

Appendix Table



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

Single row radial ball bearings		67								68								
Double row radial ball bearings																		
Cylindrical roller bearings								N28		N38		NN48						
Needle roller bearings												NA48						
Spherical roller bearings																		
Nominal bearing bore diameter <i>d</i>		Diameter series 7						Diameter series 8										
Number	Dimension	Nominal bearing outside diameter <i>D</i>	Dimension series				Nominal bearing outside diameter <i>D</i>	Dimension series										
			17	27	37	47		17-47	Nominal width <i>B</i>								Chamfer dimension <i>r_s</i> min	
								08	18	28	38	48	58	68	08	18-68		
—	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



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

Single row radial ball bearings		69										160		90									
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																							
Nominal bearing bore diameter <i>d</i>		Diameter series 9										Diameter series 0											
Number	Dimension	Nominal bearing outside diameter <i>D</i>	Dimension series										Nominal bearing outside diameter <i>D</i>	Dimension series									
			09	19	29	39	49	59	69	09	19-39	49-69		Nominal width <i>B</i>								Chamfer dimension <i>r_s</i> min	
—	0.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
1	1	4	—	1.6	—	2.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
—	1.5	5	—	2	—	2.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
2	2	6	—	2.3	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
—	2.5	7	—	2.5	—	3.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
3	3	8	—	3	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
4	4	11	—	4	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
5	5	13	—	4	—	6	10	—	—	—	—	—	—	—	—	—	—	—	—	—			
6	6	15	—	5	—	7	10	—	—	—	—	—	—	—	—	—	—	—	—	—			
7	7	17	—	5	—	7	10	—	—	—	—	—	—	—	—	—	—	—	—	—			
8	8	19	—	6	—	9	11	—	—	—	—	—	—	—	—	—	—	—	—	—			
9	9	20	—	6	—	9	11	—	—	—	—	—	—	—	—	—	—	—	—	—			
00	10	22	—	6	8	10	13	16	22	—	—	—	—	—	—	—	—	—	—	—			
01	12	24	—	6	8	10	13	16	22	—	—	—	—	—	—	—	—	—	—	—			
02	15	28	—	7	8.5	10	13	18	23	—	—	—	—	—	—	—	—	—	—	—			
03	17	30	—	7	8.5	10	13	18	23	—	—	—	—	—	—	—	—	—	—	—			
04	20	37	7	9	11	13	17	23	30.3	0.3	0.3	0.3	0.3	42	8	12	14	16	22	30			
/22	22	39	7	9	11	13	17	23	30.3	0.3	0.3	0.3	0.3	44	8	12	14	16	22	30			
05	25	42	7	9	11	13	17	23	30.3	0.3	0.3	0.3	0.3	47	8	12	14	16	22	30			
/28	28	45	7	9	11	13	17	23	30.3	0.3	0.3	0.3	0.3	52	8	12	15	18	24	32			
06	30	47	7	9	11	13	17	23	30.3	0.3	0.3	0.3	0.3	55	9	13	16	19	25	34			
/32	32	52	7	10	13	15	20	27	36.3	0.6	0.6	0.6	0.6	58	9	13	16	20	26	35			
07	35	55	7	10	13	15	20	27	36.3	0.6	0.6	0.6	0.6	62	9	14	17	20	27	36			
08	40	62	8	12	14	16	22	30	40.3	0.6	0.6	0.6	0.6	68	9	15	18	21	28	38			
09	45	68	8	12	14	16	22	30	40.3	0.6	0.6	0.6	0.6	75	10	16	19	23	30	40			
10	50	72	8	12	14	16	22	30	40.3	0.6	0.6	0.6	0.6	80	10	16	19	23	30	40			
11	55	80	9	13	16	19	25	34	45.3	1	1	1	1	90	11	18	22	26	35	46			
12	60	85	9	13	16	19	25	34	45.3	1	1	1	1	95	11	18	22	26	35	46			
13	65	90	9	13	16	19	25	34	45.3	1	1	1	1	100	11	18	22	26	35	46			
14	70	100	10	16	19	23	30	40	54.6	1	1	1	1	110	13	20	24	30	40	54			
15	75	105	10	16	19	23	30	40	54.6	1	1	1	1	115	13	20	24	30	40	54			
16	80</																						

Appendix Table



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

Single row radial ball bearings																				62		622		632															
Double row radial ball bearings																				12		42		52															
Cylindrical roller bearings																				N2		N22		N32															
Needle roller bearings																																							
Spherical roller bearings																								222		232													
Nominal bearing bore diameter <i>d</i>		Diameter series 1										Diameter series 2																											
Number	Dimension	Dimension series										Dimension series																											
		Nominal width <i>B</i>										Nominal width <i>B</i>																											
		Chamfer dimension <i>r_s min</i>										Chamfer dimension <i>r_s min</i>																											
		01		11		21		31		41		51		61		01		11-61		82		02		12		22		32		42		52		62		82		02-62	
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



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

Single row radial ball bearings																				64		74							
Double row radial ball bearings																				13		43		53					
Cylindrical roller bearings																				N3		N23		N33					
Needle roller bearings																													
Spherical roller bearings																						213		223					
Nominal bearing bore diameter <i>d</i>		Diameter series 3										Diameter series 4																	
Number	Dimension	Dimension series										Dimension series																	
		Nominal width <i>B</i>										Nominal width <i>B</i>																	
		Chamfer dimension <i>r_s min</i>										Chamfer dimension <i>r_s min</i>																	
		83		03		13		23		33		83		03-33		04		24		Chamfer dimension <i>r_s min</i>									
30	150	320	—	65	75	108	128	—	4	380	85	138	5																
32	160	340	—	68	79	114	136	—	4	400	88	142	5																
34	170	360	—	72	84	120	140	—	4	420	92	145	5																
36	180	380	—	75	88	126	150	—	4	440	95	150	6																
38	190	400	—	78	92	132	155	—	5	460	98	155	6																
40	200	420	—	80	97	138	165	—	5	480	102	160	6																
44	220	460	—	88	106	145	180	—	5	540	115	180	6																
48	240	500	—	95	114	155	195	—	5	580	122	190	6																
52	260	540	—	102	123	165	206	—	6	620	132	206	7.5																
56	280	580	—	108	132	175	224	—	6	670	140	224	7.5																
60	300	620	—	109	140	185	236	—	7.5	710	150	236	7.5																
64	320	670	—	112	155	200	258	—	7.5	750	155	250	9.5																
68	340	710	—	118	165	212	272	—	7.5	800	164	265	9.5																
72	360	750	—	125	170	224	290	—	7.5	850	180	280	9.5																
76	380	780	—	128	175	230	300	—	7.5	900	190	300	9.5																
80	400	820	—	136	185	243	308	—	7.5	950	200	315	12																
84	420	850	—	136	190	250	315	—	9.5	980	206	325	12																
88	440	900	—	145	200	265	345	—	9.5	1030	212	335	12																
92	460	950	—	155	212	280	365	—	9.5	1060	218	345	12																
96	480	980	—	160	218	290	375	—	9.5	1120	230	365	15																
/500	500	1030	—	170	230	300	388	—	12	1150	236	375	15																
/530	530	1090	—	180	243	325	412	—	12	1220	250	400	15																
/560	560	1150	—	190	258	335	438	—	12	1280	258	412	15																
/600	600	1220	—	200	272	355	462	—	15	1360	272	438	15																
/630	630	1280	—	206	280	375	488	—	15	1420	280	450	15																
/																													

