over	Incl.	j5 Upper	j5 Lower	js5 Upper	js5 Lower	j6 Upper	j6 Lower	js6 Upper	js6 Lower	j7 Upper	j7 Lower	k4 Upper	k4 Lower	k5 Upper	k5 Lower	k6 Upper	k6 Lower	m5 Upper	m5 Lower
–	3	+2	– 2	+ 2	– 2	+ 4	– 2	+ 3	– 3	+ 6	– 4	+ 3	0	+ 4	0	+ 6	0	+ 6	+ 2
3	6	+3	– 2	+ 2.5	– 2.5	+ 6	– 2	+ 4	– 4	+ 8	– 4	+ 5	+1	+ 6	+1	+ 9	+1	+ 9	+ 4
6	10	+4	– 2	+ 3	– 3	+ 7	– 2	+ 4.5	– 4.5	+10	– 5	+ 5	+1	+ 7	+1	+ 10	+1	+12	+ 6
10	18	+5	– 3	+ 4	– 4	+ 8	– 3	+ 5.5	– 5.5	+12	– 6	+ 6	+1	+ 9	+1	+ 12	+1	+15	+ 7
18	30	+5	– 4	+ 4.5	– 4.5	+ 9	– 4	+ 6.5	– 6.5	+13	– 8	+ 8	+2	+11	+2	+ 15	+2	+17	+ 8
30	40	+6	– 5	+ 5.5	– 5.5	+11	– 5	+ 8	– 8	+15	–10	+ 9	+2	+13	+2	+ 18	+2	+20	+ 9
40	50																		
50	65	+6	– 7	+ 6.5	– 6.5	+12	– 7	+ 9.5	– 9.5	+18	–12	+10	+2	+15	+2	+ 21	+2	+24	+11
65	80																		
80	100	+6	– 9	+ 7.5	– 7.5	+13	– 9	+11	–11	+20	–15	+13	+3	+18	+3	+ 25	+3	+28	+13
100	120																		
120	140	+7	–11	+ 9	– 9	+14	–11	+12.5	–12.5	+22	–18	+15	+3	+21	+3	+ 28	+3	+33	+15
140	160																		
160	180																		
180	200	+7	–13	+10	–10	+16	–13	+14.5	–14.5	+25	–21	+18	+4	+24	+4	+ 33	+4	+37	+17
200	225																		
225	250																		
250	280	+7	–16	+11.5	–11.5	+16	–16	+16	–16	+26	–26	+20	+4	+27	+4	+ 36	+4	+43	+20
280	315																		
315	355	+7	–18	+12.5	–12.5	+18	–18	+18	–18	+29	–28	+22	+4	+29	+4	+ 40	+4	+46	+21
355	400																		
400	450	+7	–20	+13.5	–13.5	+20	–20	+20	–20	+31	–32	+25	+5	+32	+5	+ 45	+5	+50	+23
450	500																		
500	560	–	–	+16	–16	–	–	+22	–22	–	–	–	–	–	–	+ 44	0	–	–
560	630																		
630	710	–	–	+18	–18	–	–	+25	–25	–	–	–	–	–	–	+ 50	0	–	–
710	800																		
800	900	–	–	+20	–20	–	–	+28	–28	–	–	–	–	–	–	+ 56	0	–	–
900	1 000																		
1 000	1 120	–	–	+23.5	–23.5	–	–	+33	–33	–	–	–	–	–	–	+ 66	0	–	–
1 120	1 250																		
1 250	1 400	–	–	+27.5	–27.5	–	–	+39	–39	–	–	–	–	–	–	+ 78	0	–	–
1 400	1 600																		
1 600	1 800	–	–	+32.5	–32.5	–	–	+46	–46	–	–	–	–	–	–	+ 92	0	–	–
1 800	2 000																		
2 000	2 240	–	–	+39	–39	–	–	+55	–55	–	–	–	–	–	–	+110	0	–	–
2 240	2 500																		
2 500	2 800	–	–	+48	–48	–	–	+67.5	–67.5	–	–	–	–	–	–	+135	0	–	–
2 800	3 150																		

