

OVER VIEW

WBC 원일베어링공업(주)는 1988년 4월 1일 설립 이래 오직 스러스트 베어링 제조에만 전념해온 베어링 전문기업입니다. 당사는 국내산업 전반에 소요되는 각종 스러스트 베어링을 국산화하여 수입 대체효과 및 국내 제조업의 원가절감에 많은 기여를 하고 있습니다. 최근에는 전량 수입에 의존하던 스러스트 니이들 베어링에 이어서 텀덤 스러스트 베어링도 국내에서 최초로 개발하여 공급하고 있습니다. 저희 WBC 원일베어링공업(주)의 임직원은 지속적인 연구개발과 투자로 더욱 다양한 종류의 베어링 개발에 최선의 노력을 다 할 것을 약속드립니다.

사훈 The motto of a company

信用 (Trust)
 創意 (Originality)
 信義 (Faith)



경영방침

세계적 품질의 WBC 원일베어링을 만들자.

품질방침

공정품질 100PPM달성.
 고객불만 (CLAIM)제로화.
 신속, 정확하고 친절한 서비스 제공.

History

1988	04	원일베어링공업사 설립
1988	07	스러스트 볼 베어링 시제품 생산
1993	12	유망중소기업 선정 (국민은행)
1996	01	스러스트 볼 베어링 미국 수출개시
1996	02	스러스트 볼 베어링 이태리 수출개시
1996	08	스러스트 볼 베어링 일본 수출개시
1997	01	원일베어링공업주식회사로 법인 전환
1998	04	유망 선진기술 기업 지정 (중소기업청)
1998	09	기술혁신개발사업 (중소기업청, 한국기계연구원)
2000	01	스러스트 볼 베어링 뉴질랜드 수출개시
2002	09	우수자본개발 국무총리표창
2002	11	부품소재 전문기업 인증 획득 (산업자원부)
2003	03	ISO 9001 / KSA 9001 품질인증 획득
2003	05	연구개발 전담부서 등록 (한국산업기술진흥원)
2005	05	스러스트 볼 베어링 독일, 중국 수출개시
2007	01	부품&소재 신뢰성인증 획득 (산업자원부 기술표준원)
2007	08	신기술기업 선정 (중소기업청)
2008	06	수출유망중소기업 선정 (중소기업청)
1988	04	Established Wonil Bearing Company
1988	07	Manufactured a commercial Thrust Ball Bearing
1993	12	Selected as Promising Small- and Medium-sized business (by Kookmin Bank)
1996	01	Exported Thrust Ball Bearing to the United States
1996	02	Exported Duplex Pair Thrust Ball Bearing to Italy
1996	08	Exported Thrust Ball Bearing to Japan
1997	01	Changed to Wonil Bearing Co., Ltd.
1998	04	Selected as Promising Advanced Technology Company (by Small Business Administration)
2002	09	High-tech product localization prize by the prime minister.
2002	11	Acquire 'Parts&Materials Specialized Business certification (The Ministry of Commerce, Industry and Energy)
2003	03	Acquire ISO9001/KSA9001 Certificates.
2003	05	Foundation of R&D Center.
2005	05	Exported Thrust Rail&Roller Bearing to the Germany&China.
2007	01	Acquire Reliability Certification. (Korean Agency for Technology and Standards)
2007	08	Selected as High-Technology Company.
2008	06	Export bluechip medium and small enterprises choice (small and medium business administration)

PRODUCT LIST

국내 최초 100% 국산화 성공제품

WBC THRUST BALL BEARING

■ SINGLE DIRECTION

· 축 방향 하중을 받는 스러스트 볼베어링은 중속 및 저속에서 유용하게 사용됩니다.
51100, 51200, 51300, 51400, 900, 2900, 3900, INCH, 0

■ DOUBLE DIRECTION

■ SPHERICAL HOUSING WASHER & SEATING RING

■ MINIATURE THRUST BALL BEARING

■ KING PIN THRUST BALL BEARING

WBC THRUST NEEDLE BEARING

■ THRUST NEEDLE ROLLER AND CAGE ASSEMBLY

· WBC 니들 로울러 스러스트 베어링은 좁은공간에서 유용하게 사용됩니다.
· 베어링의 구성은 AXK, AS, GS, LS로 구성됩니다.
1024, 1226, 1528, 1730, 2035, 3047, 3552, 4060, 4565, 5070, 5578, 6085, 6590, 80105, 90120

