



1) Materials for KBS Thrust Ball Bearing's Shaft ring, Seat ring & Rolling Elements

The most common through-hardening steel used for rolling bearing of KBS used is a carbon chromium steel containing approximately 1% carbon and 1.5% chromium. Below table 1.1 which shown G Cr15--the main material that KBS used for producing our ball bearings and its interchangeable material in other nations.

Table 1.1

Name	Standard	Chemical Composition (%)					
		C	Mn	Si	Cr	S≤	P≤
G Cr15	KBS	0,95~1,05	0,20~0,40	0,15~0,35	1,30~1,65	0,020	0,027
SUJ 2	JIS G 4805	0,95~1,10	0,50≤	0,15~0,35	1,30~1,60	0,025	0,025
100Cr6	DIN	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
E52100	AISI	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
ISO	683/XVII	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
SKF	-	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -

Note: KBS supplies all general bearings with material of G Cr15 as normal products, unless otherwise specified by customer for special usage before ordering. i.e. Pure carbon or Stainless Steel etc.

2) Material for Bearing Retainers

The retainer is demanded to bear hitting load and have the lowest friction with the rolling elements when KBS bearing is working. So, low carbon steel is adopted. (Please refer to Table 2.1)

Table 2.1

Name	Standard	Chemical Composition (%)				
		C	Mn	Si	S≤	P≤
10F	Chinese GB	0,05~0,11	0,25~0,50	0,07≤	0,035	0,035
SPCC	JIS G 3141	0,12≤	0,50≤	-	0,045	0,040

Note: KBS supply bearings with retainer material of 10F as normal products, unless otherwise specified by customers for special useage before ordering. i.e Corrosion proof and water resistant etc.

3) Precision Class for the bearings

3.1) The accuracy of a bearing are both dimensional and running accuracy of the bearing It has been standardised internationally. Here we give out a interchangeable precision class standard table which is equal to KBS (Table 3.1 refers) for your reference.



Table 3.1

Selection	Classification standard			
	P0	P6	P5	P4
ISO	Class 6X	Class 6	Class 5	Class 4
Japan Industrial	Class 0	Class 6	Class 5	Class 4
German	P0	P6	P5	P4
United States	ABEC-1	ABEC-3	ABEC-5	ABEC-7

3.2) Relatively, as specified value of accuracy, **KBS** gives out the normal tolerances for thrust ball bearings.
(Tables 3,2, 3,3 and 3,4 refers)

Table 3.2 Normal Tolerances for inner diameter of shaft ring
(Unit: μm)

Nominal bore dimension d(mm)		Deviation of the mean bore diameter from the nominal			Deviation of the bore diameter		
		For			For		
		P0, P6 & P5			P4		
		Δdmp		Vdp	Δdmp		Vdp
over	incl.	high	low	max.	high	low	max.
-	18	0	-8	6	0	-7	5
18	30	0	-10	8	0	-8	6
30	50	0	-12	9	0	-10	8
50	80	0	-15	11	0	-12	9
80	120	0	-20	15	0	-15	11
120	180	0	-25	19	0	-18	14
180	250	0	-30	23	0	-22	17
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-30	23
400	500	0	-45	34	0	-35	26
500	630	0	-50	38	0	-40	30
630	800	0	-75	-	0	-50	-
800	1000	0	-100	-	-	-	-
1000	1250	0	-125	-	-	-	-



Table 3,3 Normal Tolerances for outer diameter of seating.
(Unit:μm)

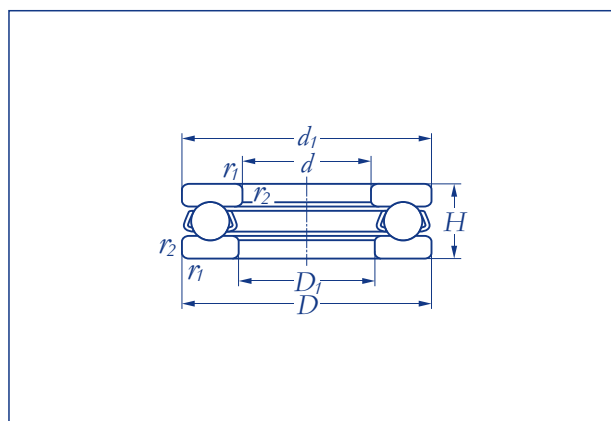
Nominal bore dimension D(mm)		Deviation of the mean bore diameter from the nominal			Deviation of the bore diameter		
		For			For		
		P0, P6 & P5			P4		
		ΔDmp		VDp	ΔDmp		VDp
over	incl.	high	low	max.	high	low	max.
10	18	0	-11	8	0	-7	5
18	30	0	-13	10	0	-8	6
30	50	0	-16	12	0	-9	7
50	80	0	-19	14	0	-11	8
80	120	0	-22	17	0	-13	10
120	180	0	-25	19	0	-15	11
180	250	0	-30	23	0	-20	15
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-28	21
400	500	0	-45	34	0	-33	25
500	630	0	-50	38	0	-38	29
630	800	0	-75	55	0	-45	34
800	1000	0	-100	75	-	-	-
1000	1250	0	-125	-	-	-	-
1250	1600	0	-160	-	-	-	-



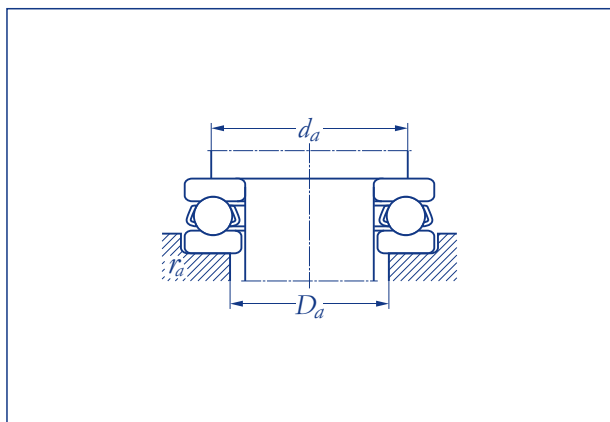
Table 3,4 Normal Tolerances for thikness variation of the shaft ring and seat ring.

(Unit: μm)

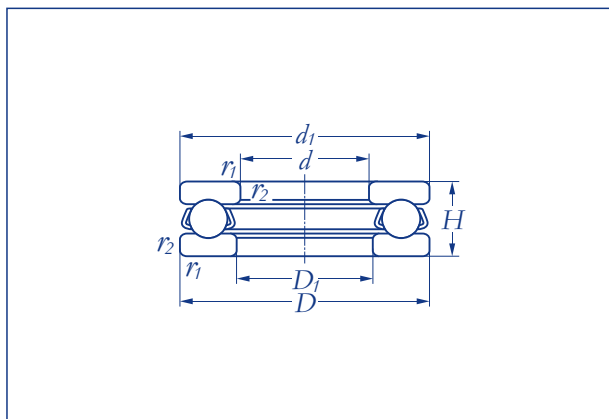
Nominal bore dimension d(mm)		Thikness variation of the shaft ring trace groove towards its end surface				Thikness variation of the seat ring trace groove towards its end surface			
		Si				Se			
		P0	P6	P5	P4	P0	P6	P5	P4
over	incl.	max	max	max	max	max	max	max	
-	18	10	5	3	2	The same value as Si of the same bearing			
18	30	10	5	3	2				
30	50	10	6	3	2				
50	80	10	7	4	3				
80	120	15	8	4	3				
120	180	15	9	5	4				
180	250	20	10	5	4				
250	315	25	13	7	5				
315	400	30	15	7	5				
400	500	30	18	9	6				
500	630	35	21	11	7				
630	800	40	25	13	8				
800	1000	45	30	15	-				
1000	1250	50	35	18	-				

Thrust ball bearing single direction
 Series **511**

511..

Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
51100	20	10	24	9	7.900	11.200	4.900	6.600	1,00
51101	22	12	26	9	8.300	12.200	4.600	6.300	0,81
51102	23	15	28	9	7.400	11.200	4.400	5.900	1,00
51103	25	17	30	9	7.800	12.200	4.400	5.900	1,20
51104	38	20	35	10	10.100	16.600	3.900	5.200	2,20
51105	56	25	42	11	12.700	23.200	3.300	4.400	4,40
51106	63	30	47	11	13.400	26.800	3.100	4.200	5,80
51107	80	35	52	12	13.900	30.000	3.000	3.900	7,30
51108	120	40	60	13	18.700	40.000	2.600	3.500	13,00
51109	140	45	65	14	19.300	45.600	2.300	3.100	16,00
51110	160	50	70	14	20.400	50.400	2.200	3.000	20,00
51111	230	55	78	16	24.500	62.400	1.900	2.600	31,00
51112	200	60	85	17	28.600	72.000	1.800	2.500	42,00
51113	330	65	90	18	29.600	78.400	1.600	2.300	49,00
51114	350	70	95	18	30.100	83.200	1.600	2.300	56,00
51115	400	75	100	19	35.300	109.600	1.500	2.200	97,00
51116	420	80	105	19	35.900	112.000	1.400	2.100	100,00
51117	440	85	110	19	36.900	120.000	1.400	2.100	120,00
51118	670	90	120	22	47.300	152.000	1.200	1.800	190,00
51120	970	100	135	25	68.100	216.000	1.100	1.600	380,00
51122	1.050	110	145	25	69.600	232.000	1.100	1.500	440,00
51124	1.150	120	155	25	70.700	248.000	1.100	1.500	500,00
51126	1.850	130	170	30	88.800	312.000	900	1.300	790,00
51128	2.050	140	180	31	88.800	320.000	900	1.200	830,00
51130	2.200	150	190	31	88.800	320.000	800	1.100	830,00
51132	2.350	160	200	31	89.600	340.000	800	1.100	940,00

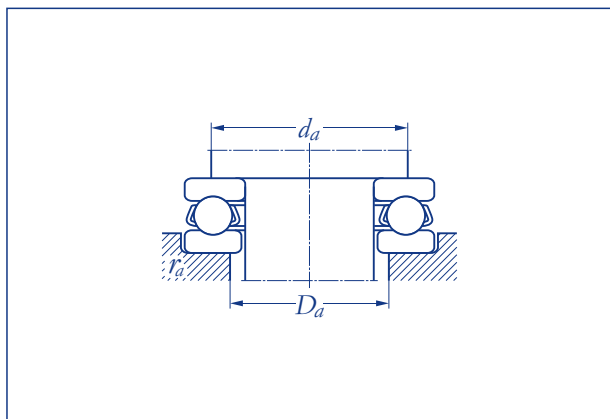
Thrust ball bearing single direction
 Series **511**


Designation	Dimensions(mm)					
	d _i	D _i	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51100	24	11	0,3	19	15	0,3
51101	26	13	0,3	21	17	0,3
51102	28	16	0,3	23	20	0,3
51103	30	18	0,3	25	22	0,3
51104	35	21	0,3	29	26	0,3
51105	42	26	0,6	35	32	0,6
51106	47	32	0,6	40	37	0,6
51107	52	37	0,6	45	42	0,6
51108	60	42	0,6	52	48	0,6
51109	65	47	0,6	57	53	0,6
51110	70	52	0,6	62	58	0,3
51111	78	57	0,6	69	64	0,6
51112	85	62	1,0	75	70	1,0
51113	90	67	1,0	80	75	1,0
51114	95	72	1,0	85	80	1,0
51115	100	77	1,0	90	85	1,0
51116	105	82	1,0	95	90	1,0
51117	110	87	1,0	100	95	1,0
51118	120	92	1,0	108	102	1,0
51120	135	102	1,0	121	114	1,0
51122	145	112	1,0	131	124	1,0
51124	155	122	1,0	141	134	1,0
51126	170	132	1,0	154	146	1,0
51128	178	142	1,0	164	156	1,0
51130	188	152	1,0	174	166	1,0
51132	198	162	1,0	184	176	1,0

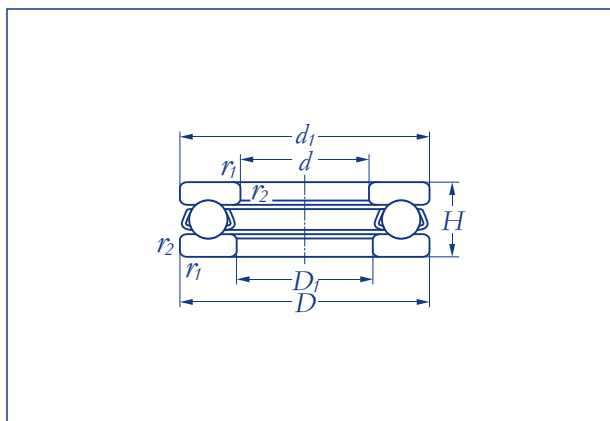
Thrust ball bearing single direction
 Series **511**

511..

Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C_w (N)	C_{ow} (N)	$F_{r \text{ perm}}$ (N)	$F_{or \text{ perm}}$ (N)	P_u (N)
51134	3300	170	215	34	106.400	400.000	7.000	1.100	130.000
51136	3500	180	225	34	108.000	424.000	700	1.000	150.000
51138	4050	190	240	37	137.600	524.000	600	900	220.000
51140	4250	200	250	37	134.400	524.000	600	900	220.000
51144	4600	220	270	37	142.400	588.000	600	900	280.000
51148	7550	240	300	45	187.200	772.000	500	700	480.000
51152	8100	260	320	45	190.400	816.000	500	700	540.000
51156	12.000	280	350	53	255.200	1.072.000	400	600	930.000
51160	17.500	300	380	62	291.200	1.280.000	400	500	13.000
51164	19.000	320	400	63	296.800	1.360.000	400	500	15.000
51168	20.500	340	420	64	301.600	1.440.000	400	500	17.000
51172	22.000	360	440	65	312.000	1.520.000	300	500	19.000
51176	23.000	380	460	65	317.600	1.600.000	300	500	21.000
51180	24.000	400	480	65	322.400	1.696.000	300	400	23.000
51184	25.500	420	500	65	328.000	1.760.000	300	400	25.000
51188	42.000	440	540	80	421.600	2.400.000	300	400	47.000
51192	43.500	460	560	80	421.600	2.400.000	300	400	47.000
51196	45.500	480	580	80	432.000	2.600.000	300	300	55.000
511/500	47.000	500	600	80	442.400	2.680.000	300	300	58.000
511/530	58.500	530	640	85	520.000	3.240.000	200	300	85.000
511/560	61.000	560	670	85	530.400	3.400.000	200	300	94.000
511/600	65.000	600	710	85	530.400	3.600.000	200	300	110.000
511/630	84.000	630	750	95	582.400	4.000.000	200	300	130.000
511/670	105.000	670	800	105	681.600	4.880.000	200	200	190.000

Thrust ball bearing single direction
Series **511**

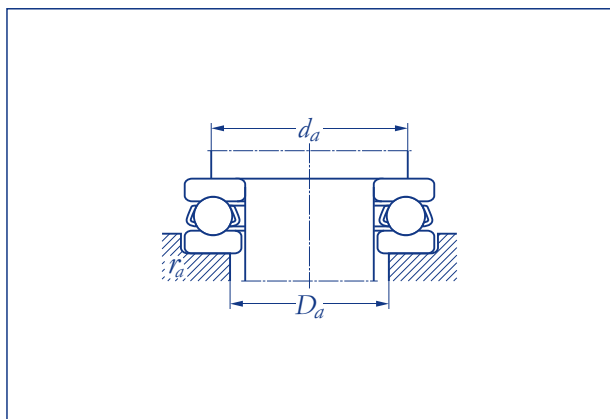


Designation	Dimensions(mm)					
	d ₁	D ₁	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51134	213	172	1,1	197	188	1,0
51136	822	183	1,1	207	199	1,0
51138	237	193	1,1	220	210	1,0
51140	247	203	1,1	230	220	1,0
51144	267	223	1,1	250	240	1,0
51148	297	243	1,5	276	264	1,5
51152	317	263	1,5	296	284	1,5
51156	347	283	1,5	322	308	1,5
51160	376	304	2,0	348	332	2,0
51164	396	324	2,0	368	352	2,0
51168	416	344	2,0	388	372	2,0
51172	436	364	2,0	408	392	2,0
51176	456	384	2,0	428	412	2,0
51180	476	404	2,0	448	432	2,0
51184	496	424	2,0	468	452	2,0
51188	536	444	2,1	499	481	2,0
51192	556	464	2,1	519	501	2,0
51196	576	484	2,1	539	521	2,0
511/500	596	504	2,1	559	541	2,0
511/530	636	534	3,0	595	575	2,5
511/560	666	564	3,0	625	606	2,5
511/600	706	604	3,0	665	645	2,5
511/630	746	634	3,0	701	679	2,5
511/670	795	675	4,0	747	723	3,0