Unit: μm

h4 Upper	h4 Lower	h5 Upper	h5 Lower	h6 Upper	h6 Lower	h7 Upper	h7 Lower	h8 Upper	h8 Lower	h9 Upper	h9 Lower	h10 Upper	h10 Lower	h11 Upper	h11 Lower	h13 Upper	h13 Lower	js4 Upper	js4 Lower	Diameter division mm Over	Incl.
0	– 3	0	– 4	0	– 6	0	– 10	0	– 14	0	– 25	0	– 40	0	– 60	0	– 140	+ 1.5	– 1.5	–	3
0	– 4	0	– 5	0	– 8	0	– 12	0	– 18	0	– 30	0	– 48	0	– 75	0	– 180	+ 2	– 2	3	6
0	– 4	0	– 6	0	– 9	0	– 15	0	– 22	0	– 36	0	– 58	0	– 90	0	– 220	+ 2	– 2	6	10
0	– 5	0	– 8	0	– 11	0	– 18	0	– 27	0	– 43	0	– 70	0	– 110	0	– 270	+ 2.5	– 2.5	10	18
0	– 6	0	– 9	0	– 13	0	– 21	0	– 33	0	– 52	0	– 84	0	– 130	0	– 330	+ 3	– 3	18	30
0	– 7	0	–11	0	– 16	0	– 25	0	– 39	0	– 62	0	–100	0	– 160	0	– 390	+ 3.5	– 3.5	30	40
																				40	50
0	– 8	0	–13	0	– 19	0	– 30	0	– 46	0	– 74	0	–120	0	– 190	0	– 460	+ 4	– 4	50	65
																				65	80
0	–10	0	–15	0	– 22	0	– 35	0	– 54	0	– 87	0	–140	0	– 220	0	– 540	+ 5	– 5	80	100
																				100	120
0	–12	0	–18	0	– 25	0	– 40	0	– 63	0	–100	0	–160	0	– 250	0	– 630	+ 6	– 6	120	140
																				140	160
																				160	180
0	–14	0	–20	0	– 29	0	– 46	0	– 72	0	–115	0	–185	0	– 290	0	– 720	+ 7	– 7	180	200
																				200	225
																				225	250
0	–16	0	–23	0	– 32	0	– 52	0	– 81	0	–130	0	–210	0	– 320	0	– 810	+ 8	– 8	250	280
																				280	315
0	–18	0	–25	0	– 36	0	– 57	0	– 89	0	–140	0	–230	0	– 360	0	– 890	+ 9	– 9	315	355
																				355	400
0	–20	0	–27	0	– 40	0	– 63	0	– 97	0	–155	0	–250	0	– 400	0	– 970	+10	–10	400	450
																				450	500
0	–22	0	–32	0	– 44	0	– 70	0	–110	0	–175	0	–280	0	– 440	0	–1 100	+11	–11	500	560
																				560	630
0	–25	0	–36	0	– 50	0	– 80	0	–125	0	–200	0	–320	0	– 500	0	–1 250	+12.5	–12.5	630	710
																				710	800
0	–28	0	–40	0	– 56	0	– 90	0	–140	0	–230	0	–360	0	– 560	0	–1 400	+14	–14	800	900
																				900	1 000
0	–33	0	–47	0	– 66	0	–105	0	–165	0	–260	0	–420	0	– 660	0	–1 650	+16.5	–16.5	1 000	1 120
																				1 120	1 250
0	–39	0	–55	0	– 78	0	–125	0	–195	0	–310	0	–500	0	– 780	0	–1 950	+19.5	–19.5	1 250	1 400
																				1 400	1 600
0	–46	0	–65	0	– 92	0	–150	0	–230	0	–370	0	–600	0	– 920	0	–2 300	+23	–23	1 600	1 800
																				1 800	2 000
0	–55	0	–78	0	–110	0	–175	0	–280	0	–440	0	–700	0	–1 100	0	–2 800	+27.5	–27.5	2 000	2 240
																				2 240	2 500
0	–68	0	–96	0	–135	0	–210	0	–330	0	–540	0	–860	0	–1 350	0	–3 300	+34	–34	2 500	2 800
																				2 800	3 150

Unit: μm

m6 Upper	m6 Lower	n5 Upper	n5 Lower	n6 Upper	n6 Lower	p5 Upper	p5 Lower	p6 Upper	p6 Lower	r6 Upper	r6 Lower	r7 Upper	r7 Lower	Basic tolerance IT2	IT3	IT5	IT7	Diameter division mm Over	Incl.
+ 8	+ 2	+ 8	+ 4	+ 10	+ 4	+10	+ 6	+ 12	+ 6	+ 16	+ 10	+ 20	+ 10	1.2	2	4	10	–	3
+ 12	+ 4	+13	+ 8	+ 16	+ 8	+17	+12	+ 20	+ 12	+ 23	+ 15	+ 27	+ 15	1.5	2.5	5	12	3	6
+ 15	+ 6	+16	+10	+ 19	+ 10	+21	+15	+ 24	+ 15	+ 28	+ 19	+ 34	+ 19	1.5	2.5	6	15	6	10
+ 18	+ 7	+20	+12	+ 23	+ 12	+26	+18	+ 29	+ 18	+ 34	+ 23	+ 41	+ 23	2	3	8	18	10	18
+ 21	+ 8	+24	+15	+ 28	+ 15	+31	+22	+ 35	+ 22	+ 41	+ 28	+ 49	+ 28	2.5	4	9	21	18	30
+ 25	+ 9	+28	+17	+ 33	+ 17	+37	+26	+ 42	+ 26	+ 50	+ 34	+ 59	+ 34	2.5	4	11	25	30	40
																		40	50
+ 30	+11	+33	+20	+ 39	+ 20	+45	+32	+ 51	+ 32	+ 60	+ 41	+ 71	+ 41	3	5	13	30	50	65
										+ 62	+ 43	+ 73	+ 43					65	80
+ 35	+13	+38	+23	+ 45	+ 23	+52	+37	+ 59	+ 37	+ 73	+ 51	+ 86	+ 51	4	6	15	35	80	100
										+ 76	+ 54	+ 89	+ 54					100	120
+ 40	+15	+45	+27	+ 52	+ 27	+61	+43	+ 68	+ 43	+ 88	+ 63	+103	+ 63	5	8	18	40	120	140
										+ 90	+ 65	+105	+ 65					140	160
										+ 93	+ 68	+108	+ 68					160	180
+ 46	+17	+51	+31	+ 60	+ 31	+70	+50	+ 79	+ 50	+106	+ 77	+123	+ 77	7	10	20	46	180	200
										+109	+ 80	+126	+ 80					200	225
										+113	+ 84	+130	+ 84					225	250
+ 52	+20	+57	+34	+ 66	+ 34	+79	+56	+ 88	+ 56	+126	+ 94	+146	+ 94	8	12	23	52	250	280
										+130	+ 98	+150	+ 98					280	315
+ 57	+21	+62	+37	+ 73	+ 37	+87	+62	+ 98	+ 62	+144	+108	+165	+108	9	13	25	57	315	355
										+150	+114	+171	+114					355	400
+ 63	+23	+67	+40	+ 80	+ 40	+95	+68	+108	+ 68	+166	+126	+189	+126	10	15	27	63	400	450
										+172	+132	+195	+132					450	500
+ 70	+26	–	–	+ 88	+ 44	–	–	+122	+ 78	+194	+150	+220	+150	11	16	30	70	500	560
										+199	+155	+225	+155					560	630
+ 80	+30	–	–	+100	+ 50	–	–	+138	+ 88	+225	+175	+255	+175	13	18	35	80	630	710
										+235	+185	+265	+185					710	800
+ 90	+34	–	–	+112	+ 56	–	–	+156	+100	+266	+210	+300	+210	15	21	40	90	800	900
										+276	+220	+310	+220					900	1 000
+106	+40	–	–	+132	+ 66	–	–	+186	+120	+316	+250	+355	+250	18	24	46	105	1 000	1 120
										+326	+260	+365	+260					1 120	1 250
+126	+48	–	–	+156	+ 78	–	–	+218	+140	+378	+300	+425	+300	21	29	54	125	1 250	1 400
										+408	+330	+455	+330					1 400	1 600
+150	+58	–	–	+184	+ 92	–	–	+262	+170	+462	+370	+520	+370	25	35	65	150	1 600	1 800
										+492	+400	+550	+400					1 800	2 000
+178	+68	–	–	+220	+110	–	–	+305	+195	+550	+440	+615	+440	30	41	77	175	2 000	2 240
										+570	+460	+635	+460					2 240	2 500
+211	+76	–	–	+270	+135	–	–	+375	+240	+685	+550	+760	+550	36	50	93	210	2 500	2 800
										+715	+580	+790	+580					2 800	3 150