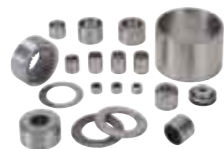
WBC THRUST ROLLER BEARING

■ CYLINDRICAL ROLLER THRUST BEARING

· WBC 원통 로울러 스러스트 베어링은 높은 하중 및 충격하중에 견딜수 있는 견고한 구조입니다.
· 베어링의 구성은 CAGE(K), WS, GS, LS로 구성됩니다.
81100, 81200, 89300, 89400, 87400

WBC TANDEM THRUST BEARING

· WBC 텐덤 스러스트 베어링은 일직선상에 병렬로 조합된 여러개의 원통 로울러 스러스트 베어링에 Ring, Washer, Bush등의 부품을 최적의 조건으로 조합하여 설계하였습니다.
· 텐덤 2열 (T2AR), 텐덤 3열 (T3AR), 텐덤 4열 (T4AR), 텐덤 6열 (T6AR), 텐덤 8열 (T8AR)
· 텐덤 스러스트 베어링은 전량 주문생산 받습니다.



기타베어링 주문생산

www.wbc-bearing.co.kr

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WONIL BEARING INDUSTRY CO., LTD.

THRUST BEARING

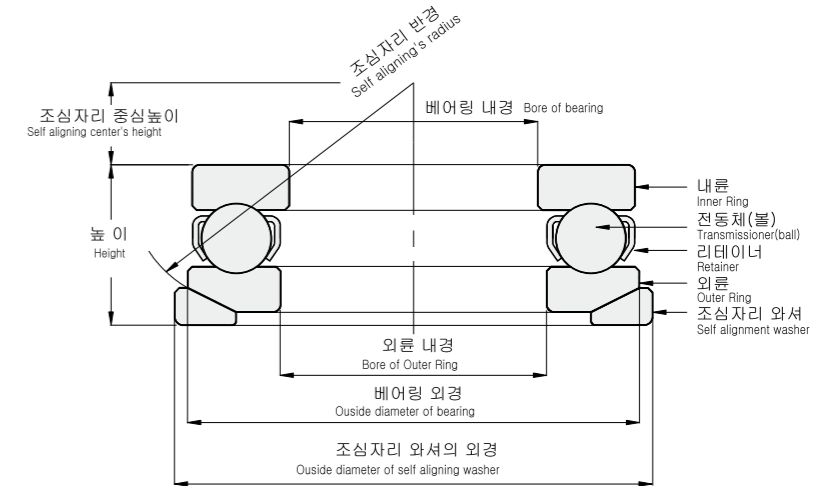


THRUST BALL BEARINGS

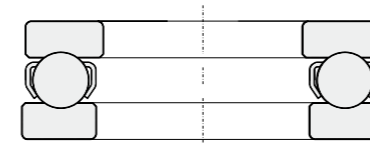
스러스트 볼 베어링의 특성 Thrust Ball Bearing's feature

스러스트 볼 베어링은 분리형 베어링으로서 고정륜, 회전륜, 전동체 및 리테이너(Retainer)로 구성되어 있다. 이 베어링은 축방향 하중만을 받을 수 있으며 주로 저속, 중속에서 사용된다. 경사에서는 상당히 민감하지만 축방향으로는 견고하게 지지할 수 있는 특징이 있다. 만일의 경우 일어날 수 있는 경사의 영향을 흡수 할 수 있도록 조심자리 와셔(Washer)를 사용하기도 한다. 한쪽 방향만의 축방향 하중을 받는 단식 스러스트 베어링과 양쪽 방향의 축방향 하중을 모두 받을 수 있는 복식 스러스트 베어링이 있다.

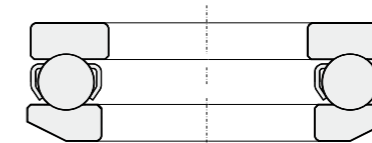
Thrust ball bearing is composed of inner ring, outer ring, transmissioner (ball) & retainer. Though it is sensitive in incline & no uses in radial loads, but it can sustain strongly in axial loads, and uses in low or medium speed. Thrust ball bearings are divided into single and double direction types. The former is able to accomodate axial load in one direction, while the latter is able to accomodate it in both directions. And it uses self aligning seat washer when the incline is extremed.