Appendix Table



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

Unit: mm

Tapered roller bearings	332								303					303D				
	Bore diameter No.	Bearing bore diameter	Bearing outside diameter	Diameter series 2				Bearing outside diameter	Diameter series 3				Diameter series 3					
				Dimension series 32					Dimension series 03				Dimension series 03					
				Assembly width	Inner ring width	Outer ring width	Chamfer dimension		Inner ring	Outer ring	Inner ring	Outer ring	Inner ring	Outer ring	Inner ring	Outer ring		
<i>d</i>	<i>D</i>	<i>T</i>	<i>B</i>	<i>C</i>	<i>r</i> (min.)	<i>D</i>	<i>T</i>	<i>B</i>	<i>C</i>	<i>r</i> (min.)	<i>D</i>	<i>T</i>	<i>B</i>	<i>C</i>	<i>r</i> (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	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	—	—	—	—	—	—	—	—	—	—	—	—
06	30	62	25	25	19.5	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	—	—	—	—	—	—	—	—	—	—	—	—
07	35	72	28	28	22	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	90	25.25	23	20	2	1.5	90	25.25	23	17	2	1.5
09	45	85	32	32	25	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	110	29.25	27	23	2.5	2	110	29.25	27	19	2.5	2
11	55	100	35	35	27	2	120	31.5	29	25	2.5	2	120	31.5	29	21	2.5	2
12	60	110	38	38	29	2	130	33.5	31	26	3	2.5	130	33.5	31	22	3	2.5
13	65	120	41	41	32	2	140	36	33	28	3	2.5	140	36	33	23	3	2.5
14	70	125	41	41	32	2	150	38	35	30	3	2.5	150	38	35	25	3	2.5
15	75	130	41	41	31	2	160	40	37	31	3	2.5	160	40	37	26	3	2.5
16	80	140	46	46	35	2.5	170	42.5	39	33	3	2.5	170	42.5	39	27	3	2.5
17	85	150	49	49	37	2.5	180	44.5	41	34	4	3	180	44.5	41	28	4	3
18	90	160	55	55	42	2.5	190	46.5	43	36	4	3	190	46.5	43	30	4	3
19	95	170	58	58	44	3	200	49.5	45	38	4	3	200	49.5	45	32	4	3
20	100	180	63	63	48	3	215	51.5	47	39	4	3	—	—	—	—	—	—
21	105	190	68	68	52	3	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



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

Unit: mm

Tapered roller bearings	313								323				
	Bore diameter No.	Bearing bore diameter	Bearing outside diameter	Diameter series 3				Bearing outside diameter	Diameter series 3				
				Dimension series 13					Dimension series 23				
				Assembly width	Inner ring width	Outer ring width	Chamfer dimension		Inner ring	Outer ring	Inner ring	Outer ring	
<i>d</i>	<i>D</i>	<i>T</i>	<i>B</i>	<i>C</i>	<i>r</i> (min.)	<i>D</i>	<i>T</i>	<i>B</i>	<i>C</i>	<i>r</i> (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	215	77.5	73	60	4	3	
21	105	225	58	53	36	4	225	81.5	77	63	4	3	
22	110	240	63	57	38	4	240	84.5	80	65	4	3	
24	120	260	68	62	42	4	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



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

Thrust ball bearings		511										512				522				
Thrust spherical roller bearings		292																		
Bore diameter code	Nominal bearing bore diameter d	Diameter series 0					Diameter series 1					Diameter series 2								
		Dimension series			Nominal bearing outside diameter D	Chamber dimension r (min.)	Dimension series			Dimension series				Chamber dimension r (min.)	Chamber dimension r_1 (min.)					
		70	90	10			71	91	11	72	92	12	22			22				
		Nominal height T					Nominal height T			Nominal height T						Central raceway washer				
										Nominal bore diameter d_2	Nominal height B									
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, d_2 becomes the nominal bearing bore diameter.
 2. For the outside diameter of the shaft raceway washer and the bore diameter of the housing raceway washer, see the dimension table of thrust bearings.