Appendix table-8: Dimensional tolerance for housing bore

Unit: μm

Diameter division mm		E7		E10		E11		E12		F6		F7		F8		G6	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
–	3	+ 24	+ 14	+ 54	+ 14	+ 74	+ 14	+ 114	+ 14	+ 12	+ 6	+ 16	+ 6	+ 20	+ 6	+ 8	+ 2
3	6	+ 32	+ 20	+ 68	+ 20	+ 95	+ 20	+ 140	+ 20	+ 18	+ 10	+ 22	+ 10	+ 28	+ 10	+ 12	+ 4
6	10	+ 40	+ 25	+ 83	+ 25	+ 115	+ 25	+ 175	+ 25	+ 22	+ 13	+ 28	+ 13	+ 35	+ 13	+ 14	+ 5
10	18	+ 50	+ 32	+ 102	+ 32	+ 142	+ 32	+ 212	+ 32	+ 27	+ 16	+ 34	+ 16	+ 43	+ 16	+ 17	+ 6
18	30	+ 61	+ 40	+ 124	+ 40	+ 170	+ 40	+ 250	+ 40	+ 33	+ 20	+ 41	+ 20	+ 53	+ 20	+ 20	+ 7
30	40	+ 75	+ 50	+ 150	+ 50	+ 210	+ 50	+ 300	+ 50	+ 41	+ 25	+ 50	+ 25	+ 64	+ 25	+ 25	+ 9
40	50																
50	65	+ 90	+ 60	+ 180	+ 60	+ 250	+ 60	+ 360	+ 60	+ 49	+ 30	+ 60	+ 30	+ 76	+ 30	+ 29	+10
65	80																
80	100	+107	+ 72	+ 212	+ 72	+ 292	+ 72	+ 422	+ 72	+ 58	+ 36	+ 71	+ 36	+ 90	+ 36	+ 34	+12
100	120																
120	140																
140	160	+125	+ 85	+ 245	+ 85	+ 335	+ 85	+ 485	+ 85	+ 68	+ 43	+ 83	+ 43	+106	+ 43	+ 39	+14
160	180																
180	200																
200	225	+146	+100	+ 285	+100	+ 390	+100	+ 560	+100	+ 79	+ 50	+ 96	+ 50	+122	+ 50	+ 44	+15
225	250																
250	280	+162	+110	+ 320	+110	+ 430	+110	+ 630	+110	+ 88	+ 56	+108	+ 56	+137	+ 56	+ 49	+17
280	315																
315	355	+182	+125	+ 355	+125	+ 485	+125	+ 695	+125	+ 98	+ 62	+119	+ 62	+151	+ 62	+ 54	+18
355	400																
400	450	+198	+135	+ 385	+135	+ 535	+135	+ 765	+135	+108	+ 68	+131	+ 68	+165	+ 68	+ 60	+20
450	500																
500	560	+215	+145	+ 425	+145	+ 585	+145	+ 845	+145	+120	+ 76	+146	+ 76	+186	+ 76	+ 66	+22
560	630																
630	710	+240	+160	+ 480	+160	+ 660	+160	+ 960	+160	+130	+ 80	+160	+ 80	+205	+ 80	+ 74	+24
710	800																
800	900	+260	+170	+ 530	+170	+ 730	+170	+1 070	+170	+142	+ 86	+176	+ 86	+226	+ 86	+ 82	+26
900	1 000																
1 000	1 120	+300	+195	+ 615	+195	+ 855	+195	+1 245	+195	+164	+ 98	+203	+ 98	+263	+ 98	+ 94	+28
1 120	1 250																
1 250	1 400	+345	+220	+ 720	+220	+1 000	+220	+1 470	+220	+188	+110	+235	+110	+305	+110	+108	+30
1 400	1 600																
1 600	1 800	+390	+240	+ 840	+240	+1 160	+240	+1 740	+240	+212	+120	+270	+120	+350	+120	+124	+32
1 800	2 000																
2 000	2 240	+435	+260	+ 960	+260	+1 360	+260	+2 010	+260	+240	+130	+305	+130	+410	+130	+144	+34
2 240	2 500																
2 500	2 800	+500	+290	+1 150	+290	+1 640	+290	+2 390	+290	+280	+145	+355	+145	+475	+145	+173	+38
2 800	3 150																