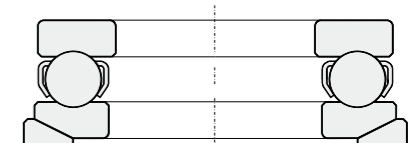
단식 스러스트 베어링 Thrust ball bearings single direction



511, 512, 513, 514
평면 자리형
single Direction (A)

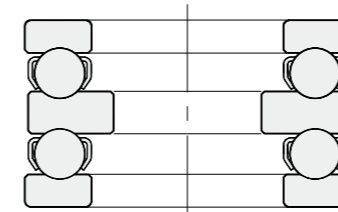


532, 533, 534
조심 자리형
Spherical Housing Washer (B)

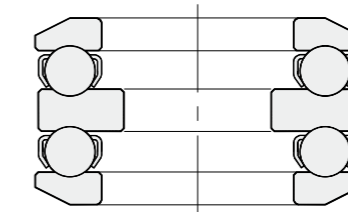


532, 533, 534
조심 자리 와셔형 U2,U3,U4
Spherical Housing Washer and Seating Ring (C)

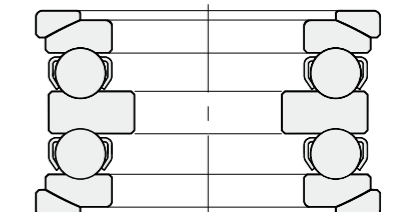
복식 스러스트 베어링 Thrust ball bearings double direction



522, 523, 524
평면 자리형
single Direction (A)



542, 543, 544
조심 자리형
Spherical Housing Washer (B)



542, 543, 544
조심 자리 와셔형 U2,U3,U4
Spherical Housing Washer and Seating Ring (C)

평면 자리형 스러스트 볼 베어링의 정밀도

Plane types thrust ball bearing's precision degree

내륜의 내경 또는 중앙륜 내경의 허용차 및 축방향 흔들림의 허용차
Inner ring or middle ring's bore dia's tolerance And shaft direction's vibration tolerance.

단위 : μm

Unit : 0.001mm

베어링 내경d 또는 중앙륜 내경d의 호칭 치수(mm) Bore dia of bearing(d) or middle ring's (d) (mm)	내륜의 내경 또는 중앙륜 내경 Inner ring or middle ring's bore		내륜 또는 중앙륜 및 외륜의 축방향 흔들림 At, Ae 허용차 (2) (최대) Inner ring or middle ring or outer ring's shaft direction's vibration At, Ae's tolerance(2)				
	dm 또는 dim의 허용차 dm or dim's tolerance (1)						
	0급, 6급, 5급 /degree	4 급 /degree	0급/degree	6급/degree	5급/degree	4급/degree	
초과 (Exceed) 이하(Below)	위 (max) 아래 (min)	위 (max) 아래 (min)	0급/degree	6급/degree	5급/degree	4급/degree	
-	18	0 - 8	0 - 7	10	5	3	2
18	30	0 - 10	0 - 8	10	5	3	2
30	50	0 - 12	0 - 10	10	6	3	2
50	80	0 - 15	0 - 12	10	7	4	3
80	120	0 - 20	0 - 15	15	8	4	3
120	180	0 - 25	0 - 18	15	9	5	4
180	250	0 - 30	0 - 22	20	10	5	4
250	315	0 - 35	0 - 25	25	13	7	5
315	400	0 - 40	0 - 30	30	15	7	5
400	500	0 - 45	0 - 35	30	18	9	6
500	630	0 - 50	0 - 40	35	21	11	7
630	800	0 - 75	0 - 50	40	25	13	8
800	1000	0 - 100	- -	45	30	15	-
1000	1250	0 - 125	- -	50	35	18	-

주 : 1) dm 및 dim은 각각 내륜 및 중앙륜 내경의 2점 측정에 의하여 얻어진 최대경과 최소경의 산술 평균치이다.

2) 축방향 흔들림 At 및 Ae의 허용차는 베어링 내경의 호칭치수의 구분에 따른다.

비고 : 이 표에 정한 내륜 내경 또는 중앙륜 내경의 위의 허용차는 궤도를 측면으로부터 호칭 모떼기 치수의 2배거리 이내에는 적용하지 않는다.

Remarks: 1) dm and dim are average diameter calculated from two points measurement of the minimum and maximum diameter.

