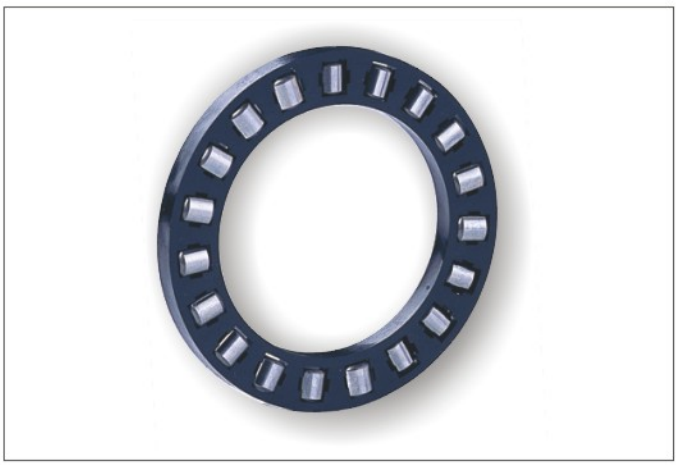
Thrust roller bearings



1. Types and designs

SLB Roller and Cage Thrust Assemblies are available in the series AXK, which has needle rollers; and in series K 811, K 812, each of which incorporates cylindrical rollers. Each pocket of the series K 811 and K 812 has a single row of cylindrical rollers. Series AXK bearings, which have needle rollers, use a pressed-steel cage. Series K 811, and K 812 they can optionally employ a pressed-steel cage or a cage of molded polyamide reinforced with glass fiber or carbon fiber (suffix TV). The TV cage features a maximum allowable operating temperature of 120°C and maximum allowable continuous operating temperature of 100°C.

The bearing washers for **SLB** Thrust Roller Bearings are available in an AS model made of surface-hardened 1 mm-thick steel plate, and in WS and GS models, which are machined types.

The AS model can be used on either the shaft or housing side. This bearing washer, however, requires that the adjacent mechanical components have sufficient rigidity and good form accuracy. Before being mounted, the bearing washer may remain somewhat warped. This phenomenon should not be regarded as a problem because the warpage will be eliminated once a predetermined level of thrust load is exerted on the washer. The bore of the WS model is fitted to a shaft, and the outside surface of the GS model is fitted to a housing. Both models therefore provide the bearings with greater rigidity and higher running accuracy. Bearing models 811, 812 are formed by respectively combining the roller and cage thrust assemblies of models K 811 and K 812 with the associated model WS or GS bearing washer.

They are standard series bearings whose dimension series, specified in ISO 104 (Boundary dimensions for rolling bearings), are 11, 12, and 93, respectively.

Fig. 1 Series AXK

Fig. 2 Series K 811, K 812

Fig. 3 Series AS

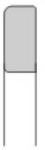


Fig. 4 Series WS

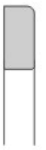


Fig. 5 Series GS

2. Interpreting bearing numbers

The bearing numbers of **SLB** Roller and Cage Thrust Assemblies, Bearing Rings, and Thrust Roller Bearings comprise a series number, dimension series code, bore diameter number, and suffix.

Roller and cage thrust assembly

AXK 5070

- 5070 — Dimension series code
- AXK — Series number

K 8 11 08

- 08 — Bore diameter number
- 11 — Dimension series code
- K 8 — Series number

Bearing washer

WS 5070

- 5070 — Dimension series code
- WS — Series number

3. Bearing tolerance

The dimensional accuracy, form accuracy, and running accuracy of series 811, 812 thrust cylindrical roller bearings are given in "Bearing Tolerances". The bore (Del) of roller and cage thrust assemblies (series AXK, K 811, K 812) is machined to a tolerance of E11 (or E12 for bearings having a suffix T2). The outside surface (Dc) of the series AXK is machined to a tolerance of c12, while those of the series K 811, K 812 are machined to a tolerance of a13.

4. Raceway surface requirements

When the shaft and housing are used as a raceway for arollerand cage thrust assembly, the raceway should satisfy the requirements in Table 1.