Diameter division mm		J6		Js6		J7		Js7		K5		K6		K7		M6	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
–	3	+ 2	– 4	+ 3	– 3	+ 4	– 6	+ 5	– 5	0	– 4	0	– 6	0	– 10	– 2	– 8
3	6	+ 5	– 3	+ 4	– 4	+ 6	– 6	+ 6	– 6	0	– 5	+2	– 6	+ 3	– 9	– 1	– 9
6	10	+ 5	– 4	+ 4.5	– 4.5	+ 8	– 7	+ 7.5	– 7.5	+1	– 5	+2	– 7	+ 5	– 10	– 3	– 12
10	18	+ 6	– 5	+ 5.5	– 5.5	+10	– 8	+ 9	– 9	+2	– 6	+2	– 9	+ 6	– 12	– 4	– 15
18	30	+ 8	– 5	+ 6.5	– 6.5	+12	– 9	+ 10.5	– 10.5	+1	– 8	+2	– 11	+ 6	– 15	– 4	– 17
30	40	+10	– 6	+ 8	– 8	+14	–11	+ 12.5	– 12.5	+2	– 9	+3	– 13	+ 7	– 18	– 4	– 20
40	50																
50	65	+13	– 6	+ 9.5	– 9.5	+18	–12	+ 15	– 15	+3	–10	+4	– 15	+ 9	– 21	– 5	– 24
65	80																
80	100	+16	– 6	+11	–11	+22	–13	+ 17.5	– 17.5	+2	–13	+4	– 18	+10	– 25	– 6	– 28
100	120																
120	140																
140	160	+18	– 7	+12.5	–12.5	+26	–14	+ 20	– 20	+3	–15	+4	– 21	+12	– 28	– 8	– 33
160	180																
180	200																
200	225	+22	– 7	+14.5	–14.5	+30	–16	+ 23	– 23	+2	–18	+5	– 24	+13	– 33	– 8	– 37
225	250																
250	280	+25	– 7	+16	–16	+36	–16	+ 26	– 26	+3	–20	+5	– 27	+16	– 36	– 9	– 41
280	315																
315	355	+29	– 7	+18	–18	+39	–18	+ 28.5	– 28.5	+3	–22	+7	– 29	+17	– 40	–10	– 46
355	400																
400	450	+33	– 7	+20	–20	+43	–20	+ 31.5	– 31.5	+2	–25	+8	– 32	+18	– 45	–10	– 50
450	500																
500	560	–	–	+22	–22	–	–	+ 35	– 35	–	–	0	– 44	0	– 70	–26	– 70
560	630																
630	710	–	–	+25	–25	–	–	+ 40	– 40	–	–	0	– 50	0	– 80	–30	– 80
710	800																
800	900	–	–	+28	–28	–	–	+ 45	– 45	–	–	0	– 56	0	– 90	–34	– 90
900	1 000																
1 000	1 120	–	–	+33	–33	–	–	+ 52.5	– 52.5	–	–	0	– 66	0	–105	–40	–106
1 120	1 250																
1 250	1 400	–	–	+39	–39	–	–	+ 62.5	– 62.5	–	–	0	– 78	0	–125	–48	–126
1 400	1 600																
1 600	1 800	–	–	+46	–46	–	–	+ 75	– 75	–	–	0	– 92	0	–150	–58	–150
1 800	2 000																
2 000	2 240	–	–	+55	–55	–	–	+ 87.5	– 87.5	–	–	0	–110	0	–175	–68	–178
2 240	2 500																
2 500	2 800	–	–	+67.5	–67.5	–	–	+105	–105	–	–	0	–135	0	–210	–76	–211
2 800	3 150																

Unit: μm

G7		H6		H7		H8		H9		H10		H11		H13		Diameter division mm	
Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Over	Incl.
+ 12	+ 2	+ 6	0	+ 10	0	+ 14	0	+ 25	0	+ 40	0	+ 60	0	+ 140	0	–	3
+ 16	+ 4	+ 8	0	+ 12	0	+ 18	0	+ 30	0	+ 48	0	+ 75	0	+ 180	0	3	6
+ 20	+ 5	+ 9	0	+ 15	0	+ 22	0	+ 36	0	+ 58	0	+ 90	0	+ 220	0	6	10
+ 24	+ 6	+ 11	0	+ 18	0	+ 27	0	+ 43	0	+ 70	0	+ 110	0	+ 270	0	10	18
+ 28	+ 7	+ 13	0	+ 21	0	+ 33	0	+ 52	0	+ 84	0	+ 130	0	+ 330	0	18	30
+ 34	+ 9	+ 16	0	+ 25	0	+ 39	0	+ 62	0	+100	0	+ 160	0	+ 390	0	30	40
																40	50
+ 40	+10	+ 19	0	+ 30	0	+ 46	0	+ 74	0	+120	0	+ 190	0	+ 460	0	50	65
																65	80
+ 47	+12	+ 22	0	+ 35	0	+ 54	0	+ 87	0	+140	0	+ 220	0	+ 540	0	80	100
																100	120
+ 54	+14	+ 25	0	+ 40	0	+ 63	0	+100	0	+160	0	+ 250	0	+ 630	0	120	140
																140	160
																160	180
+ 61	+15	+ 29	0	+ 46	0	+ 72	0	+115	0	+185	0	+ 290	0	+ 720	0	180	200
																200	225
																225	250
+ 69	+17	+ 32	0	+ 52	0	+ 81	0	+130	0	+210	0	+ 320	0	+ 810	0	250	280
																280	315
+ 75	+18	+ 36	0	+ 57	0	+ 89	0	+140	0	+230	0	+ 360	0	+ 890	0	315	355
																355	400
+ 83	+20	+ 40	0	+ 63	0	+ 97	0	+155	0	+250	0	+ 400	0	+ 970	0	400	450
																450	500
+ 92	+22	+ 44	0	+ 70	0	+110	0	+175	0	+280	0	+ 440	0	+1 100	0	500	560
																560	630
+104	+24	+ 50	0	+ 80	0	+125	0	+200	0	+320	0	+ 500	0	+1 250	0	630	710
																710	800
+116	+26	+ 56	0	+ 90	0	+140	0	+230	0	+360	0	+ 560	0	+1 400	0	800	900
																900	1 000
+133	+28	+ 66	0	+105	0	+165	0	+260	0	+420	0	+ 660	0	+1 650	0	1 000	1 120
																1 120	1 250
+155	+30	+ 78	0	+125	0	+195	0	+310	0	+500	0	+ 780	0	+1 950	0	1 250	1 400
																1 400	1 600
+182	+32	+ 92	0	+150	0	+230	0	+370	0	+600	0	+ 920	0	+2 300	0	1 600	1 800
																1 800	2 000
+209	+34	+110	0	+175	0	+280	0	+440	0	+700	0	+1 100	0	+2 800	0	2 000	2 240
																2 240	2 500
+248	+38	+135	0	+210	0	+330	0	+540	0	+860	0	+1 350	0	+3 300	0	2 500	2 800
																2 800	3 150