2) Shaft direction's vibration At and Ae's allowance are apply to the bearing's bore diameter division.

Remark: Tolerance of bore dia of inner ring and middle ring in the table does not apply when the distance from the groove side is less than twice of the chamfer's

외륜 외경의 허용차 Tolerance of outer ring's outside diameter

단위 : μm
unit : 0.001mm

베어링 외경D의 호칭치수 Outside dia of bearing (D) (mm)		베어링 외경 Dm (1)의 허용차 Tolerance of outside diameter Dm(1)			
		0급, 6급, 5급 (degree)		4급 degree	
초과 exceed	이하 below	위 max	아래 min	위 max	아래 min
10	18	0	- 11	0	- 7
18	30	0	- 13	0	- 8
30	50	0	- 16	0	- 9
50	80	0	- 19	0	- 11
80	120	0	- 22	0	- 13
120	180	0	- 25	0	- 15
180	250	0	- 30	0	- 20
250	315	0	- 35	0	- 25
315	400	0	- 40	0	- 28
400	500	0	- 45	0	- 33
500	630	0	- 50	0	- 38
630	800	0	- 75	0	- 45
800	1000	0	- 100	0	-
1000	1250	0	- 125	0	-
1250	1600	0	- 160	0	-

주 : 1) Dm은 베어링 외경의 2점 측정에 의하여 얻어진 최대경과 최소경의 산술 평균치이다.

비고 : 이 표에 정한 베어링 외경의 아래 허용차는 궤도를 측면으로부터 호칭 모떼기 치수 2배거리 이내에는 적용하지 않는다.

Remarks: 1) Dm is an average diameter calculated from two point measurement of the maximum and minimum diameter.

Remark: Tolerance of outside diameter in the table does not apply when the distance from the groove side is less than twice of the chamfer.

평면 자리형 스러스트 볼 베어링의 높이 및 중앙륜 두께의 허용차

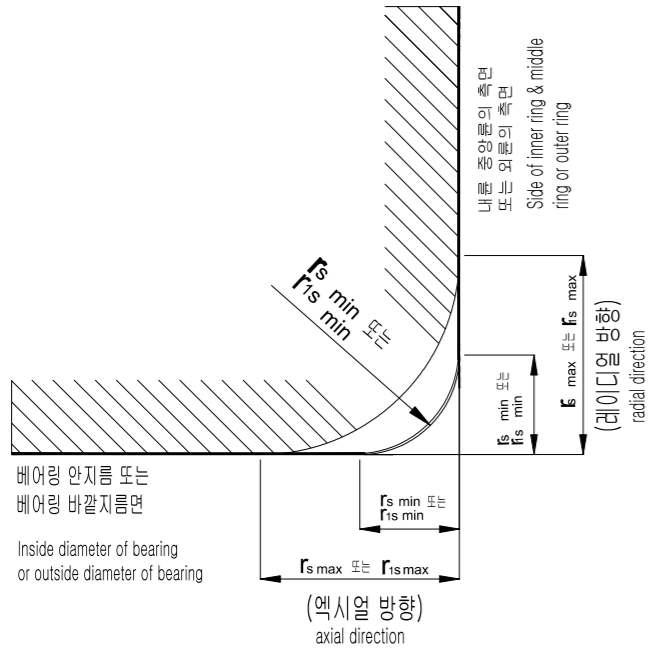
단위 : μm

Tolerance of height of the plane type thrust ball bearing and thickness of middle ring unit : 0.001mm

베어링 내경d의 호칭치수 bore dia of bearing d (mm)	단 식 single direction				복 식 double direction				
	H의 허용차 tolerance of H		H1의 허용차 tolerance of H1		중앙륜 두께a의 허용차 Tolerance of middle ring a's thickness		H의 허용차 tolerance of H		
초과 exceed	이하 below	위 max	아래 min	위 max	아래 min	위 max	아래 min	위 max	아래 min
-	30	0	- 75	0	- 75	0	- 50	+ 50	- 150
30	50	0	- 100	0	- 100	0	- 75	+ 75	- 200
50	80	0	- 125	0	- 125	0	- 100	+ 100	- 250
80	120	0	- 150	0	- 150	0	- 125	+ 125	- 300
120	180	0	- 175	0	- 175	0	- 150	+ 150	- 350
180	250	0	- 200	0	- 200	0	- 175	+ 175	- 400
250	315	0	- 250	0	- 225	0	- 200	+ 200	- 450
315	400	0	- 300	0	- 300	0	- 250	+ 250	- 600