Appendix Table



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

Thrust ball bearings		513										523				514				524			
Thrust spherical roller bearings		293														294							
Bore diameter code	Nominal bearing bore diameter d	Diameter series 3										Diameter series 4								Diameter series 5			
		Dimension series					Nominal bearing outside diameter D	Chamber dimension r (min.)	Chamber dimension r_1 (min.)	Dimension series				Chamber dimension r (min.)	Chamber dimension r_1 (min.)	Nominal bearing outside diameter D	Dimension series 95						
		73	93	13	23	23				74	94	14	24					24					
		Nominal height T								Central raceway washer		Nominal height T						Central raceway washer					
					Nominal bore diameter d_2	Nominal height B					Nominal bore diameter d_2	Nominal height B											
4	4	20	7	—	11	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
6	6	24	8	—	12	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
8	8	26	8	—	12	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
00	10	30	9	—	14	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
01	12	32	9	—	14	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
02	15	37	10	—	15	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
03	17	40	10	—	16	—	—	—	0.6	—	—	—	—	—	—	—	—	—	—	—			
04	20	47	12	—	18	—	—	—	1	—	—	—	—	—	—	—	—	—	52	21	1		
05	25	52	12	—	18	34	20	8	1	0.3	60	16	21	24	45	15	11	1	0.6	73	29	1.1	
06	30	60	14	—	21	38	25	9	1	0.3	70	18	24	28	52	20	12	1	0.6	85	34	1.1	
07	35	68	15	—	24	44	30	10	1	0.3	80	20	27	32	59	25	14	1.1	0.6	100	39	1.1	
08	40	78	17	22	26	49	30	12	1	0.6	90	23	30	36	65	30	15	1.1	0.6	110	42	1.5	
09	45	85	18	24	28	52	35	12	1	0.6	100	25	34	39	72	35	17	1.1	0.6	120	45	2	
10	50	95	20	27	31	58	40	14	1.1	0.6	110	27	36	43	78	40	18	1.5	0.6	135	51	2	
11	55	105	23	30	35	64	45	15	1.1	0.6	120	29	39	48	87	45	20	1.5	0.6	150	58	2.1	
12	60	110	23	30	35	64	50	15	1.1	0.6	130	32	42	51	93	50	21	1.5	0.6	160	60	2.1	
13	65	115	23	30	36	65	55	15	1.1	0.6	140	34	45	56	101	50	23	2	1	170	63	2.1	
14	70	125	25	34	40	72	55	16	1.1	1	150	36	48	60	107	55	24	2	1	180	67	3	
15	75	135	27	36	44	79	60	18	1.5	1	160	38	51	65	115	60	26	2	1	190	69	3	
16	80	140	27	36	44	79	65	18	1.5	1	170	41	54	68	120	65	27	2.1	1	200	73	3	
17	85	150	29	39	49	87	70	19	1.5	1	180	42	58	72	128	65	29	2.1	1.1	215	78	4	
18	90	155	29	39	50	88	75	19	1.5	1	190	45	60	77	135	70	30	2.1	1.1	225	82	4	
20	100	170	32	42	55	97	85	21	1.5	1	210	50	67	85	150	80	33	3	1.1	250	90	4	
22	110	190	36	48	63	110	95	24	2	1	230	54	73	95	166	90	37	3	1.1	270	95	5	
24	120	210	41	54	70	123	100	27	2.1	1.1	250	58	78	102	177	95	40	4	1.5	300	109	5	
26	130	225	42	58	75	130	110	30	2.1	1.1	270	63	85	110	192	100	42	4	2	320	115	5	
28	140	240	45	60	80	140	120	31	2.1	1.1	280	63	85	112	196	110	44	4	2	340	122	5	
30	150	250	45	60	80	140	130	31	2.1	1.1	300	67	90	120	209	120	46	4	2	360	125	6	
32	160	270	50	67	87	153	140	33	3	1.1	320	73	95	130	226	130	50	5	2	380	132	6	
34	170	280	50	67	87	153	150	33	3	1.1	340	78	103	135	236	135	50	5	2.1	400	140	6	
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Appendix Table



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

Thrust ball bearings		511										
Thrust spherical roller bearings												
Bore diameter code	Nominal bearing bore diameter d	Diameter series 0					Chamber dimension r (min.)	Diameter series 1				
		Dimension series			Nominal bearing outside diameter D	Dimension series			Chamber dimension r (min.)			
		70	90	10		71		91		11		
		Nominal height T				Nominal height T						
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 outside diameter of the shaft raceway washer and the bore diameter of the housing raceway washer, see the dimension table of thrust bearings.

Appendix Table



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

Thrust ball bearings		512										
Thrust spherical roller bearings		522										
Bore diameter code	Nominal bearing bore diameter d	Nominal bearing outside diameter D	Diameter series 2							Chamber dimension r (min.)	Chamber dimension r_1 (min.)	
			Dimension series					Central raceway washer	Chamber dimension r (min.)			Chamber dimension r_1 (min.)
			72	92	12	22	22					
			Nominal height T									
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



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

Thrust ball bearings					513	523						
Thrust spherical roller bearings			293									
Bore diameter code	Nominal bearing bore diameter d	Nominal bearing outside diameter D	Diameter series 3								Chamfer dimension r (min.)	Chamfer dimension r_1 (min.)
			Dimension series						Central raceway washer			
			73	93	13	23	23		Nominal bore diameter d_2	Nominal height B		
			Nominal height T									
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	1 000	150	200	258	—	—	—	9.5	—		
/710	710	1 060	160	212	272	—	—	—	9.5	—		
/750	750	1 120	165	224	290	—	—	—	9.5	—		
/800	800	1 180	170	230	300	—	—	—	9.5	—		
/850	850	1 250	180	243	315	—	—	—	12	—		
/900	900	1 320	190	250	335	—	—	—	12	—		
/950	950	1 400	200	272	355	—	—	—	12	—		
/1000	1 000	1 460	—	276	—	—	—	—	12	—		
/1060	1 060	1 540	—	288	—	—	—	—	15	—		
/1120	1 120	1 630	—	306	—	—	—	—	15	—		
/1180	1 180	1 710	—	318	—	—	—	—	15	—		
/1250	1 250	1 800	—	330	—	—	—	—	19	—		
/1320	1 320	1 900	—	348	—	—	—	—	19	—		
/1400	1 400	2 000	—	360	—	—	—	—	19	—		
/1500	1 500	2 140	—	384	—	—	—	—	19	—		
/1600	1 600	2 270	—	402	—	—	—	—	19	—		
/1700	1 700	—	—	—	—	—	—	—	—	—		
/1800	1 800	—	—	—	—	—	—	—	—	—		
/1900	1 900	—	—	—	—	—	—	—	—	—		
/2000	2 000	—	—	—	—	—	—	—	—	—		
/2120	2 120	—	—	—	—	—	—	—	—	—		
/2240	2 240	—	—	—	—	—	—	—	—	—		
/2360	2 360	—	—	—	—	—	—	—	—	—		
/2500	2 500	—	—	—	—	—	—	—	—	—		