Thrust ball bearing single direction
 Series **512**

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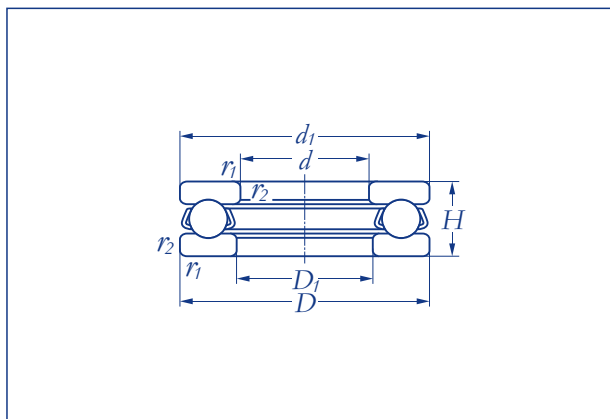
Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C_w (N)	C_{ow} (N)	$F_{r \text{ perm}}$ (N)	$F_{or \text{ perm}}$ (N)	P_u (N)
51200	31	10	26	11	10.100	13.600	4.200	5.600	1,5
51201	34	12	28	11	10.600	15.200	4.200	5.600	1,9
51202	46	15	32	12	13.200	20.000	3.700	4.900	3,3
51203	53	17	35	12	13.700	22.000	3.500	4.600	3,9
51204	83	20	40	14	18.000	30.000	3.100	4.200	7,3
51205	110	25	47	15	22.000	40.000	2.800	3.700	13
51206	130	30	52	16	20.400	38.000	2.500	3.300	11
51207	220	35	62	18	28.000	53.600	2.100	2.800	23
51208	280	40	68	19	37.400	78.400	1.900	2.600	49
51209	300	45	73	20	31.200	64.000	1.800	2.500	33
51210	370	50	78	22	39.500	84.800	1.600	2.300	58
51211	590	55	90	25	49.400	107.200	1.300	1.900	93
51212	650	60	95	26	49.900	112.000	1.300	1.900	100
51213	780	65	100	27	50.900	120.000	1.200	1.800	120
51214	790	70	105	27	52.000	128.000	1.200	1.800	130
51215	830	75	110	27	54.000	136.000	1.100	1.600	150
51216	910	80	115	28	60.800	152.000	1.100	1.600	190
51217	1.200	85	125	31	78.000	200.000	1.100	1.500	330
51218	1.700	90	135	35	95.200	240.000	1.000	1.400	470
51220	2.200	100	150	38	99.200	256.000	900	1.200	530
51222	2.400	110	160	38	104.000	288.000	800	1.100	670
51224	2.650	120	170	39	112.000	320.000	700	1.100	830
51226	4.000	130	190	45	148.800	432.000	600	900	1.500
51228	4.350	140	200	46	152.000	456.000	600	900	1.700
51230	6.100	150	215	50	190.400	588.000	600	900	2.800
51231	6.550	160	225	51	193.600	624.000	500	800	3.200

Thrust ball bearing single direction
Series **512**



Designation	Dimensions(mm)					
	d ₁	D ₁	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51200	26	12	0,6	20	16	0,6
51201	28	14	0,6	22	18	0,6
51202	32	17	0,3	25	22	0,6
51203	35	19	0,6	28	24	0,6
51204	40	22	0,6	32	28	0,6
51205	47	27	0,6	38	34	0,6
51206	52	32	0,6	43	39	0,6
51207	62	37	1,0	51	43	1,0
51208	68	42	1,0	57	51	1,0
51209	73	47	1,0	62	56	1,0
51210	78	52	1,0	67	61	1,0
51211	90	57	1,0	76	69	1,0
51212	95	62	1,0	81	74	1,0
51213	100	67	1,0	86	79	1,0
51214	105	72	1,0	91	84	1,0
51215	110	77	1,0	96	89	1,0
51216	115	82	1,0	101	94	1,0
51217	125	88	1,0	109	101	1,0
51218	135	93	1,1	117	108	1,0
51220	150	103	1,1	130	120	1,0
51222	160	113	1,1	140	130	1,0
51224	170	123	1,1	150	140	1,0
51226	187	133	1,5	166	154	1,5
51228	197	143	1,5	176	164	1,5
51230	212	153	1,5	189	176	1,5
51231	222	163	1,5	199	186	1,5

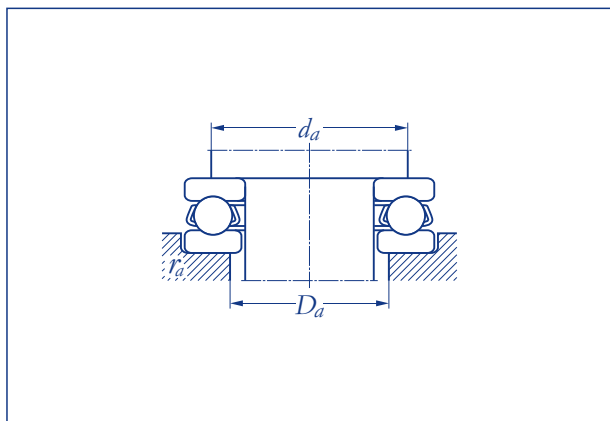
Thrust ball bearing single direction
Series **512**



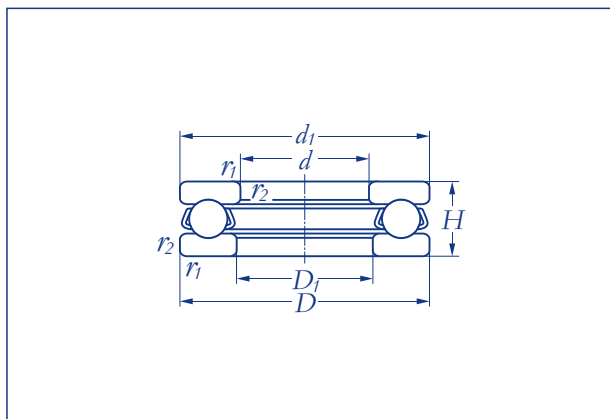
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Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C_w (N)	C_{ow} (N)	$F_{r \text{ perm}}$ (N)	$F_{or \text{ perm}}$ (N)	P_u (N)
51234	8.150	170	240	55	228.800	744.000	500	700	4.500
51236	8.600	180	250	56	236.800	800.000	500	700	5.200
51238	12.000	190	270	62	265.600	928.000	500	7.000	7.000
51240	12.000	200	280	62	270.400	976.000	500	7.000	7.700
51244	13.000	220	300	63	280.800	105.600	400	600	9.100
51248	23.000	240	340	78	369.600	1.488.000	400	500	18.000
51252	25.000	260	360	79	380.000	1.600.000	300	500	21.000
51256	26.500	280	380	80	395.200	1.728.000	300	500	24.000
51260	42.000	300	420	95	484.000	2.200.000	300	400	39.000
51264	45.500	320	440	95	457.600	2.160.000	300	400	38.000
51268	48.500	340	460	96	484.000	2.320.000	300	400	44.000
51272	70.000	360	500	110	592.800	3.040.000	200	300	75.000
51276	73.000	380	520	112	582.400	3.040.000	200	300	75.000

Thrust ball bearing single direction
Series **512**

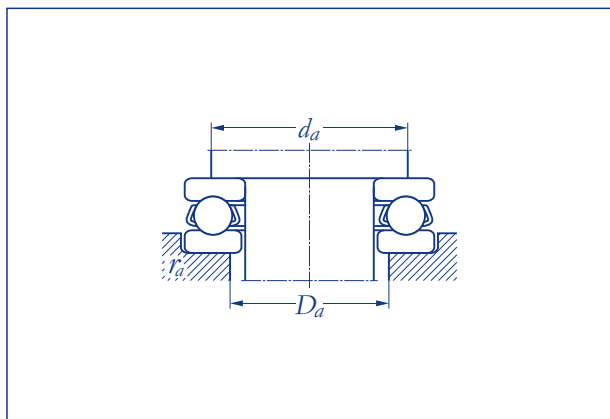


Designation	Dimensions(mm)					
	d ₁	D ₁	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51234	237	173	1.5	212	198	1.5
51236	245	183	1.5	222	208	1.5
51238	265	194	2.0	238	222	2.0
51240	275	204	2.0	248	232	2.0
51244	295	224	2.0	268	252	2.0
51248	335	244	2.1	299	281	2.0
51252	355	264	2.1	319	301	2.0
51256	375	284	2.1	339	321	2.0
51260	415	304	3.0	371	349	2.5
51264	435	325	3.0	391	369	2.5
51268	455	345	3.0	411	389	2.5
51272	495	364	4.0	443	417	3.0
51276	515	385	4.0	463	437	3.0

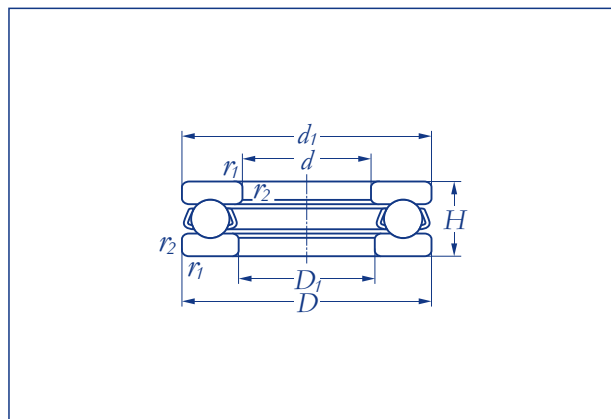
Thrust ball bearing single direction
 Series **513**

513..

Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C_w (N)	C_{ow} (N)	$F_{r \text{ perm}}$ (N)	$F_{or \text{ perm}}$ (N)	P_u (N)
51305	170	25	52	18	27.600	44.000	2.300	4.500	15
51306	260	30	60	21	30.100	52.400	1.900	3.800	22
51307	380	35	68	24	39.500	70.400	1.600	3.400	40
51308	530	40	78	26	49.400	89.600	1.400	3.000	65
51309	660	45	85	28	60.800	112.000	1.300	2.800	100
51310	940	50	95	31	70.700	138.400	1.200	2.600	160
51311	1.300	55	105	35	83.200	166.400	1.100	2.200	220
51312	1.350	60	110	35	80.800	166.400	1.100	2.200	220
51313	1.500	65	115	36	84.800	176.000	1.000	2.000	250
51314	2.000	70	125	40	108.000	240.000	900	1.900	470
51315	2.600	75	135	44	130.400	288.000	800	1.700	670
51316	2.700	80	140	44	127.200	288.000	800	1.700	670
51317	3.550	85	150	49	152.000	340.000	700	1.600	940
51318	3.800	90	155	50	156.000	372.000	700	1.500	1.100
51320	4.950	100	170	55	183.200	448.000	600	1.400	1.600
51322	7.850	110	190	63	220.800	576.000	500	1.200	2.700
51324	11.000	120	210	70	260.000	732.000	500	1.100	4.400
51326	13.000	130	225	75	286.400	848.000	500	1.000	5.800
51328	15.500	140	240	80	317.600	96.000	400	950	7.700
51330	16.500	150	250	80	328.000	1.032.000	400	900	8.700
51332	21.000	160	270	87	359.200	1.200.000	400	850	12.000
51334	22.000	170	280	87	374.400	1.280.000	400	800	13.000
51336	28.500	180	300	95	416.000	1.464.000	300	750	17.000
51340	44.500	200	340	110	499.200	1.920.000	300	630	30.000

Thrust ball bearing single direction
Series **513**

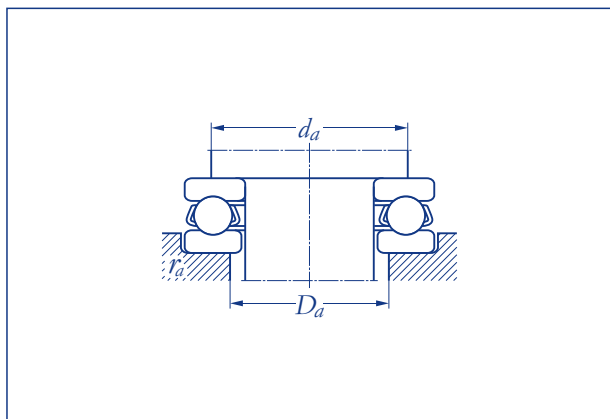


Designation	Dimensions(mm)					
	d ₁	D ₁	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51305	52	27	1,0	41	36	1,0
51306	60	32	1,0	48	42	1,0
51307	68	37	1,0	55	48	1,0
51308	78	42	1,0	63	55	1,0
51309	85	47	1,0	69	61	1,0
51310	95	52	1,1	77	68	1,0
51311	105	57	1,1	85	75	1,0
51312	110	62	1,1	90	80	1,0
51313	115	67	1,1	95	85	1,0
51314	125	72	1,1	103	92	1,0
51315	135	77	1,5	111	99	1,5
51316	140	82	1,5	116	104	1,5
51317	150	88	1,5	124	111	1,5
51318	155	93	1,5	129	116	1,5
51320	170	103	1,5	142	128	1,5
51322	187	113	2,0	158	142	2,0
51324	205	123	2,1	173	157	2,0
51326	220	134	2,1	186	169	2,0
51328	235	144	2,1	199	181	2,0
51330	245	154	2,1	209	191	2,0
51332	265	164	3,0	225	205	2,5
51334	275	174	3,0	235	215	2,5
51336	295	184	3,0	251	229	2,5
51340	335	205	4,0	283	257	3,0

Thrust ball bearing single direction
 Series **514**

514..

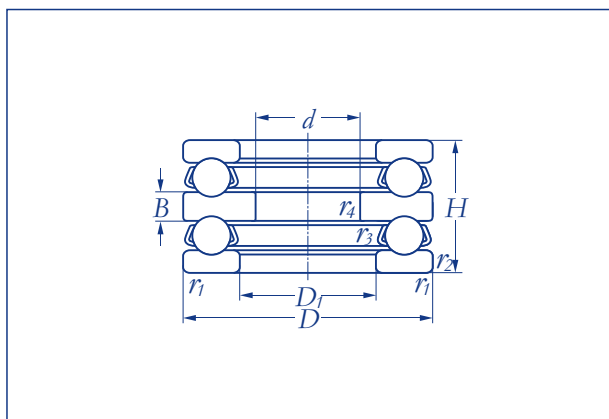
Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C_w (N)	C_{ow} (N)	$F_{r \text{ perm}}$ (N)	$F_{or \text{ perm}}$ (N)	P_u (N)
51405	340	25	60	24	44.200	72.000	1.800	2.500	42
51406	520	30	70	28	58.200	100.000	1.400	2.100	81
51407	760	35	80	32	69.600	124.800	1.200	1.800	130
51408	1.100	40	90	36	89.600	163.200	1.100	1.600	220
51409	1.400	45	100	39	104.000	192.000	1.100	1.500	300
51410	2.000	50	110	43	127.200	248.000	1.000	1.400	500
51411	2.550	55	120	48	142.400	288.000	900	1.200	670
51412	3.100	60	130	51	159.200	320.000	700	1.100	830
51413	4.000	65	140	56	172.800	360.000	700	1.000	1.100
51414	5.000	70	150	60	259.200	400.000	600	900	1.300
51415	6.750	75	160	65	200.800	448.000	600	900	1.600
51416	7.950	80	170	68	216.000	496.000	500	800	2.000
51417	9.450	85	180	72	228.800	544.000	500	800	2.400
51418	11.000	90	190	77	245.600	600.000	500	700	2.900
51420	15.000	100	210	85	296.800	772.000	400	600	4.800
51422	20.000	110	230	95	328.000	912.000	400	500	6.800
51424	25.500	120	250	102	338.400	976.000	400	500	7.700
51426	32.000	130	270	110	416.000	1.280.000	300	500	13.000
51428	34.500	140	280	112	416.000	1.280.000	300	400	13.000
51430	42.500	150	300	120	447.200	1.440.000	300	400	17.000

Thrust ball bearing single direction
Series **514**



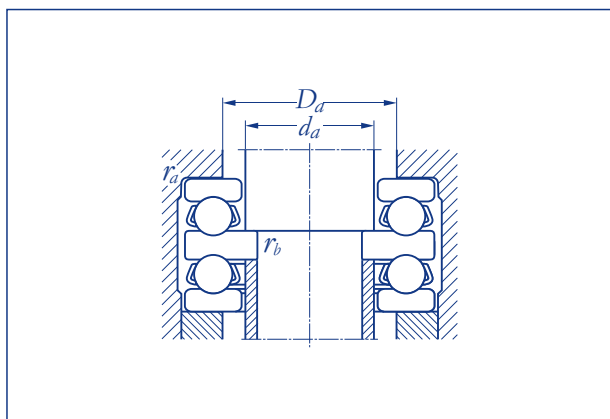
Designation	Dimensions(mm)					
	d ₁	D ₁	r _{1,2}	d _a	D _a	r _a
			min	min	max	max
51405	60	27	1,0	46	39	1,0
51406	70	32	1,0	54	46	1,0
51407	80	37	1,1	62	53	1,0
51408	90	42	1,1	70	60	1,0
51409	100	47	1,1	78	67	1,0
51410	110	52	1,5	86	74	1,5
51411	120	57	1,5	94	81	1,5
51412	130	62	1,5	102	88	1,5
51413	140	68	2,0	110	95	2,0
51414	150	73	2,0	118	102	2,0
51415	160	78	2,0	126	109	2,0
51416	170	83	2,1	133	117	2,0
51417	177	88	2,1	141	124	2,0
51418	187	93	2,1	149	131	2,0
51420	205	103	3,0	165	145	2,5
51422	225	113	3,0	181	159	2,5
51424	245	123	4,0	197	173	3,0
51426	265	134	4,0	213	187	3,0
51428	275	144	4,0	223	197	3,0
51430	295	154	4,0	239	211	3,0

Thrust ball bearing single direction

 Series **522**

522..