◆ 모떼기 치수의 허용 한계치 Limit allowance of chamfering

단위: mm
(unit: mm)

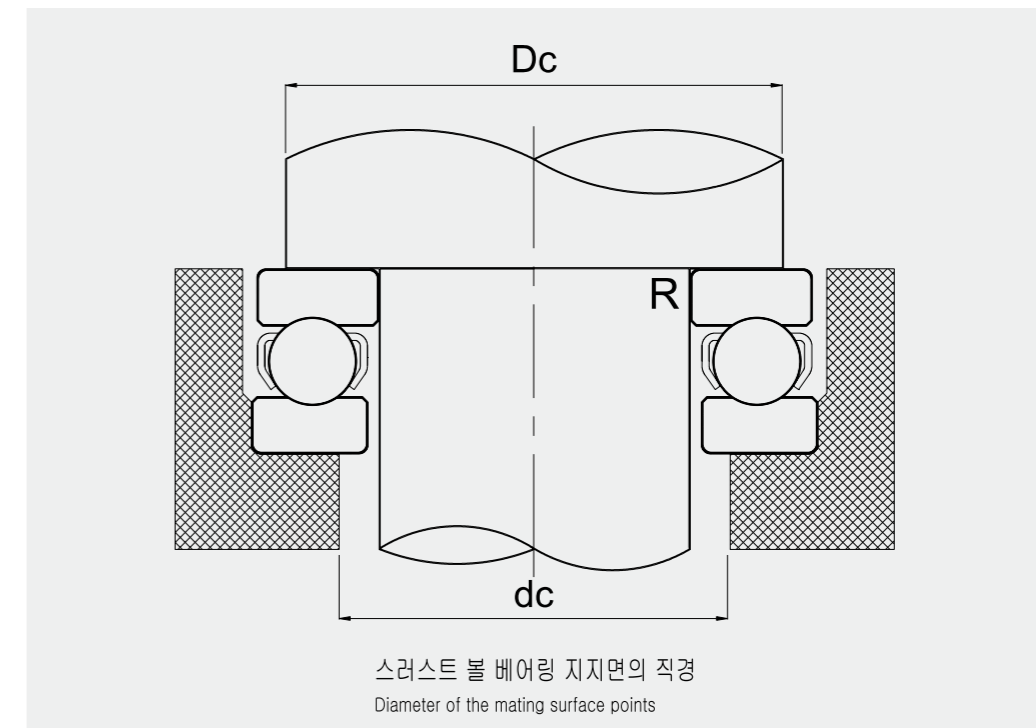


- r_s min** : 내륜 및 외륜의 최소 허용 모떼기 치수
Inner ring & outer ring's minimum chamfering
- r_s max** : 내륜 및 외륜의 최대 허용 모떼기 치수
Inner ring & outer ring's maximum chamfering
- r_{is} min** : 중앙륜의 최소 허용 모떼기 치수
Middle ring's minimum chamfering
- r_{is} max** : 중앙륜의 최대 허용 모떼기 치수
Middle ring's maximum chamfering

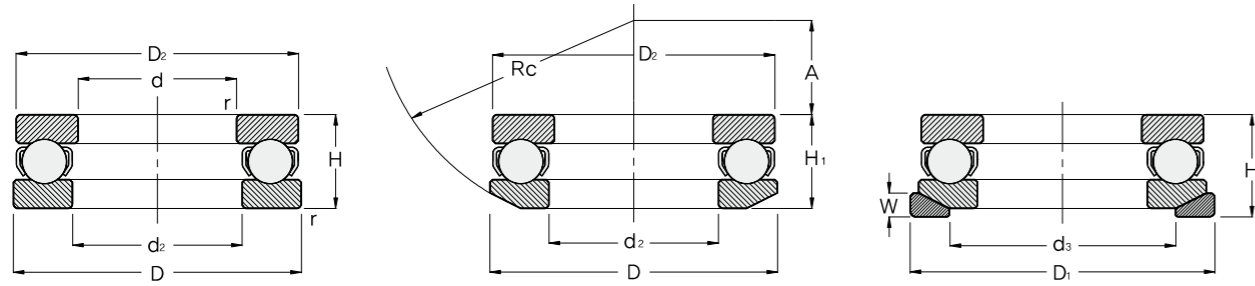
스러스트 볼 베어링의 하우징 및 어깨 가공 Thrust ball bearing's housing & mating surface point's treatment