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

Appendix Table



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

Thrust ball bearings					514	524							
Thrust spherical roller bearings			294										
Bore diameter code	Nominal bearing bore diameter d	Nominal bearing outside diameter D	Diameter series 4								Diameter series 5		
			Dimension series						Chamfer dimension r (min.)	Chamfer dimension r_1 (min.)	Nominal bearing outside diameter D	Dimension series 95	Chamfer dimension r (min.)
			74	94	14	24	24						
			Nominal height T						Central raceway washer				
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	—	1 000	315	15
/500	500	870	165	224	290	—	—	—	9.5	—	1 060	335	15
/530	530	920	175	236	308	—	—	—	9.5	—	1 090	335	15
/560	560	980	190	250	335	—	—	—	12	—	1 150	355	15
/600	600	1 030	195	258	335	—	—	—	12	—	1 220	375	15
/630	630	1 090	206	280	365	—	—	—	12	—	1 280	388	15
/670	670	1 150	218	290	375	—	—	—	15	—	1 320	388	15
/710	710	1 220	230	308	400	—	—	—	15	—	1 400	412	15
/750	750	1 280	236	315	412	—	—	—	15	—	—	—	—
/800	800	1 360	250	335	438	—	—	—	15	—	—	—	—
/850	850	1 440	—	354	—	—	—	—	15	—	—	—	—
/900	900	1 520	—	372	—	—	—	—	15	—	—	—	—
/950	950	1 600	—	390	—	—	—	—	15	—	—	—	—
/1000	1 000	1 670	—	402	—	—	—	—	15	—	—	—	—
/1060	1 060	1 770	—	426	—	—	—	—	15	—	—	—	—
/1120	1 120	1 860	—	444	—	—	—	—	15	—	—	—	—
/1180	1 180	1 950	—	462	—	—	—	—	19	—	—	—	—
/1250	1 250	2 050	—	480	—	—	—	—	19	—	—	—	—
/1320	1 320	2 160	—	505	—	—	—	—	19	—	—	—	—
/1400	1 400	2 280	—	530	—	—	—	—	19	—	—	—	—
/1500	1 500	—	—	—	—	—	—	—	—	—	—	—	—
/1600	1 600	—	—	—	—	—	—	—	—	—	—	—	—
/1700	1 700	—	—	—	—	—	—	—	—	—	—	—	—
/1800	1 800	—	—	—	—	—	—	—	—	—	—	—	—
/1900	1 900	—	—	—	—	—	—	—	—	—	—	—	—
/2000	2 000	—	—	—	—	—	—	—	—	—	—	—	—
/2120	2 120	—	—	—	—	—	—	—	—	—	—	—	—
/2240	2 240	—	—	—	—	—	—	—	—	—	—	—	—
/2360	2 360	—	—	—	—	—	—	—	—	—	—	—	—
/2500	2 500	—	—	—	—	—	—	—	—	—	—	—	—

Appendix Table

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·s ² /m	s	m/s ²	kgf	kgf/m ²	kgf/m ²	kgf·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·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·m	9.806 65	Newton meter	N·m
Inertia moment	Kilogram force / meter / square second	kgf·m·s ⁻²	9.806 65	Kilogram / square meter	kg·m ²
	Stress	kgf/m ²	9.806 65		
Pressure	Kilogram force per square meter	kgf/m ²	9.806 65	Pascal	Pa
	Meter water column	mH ₂ O	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·m	9.806 65		
	Kilowatt hour	kW·h	3.600×10^6		
	Metric horsepower per hour	PS·h	$2.647\ 79 \times 10^6$		
Power rate and power	Watt	W	1	Watt	W
	Metric horsepower	PS	735.5		
	Kilogram force / meter per second	kgf·m/s	9.806 65		

Appendix Table

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·s	m ² /s	Wb	T	A/m
CGS system	erg/s	°C	P	St	Mx	Gs	Oe
Gravitation system	kgf·m/s	°C	kgf·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·s
	Centipoise	cP	10^{-3}		
	Kilogram force / square second per meter	kgf·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	R	2.58×10^{-4}		
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		

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



Appendix table-7: Dimensional tolerance for shafts

Diameter division mm		a13		c12		d6		e6		e13		f5		f6		g5		g6	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
—	3 ¹⁾	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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	-780	-130	-430	-100	-119	-60	-79	-60	-520	-30	-43	-30	-49	-10	-23	-10	-29
50	65	-340	-800	-140	-440	-120	-142	-72	-94	-72	-612	-36	-51	-36	-58	-12	-27	-12	-34
65	80	-360	-820	-150	-450	-145	-170	-85	-110	-85	-715	-43	-61	-43	-68	-14	-32	-14	-39
80	100	-380	-920	-170	-520	-170	-199	-100	-129	-100	-820	-50	-70	-50	-79	-15	-35	-15	-44
100	120	-410	-950	-180	-530	-190	-222	-110	-142	-110	-920	-56	-79	-56	-88	-17	-40	-17	-49
120	140	-460	-1090	-200	-600	-210	-246	-125	-161	-125	-1015	-62	-87	-62	-98	-18	-43	-18	-54
140	160	-520	-1150	-210	-610	-230	-270	-135	-175	-135	-1105	-68	-95	-68	-108	-20	-47	-20	-60
160	180	-580	-1210	-230	-630	-260	-304	-145	-189	-145	-1245	-76	-120	-76	-142	-22	-51	-22	-66
180	200	-660	-1380	-240	-700	-290	-340	-160	-210	-160	-1410	-86	-142	-86	-164	-24	-55	-24	-74
200	225	-740	-1460	-260	-720	-290	-376	-170	-226	-170	-1570	-98	-164	-98	-188	-26	-59	-26	-82
225	250	-820	-1540	-280	-740	-320	-416	-195	-261	-195	-1845	-110	-188	-110	-212	-28	-63	-28	-94
250	280	-920	-1730	-300	-820	-350	-468	-220	-298	-220	-2170	-120	-212	-120	-240	-30	-67	-30	-108
280	315	-1050	-1860	-330	-850	-390	-468	-220	-298	-220	-2170	-120	-212	-120	-240	-30	-67	-30	-108
315	355	-1200	-2090	-360	-930	-420	-510	-240	-332	-240	-2540	-130	-240	-130	-260	-32	-71	-32	-124
355	400	-1350	-2240	-400	-970	-450	-560	-260	-370	-260	-3060	-145	-280	-145	-300	-34	-75	-34	-144
400	450	-1500	-2470	-440	-1070	-480	-610	-290	-425	-290	-3590	-160	-310	-160	-340	-36	-79	-36	-173
450	500	-1650	-2620	-480	-1110	-510	-660	-320	-470	-320	-4020	-175	-340	-175	-380	-38	-83	-38	-193
500	560	—	—	—	—	-260	-304	-145	-189	-145	-1245	-76	-120	-76	-142	-22	-51	-22	-66
560	630	—	—	—	—	-290	-340	-160	-210	-160	-1410	-86	-142	-86	-164	-24	-55	-24	-74
630	710	—	—	—	—	-320	-376	-170	-226	-170	-1570	-98	-164	-98	-188	-26	-59	-26	-82
710	800	—	—	—	—	-350	-416	-195	-261	-195	-1845	-110	-188	-110	-212	-28	-63	-28	-94
800	900	—	—	—	—	-390	-468	-220	-298	-220	-2170	-120	-212	-120	-240	-30	-67	-30	-108
900	1000	—	—	—	—	-420	-510	-240	-332	-240	-2540	-130	-240	-130	-260	-32	-71	-32	-124
1000	1120	—	—	—	—	-450	-560	-260	-370	-260	-3060	-145	-280	-145	-300	-34	-75	-34	-144
1120	1250	—	—	—	—	-480	-610	-290	-425	-290	-3590	-160	-310	-160	-340	-36	-79	-36	-173
1250	1400	—	—	—	—	-510	-660	-320	-470	-320	-4020	-175	-340	-175	-380	-38	-83	-38	-193
1400	1600	—	—	—	—	-540	-710	-350	-510	-350	-4500	-190	-370	-190	-410	-40	-87	-40	-213
1600	1800	—	—	—	—	-570	-760	-380	-560	-380	-5000	-205	-400	-205	-440	-42	-91	-42	-233
1800	2000	—	—	—	—	-600	-810	-410	-610	-410	-5500	-220	-430	-220	-470	-44	-95	-44	-253
2000	2240	—	—	—	—	-630	-860	-440	-660	-440	-6000	-235	-460	-235	-500	-46	-99	-46	-273
2240	2500	—	—	—	—	-660	-910	-470	-710	-470	-6500	-250	-490	-250	-530	-48	-103	-48	-293
2500	2800	—	—	—	—	-690	-960	-500	-760	-500	-7000	-265	-520	-265	-560	-50	-107	-50	-313
2800	3150	—	—	—	—	-720	-1010	-530	-810	-530	-7500	-280	-550	-280	-590	-52	-111	-52	-333