Table 1 Raceway requirements

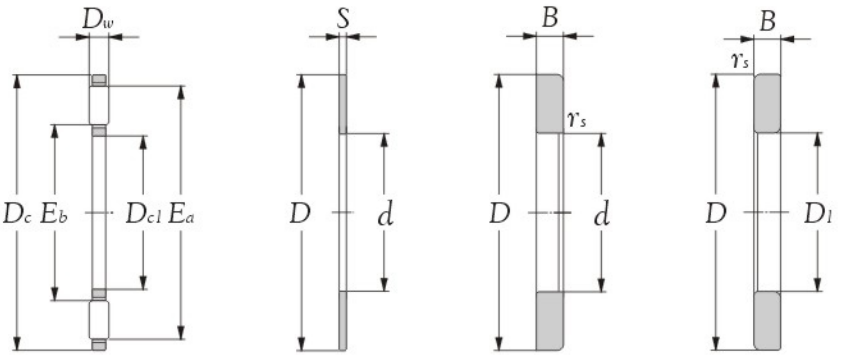
Characteristics	Requirement
Squareness (max.)	IT6 (IT4)
Surface roughness	0,4a
Surface hardness	HRC58~64

5. Bearing washer fits

The fits of the shafts and housing that mount the thrust bearing washers (AS, WS, and GS models) are given in Table 2 below.