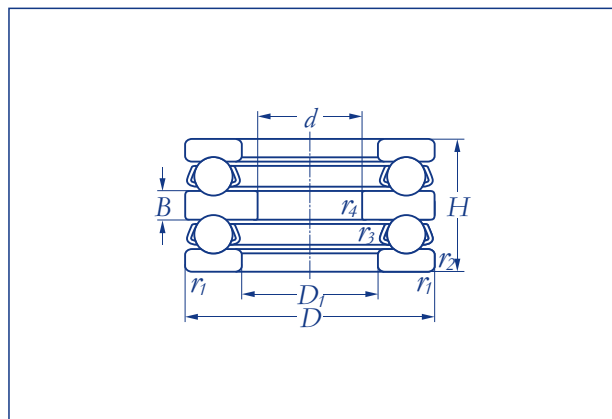
Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
52202	81	10	32	22	13.200	20.000	3.700	4.900	3,3
52204	150	15	40	26	18.000	30.000	3.100	4.200	7,3
52205	220	20	47	28	22.000	40.000	2.800	3.700	13,0
52206	250	25	52	29	20.400	38.000	2.500	3.300	11,0
52207	410	30	62	34	28.000	53.600	2.100	2.800	23,0
52208	550	30	68	36	37.400	78.400	1.900	2.600	49,0
52209	600	35	73	37	31.200	64.000	1.800	2.500	33,0
52210	710	40	78	39	39.500	84.800	1.600	2.300	58,0
52211	1.100	45	90	45	49.400	107.200	1.300	1.900	93,0
52212	1.200	50	95	46	49.900	112.000	1.300	1.900	100,0
52213	1.350	55	100	47	50.900	120.000	1.200	1.800	120,0
52215	1.550	60	110	47	54.000	136.000	1.100	1.600	150,0
52216	1.700	65	115	48	60.800	152.000	1.100	1.600	190,0
52217	2.400	70	125	55	78.000	200.000	1.100	1.500	330,0
52218	3.200	75	135	62	95.200	240.000	1.000	1.400	470,0
52220	4.200	85	150	67	99.200	256.000	900	1.200	530,0
52222	4.650	95	160	67	104.000	288.000	800	1.100	670,0
52224	5.250	100	170	68	112.000	320.000	700	1.100	830,0
52226	8.000	110	190	80	148.800	432.000	600	900	1.500,0
52228	8.650	120	200	81	152.000	456.000	600	900	1.700,0
52230	11.500	130	215	89	190.400	588.000	600	900	2.800,0
52232	12.000	140	225	90	193.600	624.000	500	800	3.200,0
52234	15.000	150	240	97	228.800	744.000	500	700	4.500,0
52334	36.000	150	280	153	374.400	1.280.000	400	500	13.000,0
52236	16.000	150	250	98	236.800	800.000	500	700	5.200,0

Thrust ball bearing single direction

 Series **522**


Designation	Dimensions(mm)							
	D ₁	B	r _{1,2}	r _{3,4}	d _a	D _a	r _a	b _a
			min	min	min	max	max	max
52202	17	5	0,6	0,3	15	22	0,6	0,3
52204	22	6	0,6	0,3	20	28	0,6	0,3
52205	27	7	0,6	0,3	25	34	0,6	0,3
52206	32	7	0,6	0,3	30	39	0,6	0,3
52207	37	8	1,0	0,3	35	46	1,0	0,3
52208	42	9	1,0	0,6	40	51	1,0	0,6
52209	47	9	1,0	0,6	45	56	1,0	0,6
52210	52	9	1,0	0,6	50	61	1,0	0,6
52211	57	10	1,0	0,6	55	69	1,0	0,6
52212	62	10	1,0	0,6	60	74	1,0	0,6
52213	67	10	1,0	0,6	65	79	1,0	0,6
52215	77	10	1,0	1,0	75	89	1,0	1,0
52216	82	10	1,0	1,0	80	94	1,0	1,0
52217	88	12	1,0	1,0	85	101	1,0	1,0
52218	93	14	1,1	1,0	90	108	1,0	1,0
52220	103	15	1,1	1,0	100	120	1,0	1,0
52222	113	15	1,1	1,0	110	130	1,0	1,0
52224	123	15	1,1	1,1	120	140	1,0	1,0
52226	133	18	1,5	1,1	130	154	1,5	1,0
52228	143	18	1,5	1,1	140	164	1,5	1,0
52230	153	20	1,5	1,1	150	176	1,5	1,0
52232	163	20	1,5	1,1	160	186	1,5	1,0
52234	173	21	1,5	1,1	170	198	1,5	1,0
52334	174	33	3,0	1,1	170	215	2,5	1,0
52236	183	21	1,5	2,0	180	208	1,5	2,0

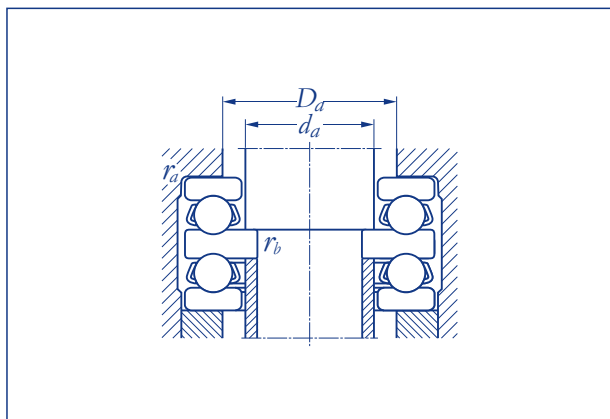
Thrust ball bearing single direction
Series **523**



523..

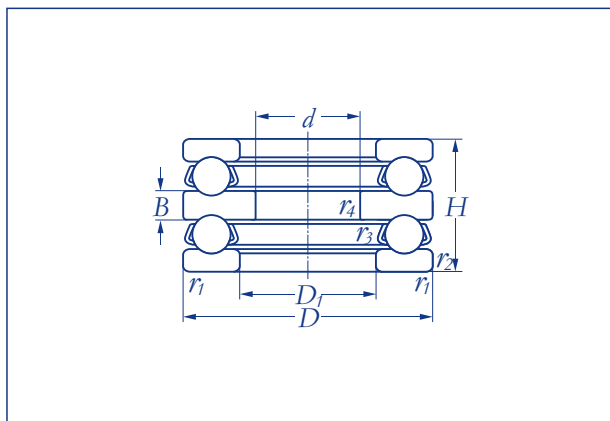
Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
52305	330	20	52	34	27.600	44.000	2.300	3.100	15
52306	470	25	60	38	30.100	52.400	1.900	2.600	22
52307	680	30	68	44	39.500	70.400	1.600	2.300	40
52308	1.050	30	78	49	49.400	89.600	1.400	2.100	65
52309	1.250	35	85	52	60.800	112.000	1.300	1.900	100
52310	1.750	40	95	58	70.700	138.400	1.200	1.800	160
52311	2.400	45	105	64	83.200	166.400	1.100	1.500	220
52312	2.550	50	110	64	80.800	166.400	1.100	1.500	220
52313	2.750	55	115	65	84.800	176.000	1.000	1.400	250
52314	3.650	55	125	72	108.000	240.000	900	1.300	470
52315	4.800	60	135	79	130.400	288.000	800	1.100	670
52316	4.940	65	140	79	127.200	288.000	800	1.100	670
52320	8.950	85	170	97	183.200	448.000	600	900	1.600
52324	19.500	100	210	123	260.000	732.000	500	700	4.400
52330	27.000	130	250	140	328.000	1.032.000	400	600	8.700

Thrust ball bearing single direction
Series **523**



Designation	Dimensions(mm)							
	D ₁	B	r _{1,2}	r _{3,4}	d _a	D _a	r _a	b _a
			min	min	min	max	max	max
52305	27	8	1,0	0,3	25	36	1,0	0,3
52306	32	9	1,0	0,3	30	42	1,0	0,3
52307	37	10	1,0	0,3	35	48	1,0	0,3
52308	42	12	1,0	0,6	40	55	1,0	0,6
52309	47	12	1,0	0,6	45	61	1,0	0,6
52310	52	14	1,1	0,6	50	68	1,0	0,6
52311	57	15	1,1	0,6	55	75	1,0	0,6
52312	62	15	1,1	0,6	60	80	1,0	0,6
52313	67	15	1,1	0,6	65	85	1,0	1,0
52314	72	16	1,1	1,0	70	92	1,0	1,0
52315	77	18	1,5	1,0	75	99	1,5	1,0
52316	82	18	1,5	1,0	80	104	1,5	1,0
52320	103	21	1,5	1,0	100	128	1,5	1,0
52324	123	27	2,1	1,1	120	157	2,0	1,0
52330	154	31	2,1	1,1	150	191	2,0	1,0

Thrust ball bearing single direction
Series **524**

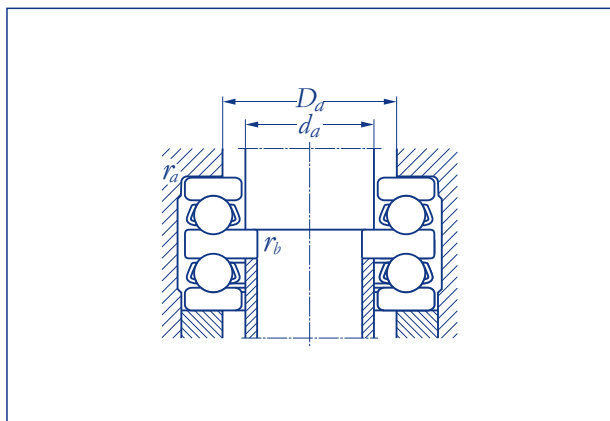


524..