Unit: μm

M7		N6		N7		P6		P7		R6		R7		Diameter division mm	
Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Over	Incl.
– 2	– 12	– 4	– 10	– 4	– 14	– 6	– 12	– 6	– 16	– 10	– 16	– 10	– 20	–	3
0	– 12	– 5	– 13	– 4	– 16	– 9	– 17	– 8	– 20	– 12	– 20	– 11	– 23	3	6
0	– 15	– 7	– 16	– 4	– 19	– 12	– 21	– 9	– 24	– 16	– 25	– 13	– 28	6	10
0	– 18	– 9	– 20	– 5	– 23	– 15	– 26	– 11	– 29	– 20	– 31	– 16	– 34	10	18
0	– 21	– 11	– 24	– 7	– 28	– 18	– 31	– 14	– 35	– 24	– 37	– 20	– 41	18	30
0	– 25	– 12	– 28	– 8	– 33	– 21	– 37	– 17	– 42	– 29	– 45	– 25	– 50	30	40
														40	50
0	– 30	– 14	– 33	– 9	– 39	– 26	– 45	– 21	– 51	– 35	– 54	– 30	– 60	50	65
										– 37	– 56	– 32	– 62	65	80
0	– 35	– 16	– 38	– 10	– 45	– 30	– 52	– 24	– 59	– 44	– 66	– 38	– 73	80	100
										– 47	– 69	– 41	– 76	100	120
0	– 40	– 20	– 45	– 12	– 52	– 36	– 61	– 28	– 68	– 56	– 81	– 48	– 88	120	140
										– 58	– 83	– 50	– 90	140	160
										– 61	– 86	– 53	– 93	160	180
0	– 46	– 22	– 51	– 14	– 60	– 41	– 70	– 33	– 79	– 68	– 97	– 60	–106	180	200
										– 71	–100	– 63	–109	200	225
										– 75	–104	– 67	–113	225	250
0	– 52	– 25	– 57	– 14	– 66	– 47	– 79	– 36	– 88	– 85	–117	– 74	–126	250	280
										– 89	–121	– 78	–130	280	315
0	– 57	– 26	– 62	– 16	– 73	– 51	– 87	– 41	– 98	– 97	–133	– 87	–144	315	355
										–103	–139	– 93	–150	355	400
0	– 63	– 27	– 67	– 17	– 80	– 55	– 95	– 45	–108	–113	–153	–103	–166	400	450
										–119	–159	–109	–172	450	500
–26	– 96	– 44	– 88	– 44	–114	– 78	–122	– 78	–148	–150	–194	–150	–220	500	560
										–155	–199	–155	–225	560	630
–30	–110	– 50	–100	– 50	–130	– 88	–138	– 88	–168	–175	–225	–175	–225	630	710
										–185	–235	–185	–265	710	800
–34	–124	– 56	–112	– 56	–146	–100	–156	–100	–190	–210	–266	–210	–300	800	900
										–220	–276	–220	–310	900	1 000
–40	–145	– 66	–132	– 66	–171	–120	–186	–120	–225	–250	–316	–250	–355	1 000	1 120
										–260	–326	–260	–365	1 120	1 250
–48	–173	– 78	–156	– 78	–203	–140	–218	–140	–265	–300	–378	–300	–425	1 250	1 400
										–330	–408	–330	–455	1 400	1 600
–58	–208	– 92	–184	– 92	–242	–170	–262	–170	–320	–370	–462	–370	–520	1 600	1 800
										–400	–492	–400	–550	1 800	2 000
–68	–243	–110	–220	–110	–285	–195	–305	–195	–370	–440	–550	–440	–615	2 000	2 240
										–460	–570	–460	–635	2 240	2 500
–76	–286	–135	–270	–135	–345	–240	–375	–240	–450	–550	–685	–550	–760	2 500	2 800
										–580	–715	–580	–790	2 800	3 150

Appendix table-9: Basic tolerance

Unit: μm

Basic dimension mm		IT basic tolerance class									
Over	Incl.	IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10
—	3	0.8	1.2	2	3	4	6	10	14	25	40
3	6	1	1.5	2.5	4	5	8	12	18	30	48
6	10	1	1.5	2.5	4	6	9	15	22	36	58
10	18	1.2	2	3	5	8	11	18	27	43	70
18	30	1.5	2.5	4	6	9	13	21	33	52	84
30	50	1.5	2.5	4	7	11	16	25	39	62	100
50	80	2	3	5	8	13	19	30	46	74	120
80	120	2.5	4	6	10	15	22	35	54	87	140
120	180	3.5	5	8	12	18	25	40	63	100	160
180	250	4.5	7	10	14	20	29	46	72	115	185
250	315	6	8	12	16	23	32	52	81	130	210
315	400	7	9	13	18	25	36	57	89	140	230
400	500	8	10	15	20	27	40	63	97	155	250
500	630	9	11	16	22	30	44	70	110	175	280
630	800	10	13	18	25	35	50	80	125	200	320
800	1 000	11	15	21	29	40	56	90	140	230	360
1 000	1 250	13	18	24	34	46	66	105	165	260	420
1 250	1 600	15	21	29	40	54	78	125	195	310	500
1 600	2 000	18	25	35	48	65	92	150	230	370	600
2 000	2 500	22	30	41	57	77	110	175	280	440	700
2 500	3 150	26	36	50	69	93	135	210	330	540	860

Appendix table-10: Viscosity conversion table

Dynamic viscosity mm^2/s	Saybolt SUS (second)	Redwood R″ (second)	Engler E (degree)
2.7	35	32.2	1.18
4.3	40	36.2	1.32
5.9	45	40.6	1.46
7.4	50	44.9	1.60
8.9	55	49.1	1.75
10.4	60	53.5	1.88
11.8	65	57.9	2.02
13.1	70	62.3	2.15
14.5	75	67.6	2.31
15.8	80	71.0	2.42
17.0	85	75.1	2.55
18.2	90	79.6	2.68
19.4	95	84.2	2.81
20.6	100	88.4	2.95
23.0	110	97.1	3.21
25.0	120	105.9	3.49
27.5	130	114.8	3.77
29.8	140	123.6	4.04
32.1	150	132.4	4.32
34.3	160	141.1	4.59
36.5	170	150.0	4.88
38.8	180	158.8	5.15
41.0	190	167.5	5.44
43.2	200	176.4	5.72
47.5	220	194.0	6.28
51.9	240	212	6.85
56.5	260	229	7.38
60.5	280	247	7.95
64.9	300	265	8.51
70.3	325	287	9.24
75.8	350	309	9.95
81.2	375	331	10.7
86.8	400	353	11.4
92.0	425	375	12.1
97.4	450	397	12.8