Table 2 Raceway requirements

Bearing washer	Shaft	Housing
Series AS	H10	H11
Series WS	h6	—
Series GS	—	H7



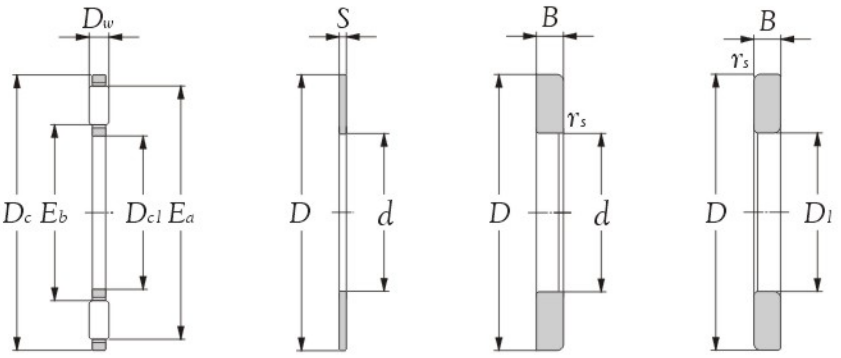
Type AXK | Type AS | Type WS | Type GS

Inner bore D_{c1} E11 mm	Bearing number				Boundary dimensions (mm)										
	thrust needle roller and cage assembly (consistant with cylindrical)	Washer	Inner ring	Outer ring	D_c C12	D_w 0 -0.01	D_p e13	D_{p1} E12	$S^{2)}$ ±0.05	d	d_1 -0.2 -0.5	D	D_1 +0.5 +0.2	B	r_s min$^{1)}$
10	AXK 1024	AS 1024	WS 1024	GS 1024	24	2	24	10	1	10	24	24	10	$2.75^{\ 0}_{-0.060}$	0.3
12	AXK 1226	AS 1226	WS 1226	GS 1226	26	2	26	12	1	12	26	26	12	$2.75^{\ 0}_{-0.060}$	0.3
15	AXK 1528	AS 1528	WS 1528	GS 1528	28	2	28	15	1	15	28	28	16	$2.75^{\ 0}_{-0.060}$	0.3
17	AXK 1730	AS 1730	WS 1730	GS 1730	30	2	30	17	1	17	30	30	18	$2.75^{\ 0}_{-0.060}$	0.3
20	AXK 2035	AS 2035	WS 2035	GS 2035	35	2	35	20	1	20	35	35	21	$2.75^{\ 0}_{-0.060}$	0.3
25	AXK 2542	AS 2542	WS 2542	GS 2542	42	2	42	25	1	25	42	42	26	$3.00^{\ 0}_{-0.060}$	0.6
30	AXK 3047	AS 3047	WS 3047	GS 3047	47	2	47	30	1	30	47	47	32	$3.00^{\ 0}_{-0.060}$	0.6
35	AXK 3552	AS 3552	WS 3552	GS 3552	52	2	52	35	1	35	52	52	37	$3.50^{\ 0}_{-0.075}$	0.6
40	AXK 4060	AS 4060	WS 4060	GS 4060	60	3	60	40	1	40	60	60	42	$3.50^{\ 0}_{-0.075}$	0.6
45	AXK 4565	AS 4565	WS 4565	GS 4565	65	3	65	45	1	45	65	65	47	$4.00^{\ 0}_{-0.075}$	0.6
50	AXK 5070	AS 5070	WS 5070	GS 5070	70	3	70	50	1	50	70	70	52	$4.00^{\ 0}_{-0.075}$	0.6
55	AXK 5578	AS 5578	WS 5578	GS 5578	78	3	78	55	1	55	78	78	57	$5.00^{\ 0}_{-0.075}$	0.6
60	AXK 6085	AS 6085	WS 6085	GS 6085	85	3	85	60	1	60	85	85	62	$4.75^{\ 0}_{-0.075}$	1.0
65	AXK 6590	AS 6590	WS 6590	GS 6590	90	3	90	65	1	65	90	90	67	$5.25^{\ 0}_{-0.075}$	1.0
70	AXK 7095	AS 7095	WS 7095	GS 7095	95	4	95	70	1	70	95	95	72	$5.25^{\ 0}_{-0.075}$	1.0
75	AXK 75100	AS 75100	WS 75100	GS 75100	100	4	100	75	1	75	100	100	77	$5.75^{\ 0}_{-0.075}$	1.0
80	AXK 80105	AS 80105	WS 80105	GS 80105	105	4	105	80	1	80	105	105	82	$5.75^{\ 0}_{-0.075}$	1.0
85	AXK 85110	AS 85110	WS 85110	GS 85110	110	4	110	85	1	85	110	110	87	$5.75^{\ 0}_{-0.075}$	1.0
90	AXK 90120	AS 90120	WS 90120	GS 90120	120	4	120	90	1	90	120	120	92	$6.50^{\ 0}_{-0.090}$	1.0
100	AXK 100135	AS 100135	WS 100135	GS 100135	135	4	135	100	1	100	135	135	102	$7.00^{\ 0}_{-0.090}$	1.0
110	AXK 110145	AS 110145	WS 110145	GS 110145	145	4	145	110	1	110	145	145	112	$7.00^{\ 0}_{-0.090}$	1.0
120	AXK 120155	AS 120155	WS 120155	GS 120155	155	4	155	120	1	120	155	155	122	$7.00^{\ 0}_{-0.090}$	1.0
130	AXK 130170	AS 130170	WS 130170	GS 130170	170	5	170	130	1	130	170	170	132	$9.00^{\ 0}_{-0.090}$	1.0
140	AXK 140180	AS 140180	WS 140180	GS 140180	180	5	180	140	1	140	178	180	142	$9.50^{\ 0}_{-0.090}$	1.0

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Measured axial load is more than 20 kgf.