Designation	Weight (g)	Dimensions (mm)			Load ratings				
		d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
52406	1.000	20	70	52	58.200	100.000	1.400	2.100	81
52407	1.450	25	80	59	69.600	124.800	1.200	1.800	130
52408	2.050	30	90	65	89.600	163.200	1.100	1.600	220
52409	2.700	35	100	72	104.000	192.000	1.100	1.500	300
52411	4.700	45	120	87	142.400	288.000	900	1.200	670
52412	6.350	50	130	93	159.200	320.000	700	1.100	830

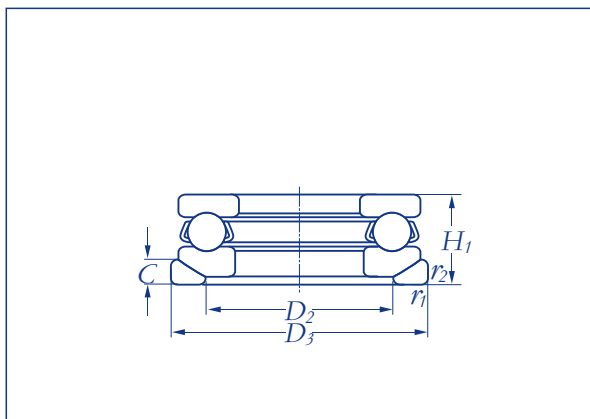
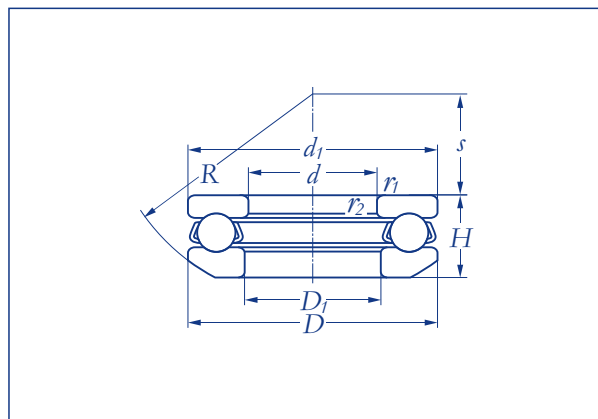


Thrust ball bearing single direction
Series 524



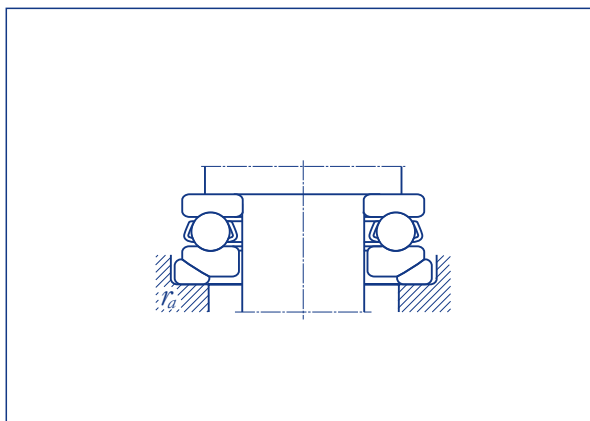
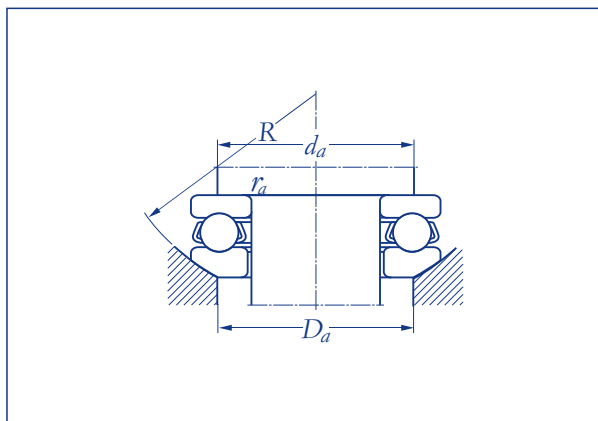
Designation	Dimensions(mm)							
	D _i	B	r _{1,2}	r _{3,4}	d _a	D _a	r _a	b _a
			min	min	min	max	max	max
52406	32	12	1,0	0,3	30	46	1,0	0,6
52407	37	14	1,1	0,6	35	53	1,0	0,6
52408	42	15	1,1	0,6	40	60	1,0	0,6
52409	47	17	1,1	0,6	45	67	1,0	0,6
52411	57	20	1,5	0,6	55	81	1,5	0,6
52412	62	21	1,5	0,6	60	88	1,5	0,6

Thrust ball bearings, single direction
 With spherical housing washers
 Series **532**



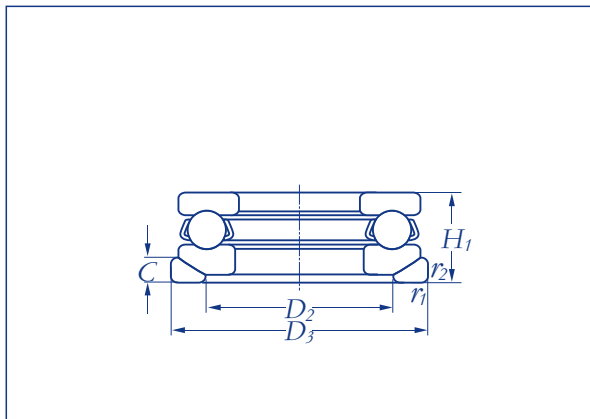
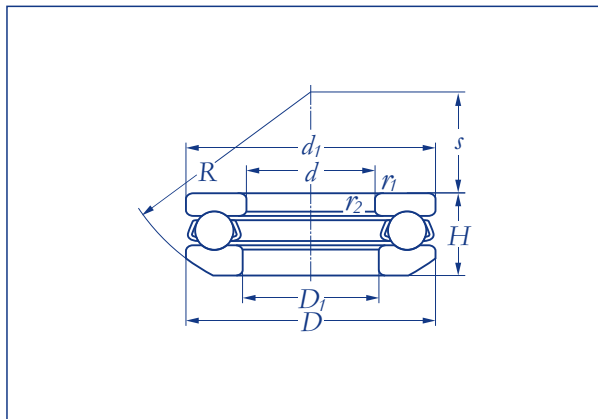
Designation	Weight (g)		Dimensions (mm)			Load ratings				
			d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
53201 U 201	33	12	12	28	11,4	10.600	15.200	4.200	5.600	1,9
53202 U 202	49	14	15	32	13,3	13.200	20.000	3.700	4.900	3,3
53203 U 203	56	15	17	35	13,2	13.700	22.000	3.500	4.600	3,9
53204 U 204	82	20	20	40	14,7	18.000	30.000	3.100	4.200	7,3
53205 U 205	120	32	25	47	16,7	22.000	40.000	2.800	3.700	13,0
53206 U 206	140	38	30	52	17,8	20.400	38.000	2.500	3.300	11,0
53207 U 207	220	57	35	62	19,9	28.000	53.600	2.100	2.800	23,0
53208 U 208	280	70	40	68	20,3	37.400	78.400	1.900	2.600	49,0
53209 U 209	300	87	45	73	21,3	31.200	64.000	1.800	2.500	33,0
53210 U 210	370	100	50	78	23,5	39.500	84.800	1.600	2.300	58,0
53211 U 211	600	150	55	90	27,3	49.400	107.200	1.300	2.900	93,0
53212 U 212	600	160	60	95	28,0	49.900	112.000	1.300	1.900	100,0
53213 U 213	730	180	65	100	28,7	50.900	120.000	1.200	1.800	120,0
53214 U 214	780	190	70	105	28,8	52.000	128.000	1.200	1.800	130,0
53215 U 215	810	210	75	110	28,3	54.000	136.000	1.100	1.600	150,0
53216 U 216	900	220	80	115	29,5	60.800	152.000	1.100	1.600	190,0
53217 U 217	1.200	290	85	125	33,1	78.000	200.000	1.100	1.500	330,0
53218 U 218	1.700	420	90	135	38,5	95.200	240.000	1.000	1.400	470,0
53220 U 220	2.200	500	100	150	40,9	99.200	256.000	900	1.200	530,0
53222 U 222	2.350	560	110	160	40,2	104.000	288.000	800	1.100	670,0
53224 U 224	2.550	650	120	170	40,8	112.000	320.000	700	1.100	830,0
53226 U 226	3.950	900	130	190	47,9	148.800	432.000	600	900	1500,0
53228 U 228	4.250	1.200	140	200	48,6	152.000	456.000	600	900	1700,0

Thrust ball bearings, single direction
 With spherical housing washers
 Series **532**