Dynamic viscosity mm^2/s	Saybolt SUS (second)	Redwood R″ (second)	Engler E (degree)
103	475	419	13.5
108	500	441	14.2
119	550	485	15.6
130	600	529	17.0
141	650	573	18.5
152	700	617	19.9
163	750	661	21.3
173	800	705	22.7
184	850	749	24.2
195	900	793	25.6
206	950	837	27.0
217	1 000	882	28.4
260	1 200	1 058	34.1
302	1 400	1 234	39.8
347	1 600	1 411	45.5
390	1 800	1 587	51
433	2 000	1 763	57
542	2 500	2 204	71
650	3 000	2 646	85
758	3 500	3 087	99
867	4 000	3 526	114
974	4 500	3 967	128
1082	5 000	4 408	142
1150	5 500	4 849	156
1300	6 000	5 290	170
1400	6 500	5 730	185
1510	7 000	6 171	199
1630	7 500	6 612	213
1740	8 000	7 053	227
1850	8 500	7 494	242
1960	9 000	7 934	256
2070	9 500	8 375	270
2200	10 000	8 816	284

Appendix table-11: Kgf to N conversion table

kgf		N	kgf		N	kgf		N
0.1020	1	9.8066	3.4670	34	333.43	6.8321	67	657.04
0.2039	2	19.613	3.5690	35	343.23	6.9341	68	666.85
0.3059	3	29.420	3.6710	36	353.04	7.0361	69	676.66
0.4079	4	39.227	3.7730	37	362.85	7.1380	70	686.46
0.5099	5	49.033	3.8749	38	372.65	7.2400	71	696.27
0.6118	6	58.840	3.9769	39	382.46	7.3420	72	706.08
0.7138	7	68.646	4.0789	40	392.27	7.4440	73	715.88
0.8158	8	78.453	4.1808	41	402.07	7.5459	74	725.69
0.9177	9	88.260	4.2828	42	411.88	7.6479	75	735.50
1.0197	10	98.066	4.3848	43	421.68	7.7499	76	745.30
1.1217	11	107.87	4.4868	44	431.49	7.8518	77	755.11
1.2237	12	117.68	4.5887	45	441.30	7.9538	78	764.92
1.3256	13	127.49	4.6907	46	451.10	8.0558	79	774.72
1.4276	14	137.29	4.7927	47	460.91	8.1578	80	784.53
1.5296	15	147.10	4.8946	48	470.72	8.2597	81	794.34
1.6316	16	156.91	4.9966	49	480.52	8.3617	82	804.14
1.7335	17	166.71	5.0986	50	490.33	8.4637	83	813.95
1.8355	18	176.52	5.2006	51	500.14	8.5656	84	823.76
1.9375	19	186.33	5.3025	52	509.94	8.6676	85	833.56
2.0394	20	196.13	5.4045	53	519.75	8.7696	86	843.37
2.1414	21	205.94	5.5065	54	529.56	8.8716	87	853.18
2.2434	22	215.75	5.6085	55	539.36	8.9735	88	862.98
2.3454	23	225.55	5.7104	56	549.17	9.0755	89	872.79
2.4473	24	235.36	5.8124	57	558.98	9.1775	90	882.60
2.5493	25	245.17	5.9144	58	568.78	9.2794	91	892.40
2.6513	26	254.97	6.0163	59	578.59	9.3814	92	902.21
2.7532	27	264.78	6.1183	60	588.40	9.4834	93	912.02
2.8552	28	274.59	6.2203	61	598.20	9.5854	94	921.82
2.9572	29	284.39	6.3223	62	608.01	9.6873	95	931.63
3.0592	30	294.20	6.4242	63	617.82	9.7893	96	941.44
3.1611	31	304.01	6.5262	64	627.62	9.8913	97	951.24
3.2631	32	313.81	6.6282	65	637.43	9.9932	98	961.05
3.3651	33	323.62	6.7302	66	647.24	10.0952	99	970.86

[How to read the table] If for example you want to convert 10 kgf to N, find "10" in the middle column of the first set of columns. Look in the N column directly to the right of "10," and you will see that 10 kgf equals 98.066 N. Oppositely, to convert 10 N to kgf, look in the kgf column to the left of "10" and you will see that 10 N equals 1.0197 kgf.