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		j5		js5		j6		js6		j7		k4		k5		k6		m5	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	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	+4	-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	+6	-7	+6.5	-6.5	+12	-7	+9.5	-9.5	+18	-12	+10	+2	+15	+2	+21	+2	+24	+11
50	65	+6	-9	+7.5	-7.5	+13	-9	+11	-11	+20	-15	+13	+3	+18	+3	+25	+3	+28	+13
65	80	+7	-11	+9	-9	+14	-11	+12.5	-12.5	+22	-18	+15	+3	+21	+3	+28	+3	+33	+15
80	100	+7	-13	+10	-10	+16	-13	+14.5	-14.5	+25	-21	+18	+4	+24	+4	+33	+4	+37	+17
100	120	+7	-16	+11.5	-11.5	+16	-16	+16	-16	+26	-26	+20	+4	+27	+4	+36	+4	+43	+20
120	140	+7	-18	+12.5	-12.5	+18	-18	+18	-18	+29	-28	+22	+4	+29	+4	+40	+4	+46	+21
140	160	+7	-20	+13.5	-13.5	+20	-20	+20	-20	+31	-32	+25	+5	+32	+5	+45	+5	+50	+23
160	180	—	—	+16	-16	—	—	+22	-22	—	—	—	—	—	—	+44	0	—	—
180	200	—	—	+18	-18	—	—	+25	-25	—	—	—	—	—	—	+50	0	—	—
200	225	—	—	+20	-20	—	—	+28	-28	—	—	—	—	—	—	+56	0	—	—
225	250	—	—	+23.5	-23.5	—	—	+33	-33	—	—	—	—	—	—	+66	0	—	—
250	280	—	—	+27.5	-27.5	—	—	+39	-39	—	—	—	—	—	—	+78	0	—	—
280	315	—	—	+32.5	-32.5	—	—	+46	-46	—	—	—	—	—	—	+92	0	—	—
315	355	—	—	+39	-39	—	—	+55	-55	—	—	—	—	—	—	+110	0	—	—
355	400	—	—	+48	-48	—	—	+67.5	-67.5	—	—	—	—	—	—	+135	0	—	—

Appendix Table



Unit: μm

Diameter division mm		h4		h5		h6		h7		h8		h9		h10		h11		h13		js4		Diameter division mm	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Over	Incl.
—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
3	6	0	-4	0	-5	0	-8	0	-12	0	-18	0	-25	0	-40	0	-60	0	-140	+1.5	-1.5	3	6
6	10	0	-4	0	-5	0	-8	0	-12	0	-18	0	-25	0	-40	0	-60	0	-140	+2	-2	3	6
10	18	0	-4	0	-6	0	-9	0	-15	0	-22	0	-30	0	-48	0	-75	0	-180	+2	-2	6	10
18	30	0	-5	0	-8	0	-11	0	-18	0	-27	0	-36	0	-58	0	-90	0	-220	+2.5	-2.5	10	18
30	40	0	-6	0	-9	0	-13	0	-21	0	-33	0	-43	0	-70	0	-110	0	-270	+3	-3	18	30
40	50	0	-7	0	-11	0	-16	0	-25	0	-39	0	-52	0	-84	0	-130	0	-330	+3.5	-3.5	30	40
50	65	0	-8	0	-13	0	-19	0	-30	0	-46	0	-62	0	-100	0	-160	0	-390	+4	-4	40	50
65	80	0	-10	0	-15	0	-22	0	-35	0	-54	0	-77	0	-120	0	-190	0	-460	+5	-5	50	65
80	100	0	-12	0	-18	0	-25	0	-40	0	-63	0	-90	0	-140	0	-220	0	-540	+6	-6	65	80
100	120	0	-14	0	-20	0	-29	0	-46	0	-72	0	-115	0	-185	0	-290	0	-720	+7	-7	80	100
120	140	0	-16	0	-23	0	-32	0	-52	0	-81	0	-130	0	-210	0	-320	0	-810	+8	-8	100	120
140	160	0	-18	0	-25	0	-36	0	-57	0	-89	0											