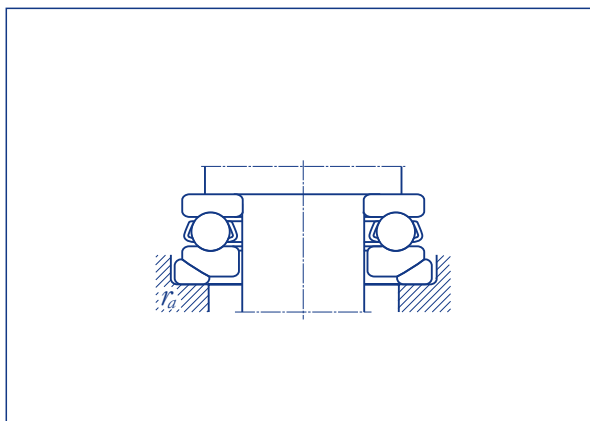
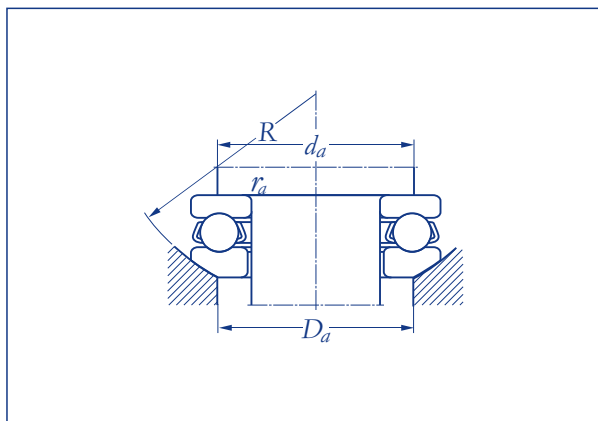
Designation	Dimensions(mm)											
	D ₁	D ₂	D ₃	B	C	H ₁	R	S	r _{1,2}	d _a	D _a	r _a
									min	min	max	max
53201 U 201	28	14	20	30	3,5	13	25	11,5	0,6	22	20	0,6
53202 U 202	32	17	24	35	4,0	15	28	12,0	0,6	25	24	0,6
53203 U 203	35	19	26	38	4,0	15	32	16,0	0,6	28	26	0,6
53204 U 204	40	22	30	42	5,0	17	36	18,0	0,6	32	30	0,6
53205 U 205	47	27	36	50	5,5	19	40	19,0	0,6	38	36	0,6
53206 U 206	52	32	42	55	5,5	20	45	22,0	0,6	43	42	0,6
53207 U 207	62	37	48	65	7,0	22	50	24,0	1,0	51	48	1,0
53208 U 208	68	42	55	72	7,0	23	56	28,5	1,0	57	55	1,0
53209 U 209	73	47	60	78	7,5	24	56	26,0	1,0	62	60	1,0
53210 U 210	78	52	62	82	7,5	26	64	32,5	1,0	67	62	1,0
53211 U 211	90	57	72	95	9,0	30	72	35,0	1,0	76	72	1,0
53212 U 212	95	62	78	100	9,0	31	72	32,5	1,0	81	78	1,0
53213 U 213	100	67	82	105	9,0	32	80	40,0	1,0	86	82	1,0
53214 U 214	105	72	88	110	9,0	32	80	38,0	1,0	91	88	1,0
53215 U 215	110	77	92	115	9,5	32	90	49,0	1,0	96	92	1,0
53216 U 216	115	82	98	120	10,0	33	90	46,0	1,0	101	98	1,0
53217 U 217	125	88	105	130	11,0	37	100	52,0	1,0	109	105	1,0
53218 U 218	135	93	110	140	13,5	42	100	45,0	1,1	117	110	1,0
53220 U 220	150	103	125	155	14,0	45	112	52,0	1,1	130	125	1,0
53222 U 222	160	113	135	165	14,0	45	125	65,0	1,1	140	135	1,0
53224 U 224	170	123	145	175	15,0	46	125	61,0	1,1	150	145	1,0
53226 U 226	187	133	160	195	17,0	83	140	67,0	1,5	166	160	1,5
53228 U 228	197	143	170	210	17,0	55	160	67,0	1,5	176	170	1,5

Thrust ball bearings, single direction
 With spherical housing washers
 Series **533**



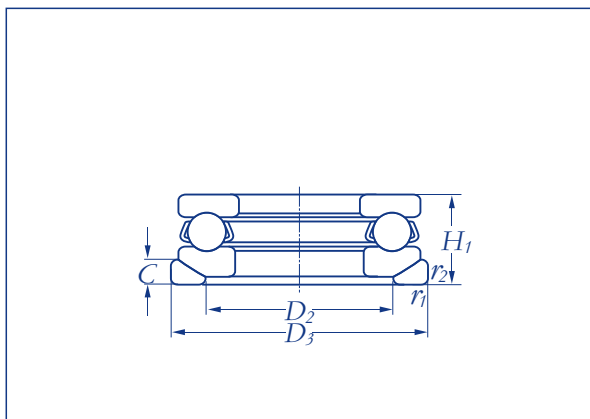
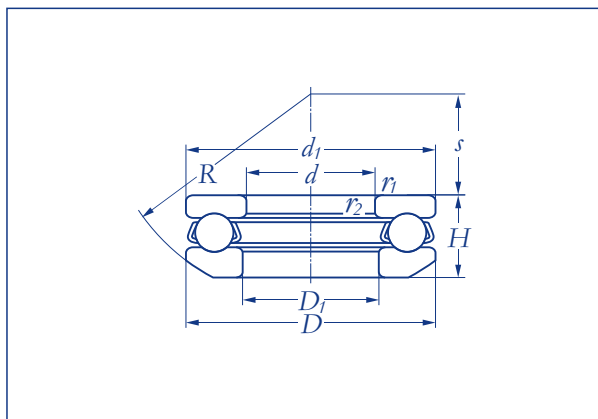
Designation	Weight (g)		Dimensions (mm)			Load ratings				
			d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
53306 U 306	270	56	30	60	22,6	30.100	52.400	2.200	2.600	22
53307 U 307	380	84	35	68	25,6	39.500	70.400	1.900	2.300	40
53308 U 308	550	120	40	78	28,5	49.400	89.600	1.600	2.100	65
53309 U 308	660	170	45	85	30,1	60.800	112.000	1.500	1.900	100
53310 U 310	970	230	50	95	34,4	70.700	138.400	1.400	1.800	160
53311 U 311	1.400	280	55	105	39,3	8.300	166.400	1.200	1.500	220
53312 U 312	1.400	310	60	110	38,3	80.800	166.400	1.200	1.500	220
53313 U 313	1.550	340	65	115	39,4	84.800	176.000	1.200	1.400	250
53314 U 314	2.100	410	70	125	44,2	108.000	240.000	1.100	1.300	470
53315 U 315	2.650	1.550	75	135	48,1	130.400	288.000	900	1.100	670
53316 U 316	2.750	570	80	140	47,6	127.200	288.000	900	1.100	670
53317 U 317	3.550	810	85	150	53,1	152.000	340.000	800	1.100	940
53318 U 318	3.850	840	90	155	54,6	156.000	372.000	800	1.000	1.100
53320 U 320	5.000	950	100	170	59,2	183.200	448.000	700	900	1.600
53322 U 322	7.800	1.300	110	190	67,2	220.800	576.000	600	800	2.700
53324 U 324	10.500	2.000	120	210	74,1	260.000	732.000	600	700	4.400

Thrust ball bearings, single direction
 With spherical housing washers
 Series **533**



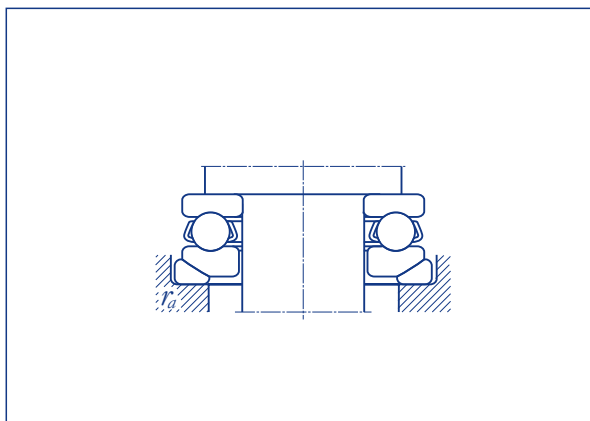
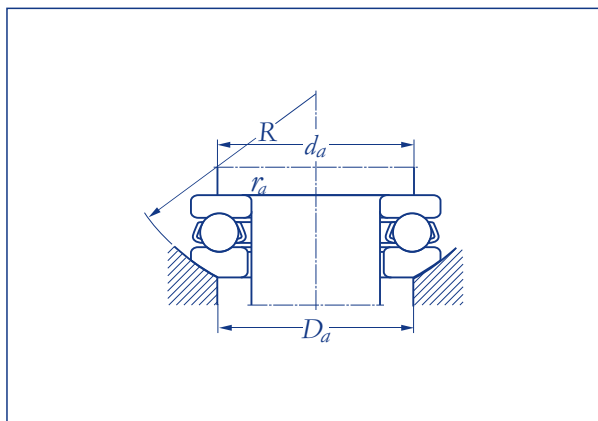
Designation	Dimensions(mm)											
	D ₁	D ₂	D ₃	B	C	H ₁	R	S	r _{1,2}	d _a	D _a	r _a
									min	min	max	max
53306 U 306	60	32	45	62	7,0	25	50	22,0	1,0	48	45	1,0
53307 U 307	68	37	52	72	7,5	28	56	24,0	1,0	55	52	1,0
53308 U 308	78	42	60	82	8,5	31	64	28,0	1,0	63	60	1,0
53309 U 308	85	47	65	90	10,0	33	64	25,0	1,0	69	65	1,0
53310 U 310	95	52	72	100	11,0	37	72	28,0	1,1	77	72	1,0
53311 U 311	105	57	80	110	11,5	42	80	30,0	1,1	85	80	1,0
53312 U 312	110	62	85	115	11,5	42	90	41,0	1,1	90	85	1,0
53313 U 313	115	67	90	120	12,5	43	90	38,5	1,1	95	90	1,0
53314 U 314	125	72	98	130	13,0	48	100	43,0	1,1	103	98	1,0
53315 U 315	135	77	105	140	15,0	52	100	37,0	1,5	111	105	1,5
53316 U 316	140	82	110	145	15,0	52	112	50,0	1,5	116	110	1,5
53317 U 317	150	88	115	155	17,5	58	112	43,0	1,5	124	115	1,5
53318 U 318	155	93	120	160	18,0	59	112	40,0	1,5	129	120	1,5
53320 U 320	170	103	135	175	18,0	64	125	46,0	1,5	142	135	1,5
53322 U 322	187	113	150	195	20,5	72	140	51,0	2,0	158	150	2,0
53324 U 324	205	123	165	220	22,0	80	160	63,0	2,1	173	165	2,0