1kgf=9.80665N
1N=0.101972kgf

Appendix table-12: Inch / millimeter conversion table

Inch		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″
Fraction	Decimal										
			25.400	50.800	76.200	101.600	127.000	152.400	177.800	203.200	228.600
1/64	0.015625	0.397	25.797	51.197	76.597	101.997	127.397	152.797	178.197	203.597	228.997
1/32	0.031250	0.794	26.194	51.594	76.994	102.394	127.794	153.194	178.594	203.994	229.394
3/64	0.046875	1.191	26.591	51.991	77.391	102.791	128.191	153.591	178.991	204.391	229.791
1/16	0.062500	1.588	26.988	52.388	77.788	103.188	128.588	153.988	179.388	204.788	230.188
5/64	0.078125	1.984	27.384	52.784	78.184	103.584	128.984	154.384	179.784	205.184	230.584
3/32	0.093750	2.381	27.781	53.181	48.581	103.981	129.381	154.781	180.181	205.581	230.981
7/64	0.109375	2.778	28.178	53.578	78.978	104.378	129.778	155.178	180.578	205.978	231.378
1/ 8	0.125000	3.175	28.575	53.975	79.375	104.775	130.175	155.575	180.975	206.375	231.775
9/64	0.140625	3.572	28.972	54.372	79.772	105.172	130.572	155.972	181.372	206.772	232.172
5/32	0.156250	3.969	29.369	54.769	80.169	105.569	130.969	156.369	181.769	207.169	232.569
11/64	0.171875	4.366	29.766	55.166	80.566	105.966	131.366	156.766	182.166	207.566	232.966
3/16	0.187500	4.762	30.162	55.562	80.962	106.362	131.762	157.162	182.562	207.962	233.362
13/64	0.203125	5.159	30.559	55.959	81.359	106.759	132.159	157.559	182.959	208.359	233.759
7/32	0.218750	5.556	30.956	56.356	81.756	107.156	132.556	157.956	183.356	208.756	234.156
15/64	0.234375	5.953	31.353	56.753	82.153	107.553	132.953	158.353	183.753	209.153	234.553
1/ 4	0.250000	6.350	31.750	57.150	82.550	107.950	133.350	158.750	184.150	209.550	234.950
17/64	0.265625	6.747	32.147	57.547	82.947	108.347	133.747	159.147	184.547	209.947	235.347
9/32	0.281250	7.144	32.544	57.944	83.344	108.744	134.144	159.544	184.944	210.344	235.744
19/64	0.296875	7.541	32.941	58.341	83.741	109.141	134.541	159.941	185.341	210.741	236.141
5/16	0.312500	7.938	33.338	58.738	84.138	109.538	134.938	160.338	185.738	211.138	236.538
21/64	0.328125	8.334	33.734	59.134	84.534	109.934	135.334	160.734	186.134	211.534	236.934
11/32	0.343750	8.731	34.131	59.531	84.931	110.331	135.731	161.131	186.531	211.931	237.331
23/64	0.359375	9.128	34.528	59.928	85.328	110.728	136.128	161.528	186.928	212.328	237.728
3/ 8	0.375000	9.525	34.925	60.325	85.725	111.125	136.525	161.925	187.325	212.725	238.125
25/64	0.390625	9.922	35.322	60.722	86.122	111.522	136.922	162.322	187.722	213.122	238.522
13/32	0.406250	10.319	35.719	61.119	86.519	111.919	137.319	162.719	188.119	213.519	238.919
27/64	0.421875	10.716	36.116	61.516	86.916	112.316	137.716	163.116	188.516	213.916	239.316
7/16	0.437500	11.112	36.512	61.912	87.312	112.721	138.112	163.512	188.912	214.312	239.712
29/64	0.453125	11.509	36.909	62.309	87.709	113.109	138.509	163.909	189.309	214.709	240.109
15/32	0.468750	11.906	37.306	62.706	88.106	113.506	138.906	164.306	189.706	215.106	240.506
31/64	0.484375	12.303	37.703	63.103	88.503	113.903	139.303	164.703	190.103	215.503	240.903
1/ 2	0.500000	12.700	38.100	63.500	88.900	114.300	139.700	165.100	190.500	215.900	241.300
33/64	0.515625	13.097	38.497	63.897	89.297	114.697	140.097	165.497	190.897	216.297	241.697
17/32	0.531250	13.494	38.894	64.294	89.694	115.094	140.494	165.894	191.294	216.694	242.094
35/64	0.546875	13.891	39.291	64.691	90.091	115.491	140.891	166.291	191.691	217.091	242.491
9/16	0.562500	14.288	39.688	65.088	90.488	115.888	141.283	166.688	192.088	217.488	242.888
37/64	0.578125	14.684	40.084	65.484	90.884	116.284	141.684	167.084	192.484	217.884	243.284
19/32	0.593750	15.081	40.481	65.881	91.281	116.681	142.081	167.481	192.881	218.281	243.681
39/64	0.609375	15.478	40.878	66.278	91.678	117.078	142.478	167.878	193.278	218.678	244.078
5/ 8	0.625000	15.875	41.275	66.675	92.075	117.475	142.875	168.275	193.675	219.075	244.475
41/64	0.640625	16.272	41.672	67.072	92.472	117.872	143.272	168.672	194.072	219.472	244.872
21/32	0.656250	16.669	42.069	67.469	92.869	118.269	143.669	169.069	194.469	219.869	245.269
43/64	0.671875	17.066	42.466	67.866	93.266	118.666	144.066	169.466	194.866	220.266	245.666
11/16	0.687500	17.462	42.862	68.262	93.662	119.062	144.462	169.862	195.262	220.662	246.062
45/64	0.703125	17.859	43.259	68.659	94.059	119.459	144.859	170.259	195.659	221.056	246.459
23/32	0.718750	18.256	43.656	69.056	94.456	119.856	145.256	170.656	196.056	221.456	246.856
47/64	0.734375	18.653	44.053	69.453	94.853	120.253	145.653	171.053	196.453	221.853	247.253
3/ 4	0.750000	19.050	44.450	69.850	95.250	120.650	146.050	171.450	196.850	222.250	247.650
49/64	0.765625	19.447	44.847	70.247	95.647	121.047	146.447	171.847	197.247	222.647	248.047
25/32	0.781250	19.844	45.244	70.644	96.044	121.444	146.844	172.244	197.644	223.044	248.444
51/64	0.796875	20.241	45.641	71.041	96.441	121.841	147.241	172.641	198.041	223.441	248.841
13/16	0.812500	20.638	46.038	71.438	96.838	122.238	147.638	173.038	198.438	223.838	249.238
53/64	0.828125	21.034	46.434	71.834	97.234	122.634	148.034	173.434	198.834	224.234	249.634
27/32	0.843750	21.431	46.831	72.231	97.631	123.031	148.431	173.831	199.231	224.631	250.031
55/64	0.859375	21.828	47.228	72.628	98.028	123.428	148.828	174.228	199.628	225.028	250.428
7/ 8	0.875000	22.225	47.625	73.025	98.425	123.825	149.225	174.625	200.025	225.425	250.825
57/64	0.890625	22.622	48.022	73.422	98.822	124.222	149.622	175.022	200.422	225.822	251.222
29/32	0.906250	23.019	48.419	73.819	99.219	124.619	150.019	175.419	200.819	226.219	251.619
59/64	0.921875	23.416	48.816	74.216	99.616	125.016	150.416	175.816	201.216	226.616	252.016
15/16	0.937500	23.812	49.212	74.612	100.012	125.412	150.812	176.212	201.612	227.012	252.412
61/64	0.953125	24.209	49.609	75.009	100.409	125.809	151.209	176.609	202.009	227.409	252.809
31/32	0.968750	24.606	50.006	75.406	100.806	126.206	151.606	177.006	202.406	227.806	253.206
63/64	0.984375	25.003	50.403	75.803	101.203	126.603	152.003	177.403	202.803	228.203	253.603