Appendix Table



Appendix table-8: Dimensional tolerance for housing bore

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	+41	+25	+64	+25	+25	+9
40	50	+90	+60	+180	+60	+250	+60	+360	+60	+49	+30	+60	+30	+74	+30	+29	+10
50	65	+107	+72	+212	+72	+292	+72	+422	+72	+58	+36	+71	+36	+90	+36	+34	+12
65	80	+125	+85	+245	+85	+335	+85	+485	+85	+68	+43	+83	+43	+106	+43	+39	+14
80	100	+146	+100	+285	+100	+390	+100	+560	+100	+79	+50	+96	+50	+122	+50	+44	+15
100	120	+162	+110	+320	+110	+430	+110	+630	+110	+88	+56	+108	+56	+137	+56	+49	+17
120	140	+182	+125	+355	+125	+485	+125	+695	+125	+98	+62	+119	+62	+151	+62	+54	+18
140	160	+198	+135	+385	+135	+535	+135	+765	+135	+108	+68	+131	+68	+165	+68	+60	+20
160	180	+215	+145	+425	+145	+585	+145	+845	+145	+120	+76	+146	+76	+186	+76	+66	+22
180	200	+240	+160	+480	+160	+660	+160	+960	+160	+130	+80	+160	+80	+205	+80	+74	+24
200	225	+260	+170	+530	+170	+730	+170	+1070	+170	+142	+86	+176	+86	+226	+86	+82	+26
225	250	+300	+195	+615	+195	+855	+195	+1245	+195	+164	+98	+203	+98	+263	+98	+94	+28
250	280	+345	+220	+720	+220	+1000	+220	+1470	+220	+188	+110	+235	+110	+305	+110	+108	+30
280	315	+390	+240	+840	+240	+1160	+240	+1740	+240	+212	+120	+270	+120	+350	+120	+124	+32
315	355	+435	+260	+960	+260	+1360	+260	+2010	+260	+240	+130	+305	+130	+410	+130	+144	+34
355	400	+500	+290	+1150	+290	+1640	+290	+2390	+290	+280	+145	+355	+145	+475	+145	+173	+38

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	+13	-6	+9.5	-9.5	+18	-12	+15	-15	+3	-10	+4	-15	+9	-21	-5	-24
50	65	+16	-6	+11	-11	+22	-13	+17.5	-17.5	+2	-13	+4	-18	+10	-25	-6	-28
65	80	+18	-7	+12.5	-12.5	+26	-14	+20	-20	+3	-15	+4	-21	+12	-28	-8	-33
80	100	+22	-7	+14.5	-14.5	+30	-16	+23	-23	+2	-18	+5	-24	+13	-33	-8	-37
100	120	+25	-7	+16	-16	+36	-16	+26	-26	+3	-20	+5	-27	+16	-36	-9	-41
120	140	+29	-7	+18	-18	+39	-18	+28.5	-28.5	+3	-22	+7	-29	+17	-40	-10	-46
140	160	+33	-7	+20	-20	+43	-20	+31.5	-31.5	+2	-25	+8	-32	+18	-45	-10	-50
160	180	—	—	+22	-22	—	—	+35	-35	—	—	0	-44	0	-70	-26	-70
180	200	—	—	+25	-25	—	—	+40	-40	—	—	0	-50	0	-80	-30	-80
200	225	—	—	+28	-28	—	—	+45	-45	—	—	0	-56	0	-90	-34	-90
225	250	—	—	+33	-33	—	—	+52.5	-52.5	—	—	0	-66	0	-105	-40	-106
250	280	—	—	+39	-39	—	—	+62.5	-62.5	—	—	0	-78	0	-125	-48	-126
280	315	—	—	+46	-46	—	—	+75	-75	—	—	0	-92	0	-150	-58	-150
315	355	—	—	+55	-55	—	—	+87.5	-87.5	—	—	0	-110	0	-175	-68	-178
355	400	—	—	+67.5	-67.5	—	—	+105	-105	—	—	0	-135	0	-210	-76	-211

Appendix Table



Unit: μm

Diameter division mm		G7		H6		H7		H8		H9		H10		H11		H13	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
—	3	+12	+2	+6	0	+10	0	+14	0	+25	0	+40	0	+60	0	+140	0
3	6	+16	+4	+8	0	+12	0	+18	0	+30	0	+48	0	+75	0	+180	0
6	10	+20	+5	+9	0	+15	0	+22	0	+36	0	+58	0	+90	0	+220	0
10	18	+24	+6	+11	0	+18	0	+27	0	+43	0	+70	0	+110	0	+270	0
18	30	+28	+7	+13	0	+21	0	+33	0	+52	0	+84	0	+130	0	+330	0
30	40	+34	+9	+16	0	+25	0	+39	0	+62	0	+100	0	+160	0	+390	0
40	50	+40	+10	+19	0	+30	0	+46	0	+74	0	+120	0	+190	0	+460	0
50	65	+47	+12	+22	0	+35	0	+54	0	+87	0	+140	0	+220	0	+540	0
65	80	+54	+14	+25	0	+40	0	+63	0	+100	0	+160	0	+250	0	+630	0
80	100	+61	+15	+29	0	+46	0	+72	0	+115	0	+185	0	+290	0	+720	0
100	120	+69	+17	+32	0	+52	0	+81	0	+130	0	+210	0	+320	0	+810	0
120	140	+75	+18	+36	0	+57	0	+89	0	+140	0	+230	0	+360	0	+890	0
140	160	+83	+20	+40	0	+63	0	+97	0	+155	0	+250	0	+400	0	+970	0
160	180	+92	+22	+44	0	+70	0	+110	0	+175	0	+280	0	+440	0	+1100	0
180	200	+104	+24	+50	0	+80	0	+125	0	+200	0	+320	0	+500	0	+1250	0
200	225	+116	+26	+56	0	+90	0	+140	0	+230	0	+360	0	+560	0	+1400	0
225	250	+133	+28	+66	0	+105	0	+165	0	+260	0	+420	0	+660	0	+1650	0
250	280	+155	+30	+78	0	+125	0	+195	0	+310	0	+500	0	+780	0	+1950	0
280	315	+182	+32	+92	0	+150	0	+230	0	+370	0	+600	0	+920	0	+2300	0
315	355	+209	+34	+110	0	+175	0	+280	0	+440	0	+700	0	+1100	0	+2800	0
355	400	+248	+38	+135	0	+210	0	+330	0	+540	0	+860	0	+1350	0	+3300	0