Thrust ball bearings, single direction
 With spherical housing washers
 Series **534**



Designation	Weight (g)		Dimensions (mm)			Load ratings				
			d	D	H	C _w (N)	C _{ow} (N)	F _{r perm} (N)	F _{or perm} (N)	P _u (N)
53408 U 408	1.100	250	40	90	38,2	89.600	163.200	1.100	1.600	220
53409 U 409	1.450	320	45	100	42,4	104.000	19.200	1.100	1.400	300
53410 U 410	1.900	410	50	110	45,6	12.700	248.000	1.000	1.400	500
53412 U 412	3.100	710	60	130	54,0	159.200	320.000	700	1.100	830
53414 U 414	5.500	1.000	70	150	63,6	187.200	400.000	600	900	1.300
53415 U 415	6.850	1.250	75	160	69,0	200.800	448.000	600	900	1.600
53416 U 416	8.000	1.400	80	170	72,2	216.000	496.000	500	800	2.000
53418 U 418	11.000	1.900	90	190	81,2	245.600	600.000	500	700	2.900
53420 U 420	15.000	2.900	100	210	90,0	296.800	772.000	400	600	4.800

Thrust ball bearings, single direction
 With spherical housing washers
 Series **534**



Designation	Dimensions(mm)											
	D ₁	D ₂	D ₃	B	C	H ₁	R	S	r _{1,2}	d _a	D _a	r _a
									min	min	max	max
53408 U 408	90	42	65	95	12,0	42	72	26	1,1	70	65	1,0
53409 U 409	100	47	72	105	12,5	46	80	29	1,1	78	72	1,0
53410 U 410	110	52	80	115	14,0	50	90	35	1,5	86	80	1,5
53412 U 412	130	62	95	135	16,0	58	100	34	1,5	102	95	1,5
53414 U 414	150	73	110	155	19,5	69	112	34	2,0	118	110	2,0
53415 U 415	160	78	115	165	21,0	75	125	42	2,0	126	115	2,0
53416 U 416	170	83	125	175	22,0	78	125	36	2,1	133	125	2,0
53418 U 418	187	93	140	195	25,5	88	140	40	2,1	149	140	2,0
53420 U 420	205	103	155	220	27,0	98	160	50	3,0	165	155	2,5



1. Materials for SLB Thrust Ball Bearing's Shaft ring, Seat ring & Rolling Elements

The most common through-hardening steel used for rolling bearing of **SLB** used is a carbon chromium steel containing approximately 1% carbon and 1.5% chromium. Below table 1.1 which shown G Cr15--the main material that **SLB** used for producing our ball bearings and its interchangeable material in other nations.

Table 1.1

Name	Standard	Chemical Composition (%)					
		C	Mn	Si	Cr	S \leq	P \leq
G Cr15	NBB	0.95~1.05	0.20~0.40	0.15~0.35	1.30~1.65	0.020	0.027
SUJ 2	JIS G 4805	0.95~1.10	0.50 \leq	0.15~0.35	1.30~1.60	0.025	0.025
100Cr6	DIN	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
E52100	AISI	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
ISO	683/XVII	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -
SKF	-	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -	- ditto -

Note: **SLB** supplies all general bearings with material of G Cr15 as normal products, unless otherwise specified by customer for special usage before ordering. i.e. Pure carbon or Stainless Steel etc.

2. Material for Bearing Retainers

The retainer is demanded to bear hitting load and have the lowest friction with the rolling elements when **SLB** bearing is working. So, low carbon steel is adopted. (Please refer to Table 2.1)

Table 2.1

Name	Standard	Chemical Composition (%)				
		C	Mn	Si	S \leq	P \leq
10F	Chinese GB	0.05~0.11	0.25~0.50	0.07 \leq	0.035	0.035
SPCC	JIS G 3141	0.12 \leq	0.50 \leq	-	0.045	0.040

Note: **SLB** supply bearings with retainer material of 10F as normal products, unless otherwise specified by customers for special usage before ordering. i.e. Corrosion proof and water resistant etc.

3. Precision Class for the bearings

3.1) The accuracy of a bearing are both dimensional and running accuracy of the bearing It has been standardised internationally. Here we give out a interchangeable precision class standard table which is equal to **SLB** (Table 3,1 refers) for your reference.



Table 3.1

Selection	Classification standard			
	P0	P6	P5	P4
ISO	Class 6X	Class 6	Class 5	Class 4
Japan Industrial	Class 0	Class 6	Class 5	Class 4
Germany	P0	P6	P5	P4
United States	ABEC-1	ABEC-3	ABEC-5	ABEC-7

3.2) Relatively, as specified value of accuracy, **SLB** gives out the normal tolerances for thrust ball bearings.
 (Tables 3,2, 3,3 and 3,4 refers)

Table 3.2 Normal Tolerances for inner diameter of shaft ring

(Unit: μm)

Nominal bore dimension d(mm)		Deviation of the mean bore diameter from the nominal For			Deviation of the bore diameter For		
		P0, P6 & P5			P4		
over	incl.	Δdmp		Vdp	Δdmp		Vdp
		high	low	max.	high	low	max.
-	18	0	-8	6	0	-7	5
18	30	0	-10	8	0	-8	6
30	50	0	-12	9	0	-10	8
50	80	0	-15	11	0	-12	9
80	120	0	-20	15	0	-15	11
120	180	0	-25	19	0	-18	14
180	250	0	-30	23	0	-22	17
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-30	23
400	500	0	-45	34	0	-35	26
500	630	0	-50	38	0	-40	30
630	800	0	-75	-	0	-50	-
800	1000	0	-100	-	-	-	-
1000	1250	0	-125	-	-	-	-



Table 3,3 Normal Tolerances for outer diameter of seating.

(Unit: μm)

Nominal bore dimension D(mm)		Deviation of the mean bore diameter from the nominal			Deviation of the bore diameter		
		For			For		
		P0, P6 & P5			P4		
		ΔDmp		VDp	ΔDmp		VDp
over	incl.	high	low	max.	high	low	max.
10	18	0	-11	8	0	-7	5
18	30	0	-13	10	0	-8	6
30	50	0	-16	12	0	-9	7
50	80	0	-19	14	0	-11	8
80	120	0	-22	17	0	-13	10
120	180	0	-25	19	0	-15	11
180	250	0	-30	23	0	-20	15
250	315	0	-35	26	0	-25	19
315	400	0	-40	30	0	-28	21
400	500	0	-45	34	0	-33	25
500	630	0	-50	38	0	-38	29
630	800	0	-75	55	0	-45	34
800	1000	0	-100	75	-	-	-
1000	1250	0	-125	-	-	-	-
1250	1600	0	-160	-	-	-	-



Table 3,4 Normal Tolerances for thickness variation of the shaft ring and seat ring.

(Unit:μ m)

Nominal bore dimension D(mm)		Thickness variation of the shaft ring trace groove towards its end surface Si				Thickness variation of the seat ring trace groove towards its end surface Se			
		P0	P6	P5	P4	P0	P6	P5	P4
over	incl.	max	max	max	max	max	max	max	max
-	18	10	5	3	2	The same value as Si of the same bearing			
18	30	10	5	3	2				
30	50	10	6	3	2				
50	80	10	7	4	3				
80	120	15	8	4	3				
120	180	15	9	5	4				
180	250	20	10	5	4				
250	315	25	13	7	5				
315	400	30	15	7	5				
400	500	30	18	9	6				
500	630	35	21	11	7				
630	800	40	25	13	8				
800	1000	45	30	15	-				
1000	1250	50	35	18	-				