Appendix table-13: Hardness conversion table (reference)-1

Rockwell hardness	Vickers hardness	Brinell hardness		Rockwell hardness		Shore hardness
C scale 1471.0N		Standard steel balls	Tungsten carbide steel balls	A scale 588.4N	B scale 980.7N	
68	940			85.6		97
67	900			85.0		95
66	865			84.5		92
65	832		739	83.9		91
64	800		722	83.4		88
63	772		705	82.8		87
62	746		688	82.3		85
61	720		670	81.8		83
60	697		654	81.2		81
59	674		634	80.7		80
58	653		615	80.1		78
57	633		595	79.6		76
56	613		577	79.0		75
55	595	—	560	78.5		74
54	577	—	543	78.0		72
53	560	—	525	77.4		71
52	544	500	512	76.8		69
51	528	487	496	76.3		68
50	513	475	481	75.9		67
49	498	464	469	75.2		66
48	484	451	455	74.7		64
47	471	442	443	74.1		63
46	458	432	432	73.6		62
45	446	421	421	73.1		60
44	434	409	409	72.5		58
43	423	400	400	72.0		57
42	412	390	390	71.5		56
41	402	381	381	70.9		55
40	392	371	371	70.4	—	54
39	382	362	362	69.9	—	52
38	372	353	353	69.4	—	51
37	363	344	344	68.9	—	50
36	354	336	336	68.4	(109.0)	49
35	345	327	327	67.9	(108.5)	48
34	336	319	319	67.4	(108.0)	47
33	327	311	311	66.8	(107.5)	46
32	318	301	301	66.3	(107.0)	44
31	310	294	294	65.8	(106.0)	43
30	302	286	286	65.3	(105.5)	42
29	294	279	279	64.7	(104.5)	41
28	286	271	271	64.3	(104.0)	41
27	279	264	264	63.8	(103.0)	40
26	272	258	258	63.3	(102.5)	38
25	266	253	253	62.8	(101.5)	38
24	260	247	247	62.4	(101.0)	37
23	254	243	243	62.0	100.0	36
22	248	237	237	61.5	99.0	35
21	243	231	231	61.0	98.5	35

1) Quoted from hardness conversion table (SAE J 417)

Appendix table-13: Hardness conversion table (reference)-2

Rockwell hardness	Vickers hardness	Brinell hardness		Rockwell hardness		Shore hardness
C scale 1471.0N		Standard steel balls	Tungsten carbide steel balls	A scale 588.4N	B scale 980.7N	
20	238	226	226	60.5	97.8	34
(18)	230	219	219	—	96.7	33
(16)	222	212	212	—	95.5	32
(14)	213	203	203	—	93.9	31
(12)	204	194	194	—	92.3	29
(10)	196	187	187		90.7	28
(8)	188	179	179		89.5	27
(6)	180	171	171		87.1	26
(4)	173	165	165		85.5	25
(2)	166	158	158		83.5	24
(0)	160	152	152		81.7	24

1) Quoted from hardness conversion table (SAE J 417)

Appendix table-14: Kg to lb conversion table

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	36.257	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	62.911	26.855	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	138.69	43.546	96	211.64
14.061	31	68.343	29.030	64	141.10	43.996	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

[How to read the table] If for example you want to convert 10 kg to lb, find "10" in the middle column of the first set of columns. Look in the lb column directly to the right of "10," and you will see that 10 kg equals 22.046 lb. Oppositely, to convert 10 lb to kg, look in the kg column to the left of "10" and you will see that 10 lb equals 4.536 kg.

1kg = 2.2046226 lb
1lb = 0.45359237 kg

Appendix table 15: °C to °F conversion table

°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	51.0	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	12.6	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	204.6	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	71.5	15.1	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	76.2	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	1000	1832
− 3.3	26	78.8	18.3	65	149.0	40.0	104	219.2	593	1100	2012
− 2.8	27	80.5	18.9	66	150.8	40.6	105	221.0	649	1200	2192
− 2.2	28	82.4	19.4	67	152.6	41.1	106	222.6	704	1300	2372
− 1.7	29	84.2	20.0	68	154.4	41.7	107	224.6	760	1400	2562
− 1.1	30	86.0	20.6	69	156.2	42.2	108	226.4	816	1500	2732
− 0.6	31	87.8	21.1	70	158.0	42.8	109	228.2	871	1600	2912

[How to read the table] If for example you want to convert 10°C to °F, find "10" in the middle column of the first set of columns. Look in the °F column directly to the right of "10," and you will see that 10°C equals 50.0 °F. Oppositely, to convert 10°F to °C, look in the °C column to the left of "10" and you will see that 10°F equals -12.2°C.

[Conversion formula]

$°C = \frac{5}{9}(°F - 32)$

$°F = 32 + \frac{9}{5}°C$

Appendix table-16: Greek alphabet list

Roman type (upright)	Italic type (slanted)		Name
Upper case	Upper case	Lower case	
Α	A	α	Alpha
Β	B	β	Beta
Γ	Γ	γ	Gamma
Δ	Δ	δ	Delta
Ε	E	ε	Epsilon
Ζ	Z	ζ	Zeta
Η	H	η	Eta
Θ	Θ	θ	Theta
Ι	I	ι	Iota
Κ	K	κ	Kappa
Λ	Λ	λ	Lambda
Μ	M	μ	Mu
Ν	N	ν	Nu
Ξ	Ξ	ξ	Xi
Ο	O	o	Omicron
Π	Π	π	Pi
Ρ	P	ρ	Rho
Σ	Σ	σ	Sigma
Τ	T	τ	Tau
Υ	Υ	υ	Upsolon
Φ	Φ	ϕ	Phi
Χ	X	χ	Khi
Ψ	Ψ	ψ	Psi
Ω	Ω	ω	Omega