Unit: μm

Diameter division mm		M7		N6		N7		P6		P7		R6		R7	
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
—	3	-2	-12	-4	-10	-4	-14	-6	-12	-6	-16	-10	-16	-10	-20
3	6	0	-12	-5	-13	-4	-16	-9	-17	-8	-20	-12	-20	-11	-23
6	10	0	-15	-7	-16	-4	-19	-12	-21	-9	-24	-16	-25	-13	-28
10	18	0	-18	-9	-20	-5	-23	-15	-26	-11	-29	-20	-31	-16	-34
18	30	0	-21	-11	-24	-7	-28	-18	-31	-14	-35	-24	-37	-20	-41
30	40	0	-25	-12	-28	-8	-33	-21	-37	-17	-42	-29	-45	-25	-50
40	50	0	-30	-14	-33	-9	-39	-26	-45	-21	-51	-35	-54	-30	-60
50	65	0	-35	-16	-38	-10	-45	-30	-52	-24	-59	-44	-66	-38	-73
65	80	0	-40	-20	-45	-12	-52	-36	-61	-28	-68	-56	-81	-48	-88
80	100	0	-46	-22	-51	-14	-60	-41	-70	-33	-79	-68	-97	-60	-106
100	120	0	-52	-25	-57	-14	-66	-47	-79	-36	-88	-75	-104	-67	-113
120	140	0	-57	-26	-62	-16	-73	-51	-87	-41	-98	-85	-117	-74	-126
140	160	0	-63	-27	-67	-17	-80	-55	-95	-45	-108	-97	-133	-87	-144
160	180	-26	-96	-44	-88	-44	-114	-78	-122	-78	-148	-113	-153	-103	-166
180	200	-30	-110	-50	-100	-50	-130	-88	-138	-88	-168	-119	-159	-109	-172
200	225	-34	-124	-56	-112	-56	-146	-100	-156	-100	-190	-135	-199	-115	-220
225	250	-40	-145	-66	-132	-66	-171	-120	-186	-120	-225	-155	-225	-125	-250
250	280	-48	-173	-78	-156	-78	-203	-140	-218	-140	-265	-175	-225	-145	-275
280	315	-58	-208	-92	-184	-92	-242	-170	-262	-170	-320	-185	-235	-165	-300
315	355	-68	-243	-110	-220	-110	-285	-195	-305	-195	-370	-210	-266	-180	-340
355	400	-76	-286	-135	-270	-135	-345	-240	-375	-240	-450	-220	-276	-200	-400

Appendix Table

Appendix table-9: Basic tolerance

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

Appendix table-10: Viscosity conversion table

Dynamic viscosit mm ² /s	Saybolt SUS (second)	Redwood R (second)	Engler E (degree)	Dynamic viscosit mm ² /s	Saybolt SUS (second)	Redwood R (second)	Engler E (degree)
2.7	35	32.2	1.18	103	475	419	13.5
4.3	40	36.2	1.32	108	500	441	14.2
5.9	45	40.6	1.46	119	550	485	15.6
7.4	50	44.9	1.60	130	600	529	17.0
8.9	55	49.1	1.75	141	650	573	18.5
10.4	60	53.5	1.88	152	700	617	19.9
11.8	65	57.9	2.02	163	750	661	21.3
13.1	70	62.3	2.15	173	800	705	22.7
14.5	75	67.6	2.31	184	850	749	24.2
15.8	80	71.0	2.42	195	900	793	25.6
17.0	85	75.1	2.55	206	950	837	27.0
18.2	90	79.6	2.68	217	1 000	882	28.4
19.4	95	84.2	2.81	260	1 200	1 058	34.1
20.6	100	88.4	2.95	302	1 400	1 234	39.8
23.0	110	97.1	3.21	347	1 600	1 411	45.5
25.0	120	105.9	3.49	390	1 800	1 587	51
27.5	130	114.8	3.77	433	2 000	1 763	57
29.8	140	123.6	4.04	542	2 500	2 204	71
32.1	150	132.4	4.32	650	3 000	2 646	85
34.3	160	141.1	4.59	758	3 500	3 087	99
36.5	170	150.0	4.88	867	4 000	3 526	114
38.8	180	158.8	5.15	974	4 500	3 967	128
41.0	190	167.5	5.44	1 082	5 000	4 408	142
43.2	200	176.4	5.72	1 150	5 500	4 849	156
47.5	220	194.0	6.28	1 300	6 000	5 290	170
51.9	240	212	6.85	1 400	6 500	5 730	185
56.5	260	229	7.38	1 510	7 000	6 171	199
60.5	280	247	7.95	1 630	7 500	6 612	213
64.9	300	265	8.51	1 740	8 000	7 053	227
70.3	325	287	9.24	1 850	8 500	7 494	242
75.8	350	309	9.95	1 960	9 000	7 934	256
81.2	375	331	10.7	2 070	9 500	8 375	270
86.8	400	353	11.4	2 200	10 000	8 816	284
92.0	425	375	12.1				
97.4	450	397	12.8				

Appendix Table



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.