- 스러스트 볼 베어링은 궤도륜의 지지면을 충분히 넓게 하여야 한다.
- 또한 지지면의 직각도 및 평면도를 좋게하여야 한다.
- 하우징의 어깨직경 d_c 는 볼의 피치 원경보다 큰 치수로 가공하여야만 한다.
- 어깨의 직경 d_c 및 D_c 는 베어링의 형식별로 개개의 베어링 치수표에 기재되어 있다.
- Thrust ball bearing should have to enough mating surface on the groove ring and sit on the right angled and a plane surface.
- Mating surface point of the housing (d_c) should have to bigger size than the diameter of the pitch of steel ball.
- Diameters of the mating surface points (d_c & D_c) are mentioned on the table of the each bearing's dimensions.

모떼기 치수의 호칭치수 r 또는 r ₁ Chamfering NO r, r ₁	r 또는 r ₁ 의 허용치 Allowance of r, r ₁			참고 Remark 축 또는 하우징 구석의 동글기의 반지름 R (최대) Shaft or a radius of roundness of corner of housing R (maximum)
	r min, r ₁ min	r max	r ₁ max	
0.2	0.1	0.2	-	0.1
0.3	0.15	0.3	-	0.15
0.4	0.2	0.5	-	0.2
0.5	0.3	0.8	0.8	0.3
0.8	0.5	-	1.2	0.5
1	0.6	1.5	1.5	0.6
1.2	0.8	-	1.7	0.8
1.5	1	2	2	1
2	1.5	2.5	2.5	1
2.5	2	3	3	1.5
3	2.5	3.5	3.5	2
3.5	2.5	4	4	2
4	3	4.5	4.5	2.5
5	4	6	6	3
6	5	7.5	7.5	4
8	6	9	9	5
10	7.5	12.5	-	6
12	9.5	15	-	8
15	12	18	-	10
18	15	21	-	12
22	19	25	-	15