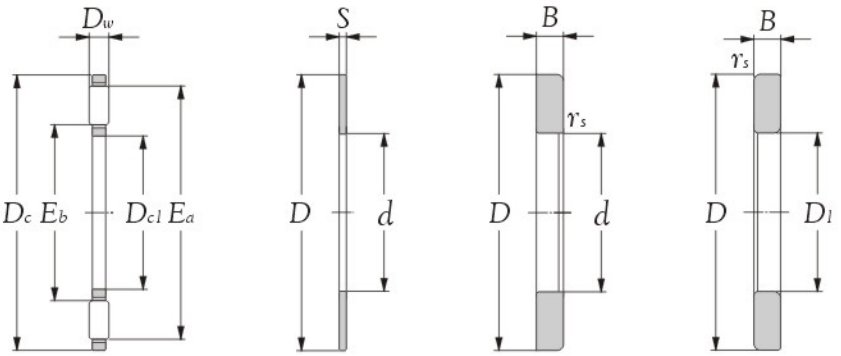
Technical supplement

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



Type AXK | Type AS | Type WS | Type GS

Basic load ratings				Max runout speed		Reference dimensions		Weight		
dynamic C	static Co	dynamic C	static Co	grease	oil	Eb	Ea	AXK..	AS..	WS.. GS..
N		kgf		r/min		mm		kg.		
9150	25300	935	2580	3500	14000	11	21	0.0028	0.0030	0.008
9850	28900	1010	2940	3300	13000	13	23	0.0030	0.0033	0.009
11300	36000	1150	3700	2800	11000	17	27	0.0035	0.0035	0.010
11900	39500	1220	4050	2500	10000	19	29	0.0040	0.0038	0.011
13200	46500	1340	4750	2100	8500	22	34	0.0050	0.0051	0.014
14600	58000	1490	5900	1800	7000	29	41	0.0070	0.0070	0.021
16300	69500	1660	7100	1500	6000	35	46	0.0080	0.0080	0.025
17800	81500	1820	8300	1400	5500	40	51	0.0100	0.0091	0.033
27400	110000	2790	11300	1200	4700	45	58	0.0185	0.0123	0.044
29800	128000	3050	13100	1100	4300	50	63	0.0205	0.0136	0.055
31500	143000	3250	14500	1000	3900	55	68	0.0235	0.0148	0.060
38000	186000	3850	19000	900	3500	60	76	0.0308	0.0189	0.095
44500	234000	4550	23900	800	3200	65	83	0.0390	0.0223	0.101
46500	254000	4750	25900	750	3000	70	88	0.0400	0.0239	0.125
53500	253000	5500	25800	750	2900	74	93	0.0600	0.0254	0.134
55000	266000	5650	27100	700	2700	79	98	0.0610	0.0270	0.155
56500	279000	5750	28400	650	2600	84	103	0.0630	0.0284	0.163
57500	291000	5900	29700	600	2400	89	108	0.0668	0.0301	0.175
71000	390000	7250	39500	600	2300	94	118	0.0860	0.0388	0.250
90500	550000	9200	56500	500	2000	105	133	0.1120	0.0505	0.350
93500	590000	9550	60500	480	1900	115	143	0.1220	0.0549	0.385
99000	650000	10100	66500	430	1700	125	153	0.1310	0.0592	0.415
140000	900000	14300	92000	400	1600	136	167	0.2050	0.0740	0.663
145000	960000	14800	97500	380	1500	146	177	0.2190	0.0790	0.749