1 kgf = 9.80665 N
1 N = 0.101972 kgf

Appendix Table



Appendix table-12: Inch / millimeter conversion table

Inch		0"	1"	2"	3"	4"	5"	6"	7"	8"	9"
Fraction	Decimal										
1/64	0.015625	0.397	25.400	50.800	76.200	101.600	127.000	152.400	177.800	203.200	228.600
1/32	0.031250	0.794	25.797	51.197	76.597	101.997	127.397	152.797	178.197	203.597	228.997
3/64	0.046875	1.191	26.194	51.594	76.994	102.394	127.794	153.194	178.594	203.994	229.394
1/16	0.062500	1.588	26.591	51.991	77.391	102.791	128.191	153.591	178.991	204.391	229.791
5/64	0.078125	1.984	26.988	52.388	77.788	103.188	128.588	153.988	179.388	204.788	230.188
3/32	0.093750	2.381	27.384	52.784	78.184	103.584	128.984	154.384	179.784	205.184	230.584
7/64	0.109375	2.778	27.781	53.181	78.581	103.981	129.381	154.781	180.181	205.581	230.981
1/8	0.125000	3.175	28.178	53.578	78.978	104.378	129.778	155.178	180.578	205.978	231.378
9/64	0.140625	3.572	28.575	53.975	79.375	104.775	130.175	155.575	180.975	206.375	231.775
5/32	0.156250	3.969	28.972	54.372	79.772	105.172	130.572	155.972	181.372	206.772	232.172
11/64	0.171875	4.366	29.369	54.769	80.169	105.569	130.969	156.369	181.769	207.169	232.569
3/16	0.187500	4.762	29.766	55.166	80.566	105.966	131.366	156.766	182.166	207.566	232.966
13/64	0.203125	5.159	30.162	55.562	80.962	106.362	131.762	157.162	182.562	207.962	233.362
7/32	0.218750	5.556	30.559	55.959	81.359	106.759	132.159	157.559	182.959	208.359	233.759
15/64	0.234375	5.953	30.956	56.356	81.756	107.156	132.556	157.956	183.356	208.756	234.156
1/4	0.250000	6.350	31.353	56.753	82.153	107.553	132.953	158.353	183.753	209.153	234.553
17/64	0.265625	6.747	31.750	57.150	82.550	107.950	133.350	158.750	184.150	209.550	234.950
9/32	0.281250	7.144	32.147	57.547	82.947	108.347	133.747	159.147	184.547	209.947	235.347
19/64	0.296875	7.541	32.544	57.944	83.344	108.744	134.144	159.544	184.944	210.344	235.744
5/16	0.312500	7.938	32.941	58.341	83.741	109.141	134.541	159.941	185.341	210.741	236.141
21/64	0.328125	8.334	33.338	58.738	84.138	109.538	134.938	160.338	185.738	211.138	236.538
11/32	0.343750	8.731	33.734	59.134	84.534	109.934	135.334	160.734	186.134	211.534	236.934
23/64	0.359375	9.128	34.131	59.531	84.931	110.331	135.731	161.131	186.531	211.931	237.331
3/8	0.375000	9.525	34.528	59.928	85.328	110.728	136.128	161.528	186.928	212.328	237.728
25/64	0.390625	9.922	34.925	60.325	85.725	111.125	136.525	161.925	187.325	212.725	238.125
13/32	0.406250	10.319	35.322	60.722	86.122	111.522	136.922	162.322	187.722	213.122	238.522
27/64	0.421875	10.716	35.719	61.119	86.519	111.919	137.319	162.719	188.119	213.519	238.919
7/16	0.437500	11.112	36.116	61.516	86.916	112.316	137.716	163.116	188.516	213.916	239.316
29/64	0.453125	11.509	36.512	61.912	87.312	112.712	138.112	163.512	188.912	214.312	239.712
15/32	0.468750	11.906	36.909	62.309	87.709	113.109	138.509	163.909	189.309	214.709	240.109
31/64	0.484375	12.303	37.306	62.706	88.106	113.506	138.906	164.306	189.706	215.106	240.506
1/2	0.500000	12.700	37.703	63.103	88.503	113.903	139.303	164.703	190.103	215.503	240.903
33/64	0.515625	13.097	38.100	63.500	88.900	114.300	139.700	165.100	190.500	215.900	241.300
17/32	0.531250	13.494	38.497	63.897	89.297	114.697	140.097	165.497	190.897	216.297	241.697
35/64	0.546875	13.891	38.894	64.294	89.694	115.094	140.494	165.894	191.294	216.694	242.094
9/16	0.562500	14.288	39.291	64.691	90.091	115.491	140.891	166.291	191.691	217.091	242.491
37/64	0.578125	14.684	39.688	65.088	90.488	115.888	141.283	166.688	192.088	217.488	242.888
19/32	0.593750	15.081	40.084	65.484	90.884	116.284	141.684	167.084	192.484	217.884	243.284
39/64	0.609375	15.478	40.481	65.881	91.281	116.681	142.081	167.481	192.881	218.281	243.681
5/8	0.625000	15.875	40.878	66.278	91.678	117.078	142.478	167.878	193.278	218.678	244.078
41/64	0.640625	16.272	41.275	66.675	92.075	117.475	142.875	168.275	193.675	219.075	244.475
21/32	0.656250	16.669	41.672	67.072	92.472	117.872	143.272	168.672	194.072	219.472	244.872
43/64	0.671875	17.066	42.069	67.469	92.869	118.269	143.669	169.069	194.469	219.869	245.269
11/16	0.687500	17.462	42.466	67.866	93.266	118.666	144.066	169.466	194.866	220.266	245.666
45/64	0.703125	17.859	42.862	68.262	93.662	119.062	144.462	169.862	195.262	220.662	246.062
23/32	0.718750	18.256	43.259	68.659	94.059	119.459	144.859	170.259	195.659	221.059	246.459
47/64	0.734375	18.653	43.656	69.056	94.456	119.856	145.256	170.656	196.056	221.456	246.856
3/4	0.750000	19.050	44.053	69.453	94.853	120.253	145.653	171.053	196.453	221.853	247.253
49/64	0.765625	19.447	44.450	69.850	95.250	120.650	146.050	171.450	196.850	222.250	247.650
25/32	0.781250	19.844	44.847	70.247	95.647	121.047	146.447	171.847	197.247	222.647	248.047
51/64	0.796875	20.241	45.244	70.644	96.044	121.444	146.844	172.244	197.644	223.044	248.444
13/16	0.812500	20.638	45.641	71.041	96.441	121.841	147.241	172.641	198.041	223.441	248.841
53/64	0.828125	21.034	46.038	71.438	96.838	122.238	147.638	173.038	198.438	223.838	249.238
27/32	0.843750	21.431	46.434	71.834	97.234	122.634	148.034	173.434	198.834	224.234	249.634
55/64	0.859375	21.828	46.831	72.231	97.631	123.031	148.431	173.831	199.231	224.631	250.031
7/8	0.875000	22.225	47.228	72.628	98.028	123.428	148.828	174.228	199.628	225.028	250.428
57/64	0.890625	22.622	47.625	73.025	98.425	123.825	149.225	174.625	200.025	225.425	250.825
29/32	0.90625										

Appendix Table

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

Rockwell hardness C scale 1 471.0 N	Vickers hardness	Brinell hardness		Rockwell hardness		Shore hardness
		Standard steel balls	Tungsten carbide steel balls	A scale 588.4 N	B scale 980.7 N	
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

Note: Quoted from hardness conversion table (SAE J 417)

Appendix Table

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

Rockwell hardness C scale 1 471.0 N	Vickers hardness	Brinell hardness		Rockwell hardness		Shore hardness
		Standard steel balls	Tungsten carbide steel balls	A scale 588.4 N	B scale 980.7 N	
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
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

Note: Quoted from hardness conversion table (SAE J 417)

Appendix Table



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.

1 kg = 2.2046226 lb
1 lb = 0.45359237 kg

Appendix Table



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]

$$°C = \frac{5}{9}(°F - 32)$$

$$°F = 32 + \frac{9}{5}°C$$