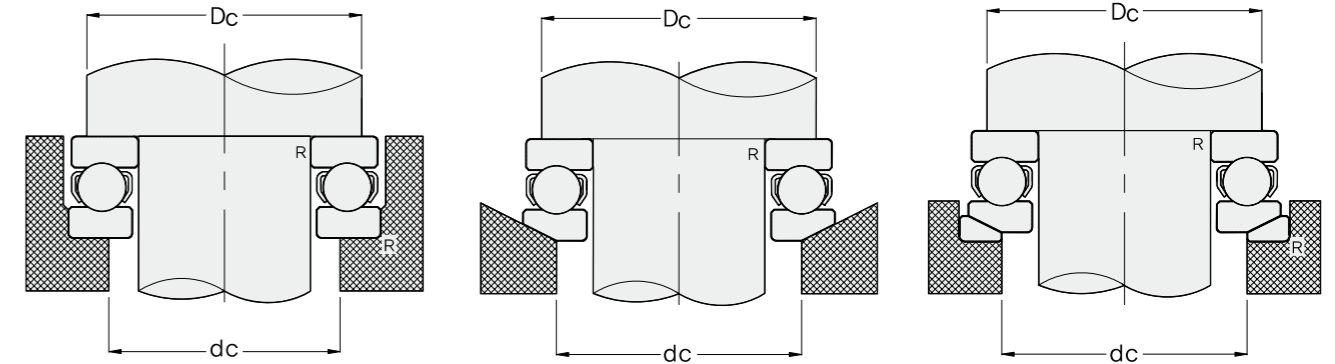
Single Direction



Single Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

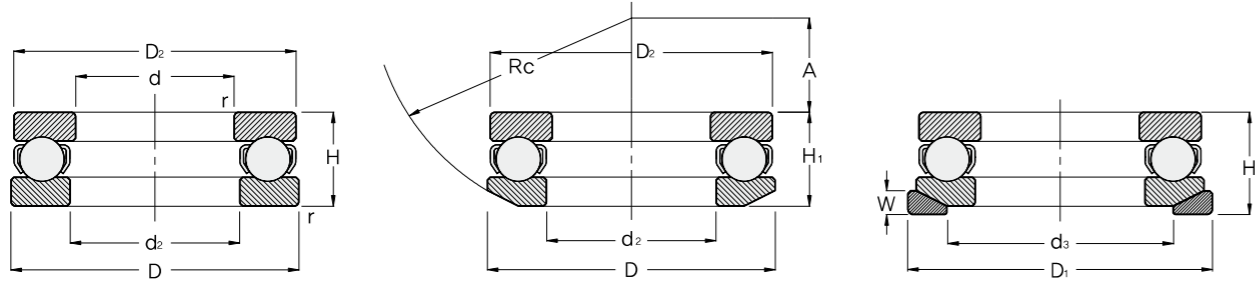
(B)

(C)

Dimensions(mm)						Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	D	H	H ₁	H ₂	r	(A)	(B)	(C)	C	Co	Grease	Oil
10	24 26	9 11	- 11.6	- 13	0.5 1	51100 51200	-	-	1,030 1,300	1,180 1,440	6,700 6,000	10,000 9,000
12	26 28	9 11	- 11.4	- 13	0.5 1	51101 51201	-	-	1,060 1,350	1,300 1,600	6,700 5,600	10,000 8,500
15	28 32	9 12	- 13.3	- 15	0.5 1	51102 51202	-	-	1,080 1,710	1,410 2,100	6,300 5,000	9,500 7,500
17	30 35	9 12	- 13.2	- 15	0.5 1	51103 51203	-	-	1,170 1,760	1,650 2,300	6,300 5,000	9,500 7,500
20	35 40	10 14	- 14.7	- 17	0.5 1	51104 51204	-	-	1,540 2,290	2,250 3,200	5,300 4,000	8,000 6,000
25	42 47 52 60	11 15 18 24	- 16.7 19.8 26.4	- 19 22 29	1 1 1.5 1.5	51105 51205 51305 51405	-	-	2,010 2,860 3,650 5,700	3,150 4,250 5,200 7,550	4,500 3,800 3,200 2,600	6,700 5,600 4,800 4,000
30	47 52 60 70	11 16 21 28	- 17.8 22.6 30.1	- 20 25 33	1 1 1.5 1.5	51106 51206 51306 51406	-	-	2,100 3,000 4,400 7,450	3,550 4,900 6,650 10,600	4,300 3,400 2,800 2,200	6,500 5,300 4,200 3,400
35	52 62 68 80	12 18 24 32	- 19.9 25.6 34	- 22 28 37	1 1.5 1.5 2	51107 51207 51307 51407	-	-	2,250 4,050 5,700 8,950	4,200 6,600 8,850 13,100	4,000 3,000 2,500 2,000	6,000 4,500 3,700 3,000
40	60 68 78 90	13 19 26 36	- 20.3 28.5 38.2	- 23 31 42	1 1.5 1.5 2	51108 51208 51308 51408	-	-	2,770 4,850 7,100 10,500	5,300 8,300 11,400 15,800	3,600 2,800 2,200 1,700	5,300 4,200 3,300 2,600
45	65 73 85 100	14 20 28 39	- 21.3 30.1 42.4	- 24 33 46	1 1.5 1.5 2	51109 51209 51309 51409	-	-	2,860 4,900 8,200 13,000	5,850 8,850 13,800 20,700	3,400 2,600 2,000 1,600	5,000 4,000 3,000 2,400
50	70 78 95 110	14 22 31 43	- 23.5 34.3 45.6	- 26 37 50	1 1.5 2 2.5	51110 51210 51310 51410	-	-	2,960 5,000 9,950 15,000	6,350 9,400 17,000 24,300	3,200 2,400 1,800 1,400	4,800 3,600 2,800 2,200