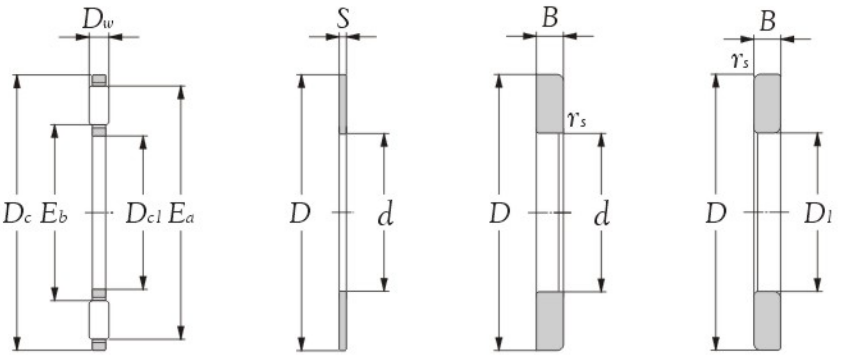
Type AXK | Type AS | Type WS | Type GS

Inner bore D_{c1} E11 mm	Bearing number				Boundary dimensions (mm)									
	thrust needle roller and cage assembly (consistant with cylindrical)	Washer	Inner ring	Outer ring	D_c C12	D_w 0 -0.01	D_p e13	D_{p1} E12	$S^{2)}$ ±0.05	d	d_1 -0.2 -0.5	D	D_1 +0.5 +0.2	B	r_s min$^{1)}$
150	AXK 150190	AS 150190	WS 150190	GS 150190	190	5	190	150	1	150	188	190	152	9.50 $^{0}_{-0.090}$	1.0
160	AXK 160200	AS 160200	WS 160200	GS 160200	200	5	200	160	1	160	198	200	162	9.50 $^{0}_{-0.090}$	1.0

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Measured axial load is more than 20 kgf.

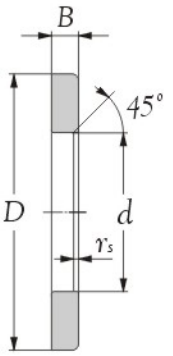
Technical supplement

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



Type AXK | Type AS | Type WS | Type GS

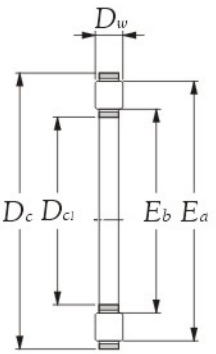
Basic load ratings				Max runout speed		Reference dimensions		Weight		
dynamic C	static Co	dynamic C	static Co	grease	oil	Eb	Ea	AXK..	AS..	WS.. GS..
N		kgf		r/min		mm		kg.		
149000	1020000	15200	104000	350	1400	156	187	0.2320	0.0840	0.796
154000	1070000	15700	110000	330	1300	166	197	0.2460	0.0890	0.842



Inner bore d mm	Bearing number	Boundary dimensions D	B mm	r_s min	Basic load ratings dynamic C N	static Co N	Limiting speed $n_{lgrease} \approx$ min^{-1}	Roll path size Eb	Ea
6	LS 0619	19	2.75	0.3	6800	15500	16000	7	18
8	LS 0821	21	2.75	0.3	7800	19400	15000	9	20
10	LS 1024	24	2.75	0.3	9200	25500	14000	12	23
12	LS 1226	26	2.75	0.3	9900	29000	13000	14	25
15	LS 1528	28	2.75	0.3	11300	36000	11000	17	27
17	LS 1730	30	2.75	0.3	11900	39500	10000	19	29
20	LS 2035	35	2.75	0.3	13100	46500	8500	22	34
25	LS 2542	42	3.00	0.6	14700	58000	7000	29	41
30	LS 3047	47	3.00	0.6	16300	70000	6000	34	46
35	LS 3552	52	3.50	0.6	17800	81000	5500	39	51
40	LS 4060	60	3.50	0.6	28000	114000	4700	45	58
45	LS 4565	65	4.00	0.6	30000	128000	4300	50	63
50	LS 5070	70	4.00	0.6	32000	143000	3900	55	68
55	LS 5578	78	5.00	0.6	38000	186000	3500	60	76
60	LS 6085	85	4.75	1.0	44500	234000	3200	65	83
65	LS 6590	90	5.25	1.0	46500	255000	3000	70	88
70	LS 7095	95	5.25	1.0	54000	255000	2900	74	93
75	LS 75100	100	5.75	1.0	55000	265000	2700	79	98
80	LS 80105	105	5.75	1.0	56000	280000	2600	84	103
85	LS 85110	110	5.75	1.0	58000	290000	2400	89	108
90	LS 90120	120	6.50	1.0	73000	405000	2300	94	118
100	LS 100135	135	7.00	1.0	91000	560000	2000	105	133
110	LS 110145	145	7.00	1.0	97000	620000	1900	115	143

Technical supplement

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

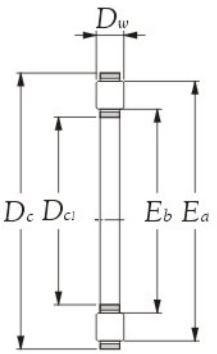


Inner bore D_{c1} E11 mm	Bearing number thrust needle roller and cage assembly	Boundary dimensions (mm) D_c C12	D_w 0 -0.01	Basic load ratings dynamic C N	static Co N	dynamic C kgf	static Co kgf	Max runout speed grease r/min	oil r/min	Reference dimensions E_b	E_a	Weight kg.
10	K 81100	24	3.5	10800	21500	1110	2190	3400	13000	12	23	0.0035
12	K 81101	26	3.5	11500	23900	1170	2430	3000	12000	14	25	0.0040
15	K 81102	28	3.5	12900	28600	1310	2920	2800	11000	16	27	0.0060
17	K 81103	30	3.5	13400	31000	1370	3150	2500	10000	18	29	0.0080
20	K 81104	35	4.5	20200	46500	2060	4700	2100	8500	21	34	0.0120
25	K 81105	42	5.0	27300	68000	2780	6900	1800	7000	27	40	0.0180
30	K 81106	47	5.0	27800	72500	2840	7400	1500	6000	32	45	0.0200
35	K 81107	52	5.0	31000	87000	3150	8900	1400	5500	37	50	0.0240
40	K 81108	60	6.0	43000	121000	4350	12400	1200	4800	42	58	0.0350
45	K 81109	65	6.0	45500	135000	4650	13800	1100	4400	47	63	0.0400
50	K 81110	70	6.0	48000	150000	4900	15300	1000	4000	52	68	0.0450
55	K 81111	78	6.0	62500	215000	6350	21900	900	3600	57	76	0.0600
60	K 81112	85	7.5	69000	215000	7000	21900	830	3300	63	82	0.0830
65	K 81113	90	7.5	73000	236000	7400	24100	780	3100	68	87	0.0900
70	K 81114	95	7.5	76500	257000	7800	26200	730	2900	73	92	0.0970
75	K 81115	100	7.5	78000	268000	7950	27300	680	2700	78	97	0.1150
80	K 81116	105	7.5	79500	279000	8100	28400	650	2600	83	102	0.1190
85	K 81117	110	7.5	83000	300000	8450	30500	630	2500	88	107	0.1250
90	K 81118	120	9.0	112000	395000	11400	40500	580	2300	93	117	0.1700

Notes: 1) The dimensional tolerance for a bearing with a T2 suffix is E12.

Technical supplement

Cages		*Precision*	*Grease*
Steel -	√		
Polymid -	X	Normal (ISO)	Nil
Brass -	X		



Inner bore D_{c1} E11 mm	Bearing number thrust needle roller and cage assembly	Boundary dimensions (mm) D_c C12	D_w 0 -0.01	Basic load ratings dynamic C N	static Co N	dynamic C kgf	static Co kgf	Max runout speed grease r/min	oil r/min	Reference dimensions E_b	E_a	Weight kg.
30	K 81206	52	7.5	53500	129000	5450	13100	1500	6000	32	50	0.050
35	K 81207	62	7.5	54500	139000	5550	14200	1200	4900	37	60	0.065
40	K 81208	68	9.0	74500	190000	7600	19400	1100	4400	43	66	0.085
45	K 81209	73	9.0	82000	222000	8350	22600	1000	4100	48	71	0.100
50	K 81210	78	9.0	85000	238000	8650	24200	950	3800	53	76	0.105
55	K 81211	90	11.0	121000	340000	12300	34500	830	3300	58	87	0.190
60	K 81212	95	11.0	125000	365000	12800	37000	780	3100	64	92	0.200
65	K 81213	100	11.0	130000	385000	13200	39500	730	2900	69	97	0.215
70	K 81214	105	11.0	134000	410000	13700	42000	680	2700	74	102	0.225
75	K 81215	110	11.0	138000	435000	14100	44500	650	2600	79	107	0.240
80	K 81216	115	11.0	142000	460000	14500	47000	630	2500	84	112	0.250

Notes: 1) The dimensional tolerance for a bearing with a T2 suffix is E12.

Technical supplement

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