Dimensions(mm)							Abutment and fillet dimensions(mm)			Weight(kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	W	Rc	A	Dc(min)	dc(Max)	R (Max)	(A)	(B)	(C)	
24 26	11 12	- 18	- 28	- 3.5	- 22	- 8.5	18 20	16 16	0.3 0.6	0.020 0.030	- 0.029	- 0.039	51100 51200
26 28	13 14	- 20	- 30	- 3.5	- 25	- 11.5	20 22	18 18	0.3 0.6	0.022 0.034	- 0.031	- 0.042	51101 51201
28 32	16 17	- 24	- 35	- 4	- 28	- 12	23 25	20 22	0.3 0.6	0.024 0.046	- 0.048	- 0.064	51102 51202
30 35	18 19	- 26	- 38	- 4	- 32	- 16	25 28	22 24	0.3 0.6	0.028 0.053	- 0.055	- 0.074	51103 51203
35 40	21 22	- 30	- 42	- 5	- 36	- 18	29 32	26 28	0.3 0.6	0.040 0.082	- 0.080	- 0.105	51104 51204
42 47 52 60	26 27 27 27	- 36 38 43	- 50 55 62	- 5.5 6 8	- 40 45 50	- 19 21 19	35 38 41 46	32 34 36 39	0.6 0.6 1 1	0.059 0.120 0.180 0.340	- 0.120 0.180 0.350	- 0.160 0.220 0.410	51105 51205 51305 51405
47 52 60 70	32 32 32 32	- 42 45 50	- 55 62 75	- 5.5 7 9	- 45 50 56	- 22 22 20	40 43 48 54	37 39 42 46	0.6 0.6 1 1	0.068 0.150 0.270 0.530	- 0.160 0.270 0.530	- 0.215 0.325 0.660	51106 51206 51306 51406
52 62 68 80	37 37 37 37	- 48 52 58	- 65 72 85	- 7 7.5 10	- 50 56 64	- 24 24 23	45 51 55 62	42 46 48 53	0.6 1 1 1	0.085 0.220 0.390 0.790	- 0.220 0.400 0.790	- 0.290 0.480 0.960	51107 51207 51307 51407
60 68 78 90	42 42 42 42	- 55 60 65	- 72 82 95	- 7 8.5 12	- 56 64 72	- 28.5 28 26	52 57 63 70	48 51 55 60	0.6 1 1 1	0.120 0.270 0.550 1.150	- 0.270 0.570 1.100	- 0.355 0.690 1.400	51108 51208 51308 51408
65 73 85 100	47 47 47 47	- 60 65 72	- 78 90 105	- 7.5 10 12.5	- 56 64 80	- 26 25 29	57 62 69 78	53 56 61 67	0.6 1 1 1	0.150 0.320 0.690 1.450	- 0.310 0.680 1.500	- 0.410 0.830 1.800	51109 51209 51309 51409
70 78 95 110	52 52 52 52	- 62 72 80	- 82 100 115	- 7.5 11 14	- 64 72 90	- 32.5 28 35	62 67 77 86	58 61 68 74	0.6 1 1 1.5	0.160 0.390 1.000 2.000	- 0.380 1.000 1.950	- 0.500 1.250 2.400	51110 51210 51310 51410

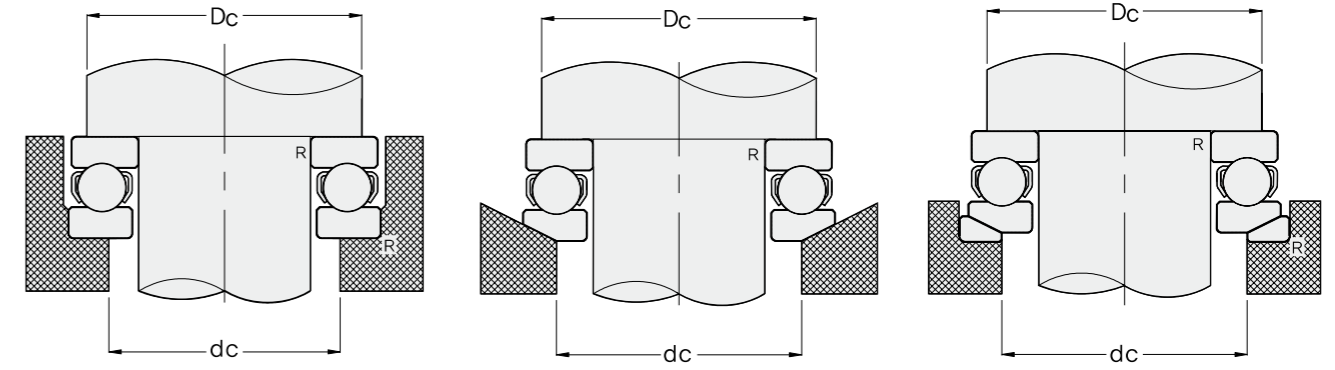
Single Direction



Single Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

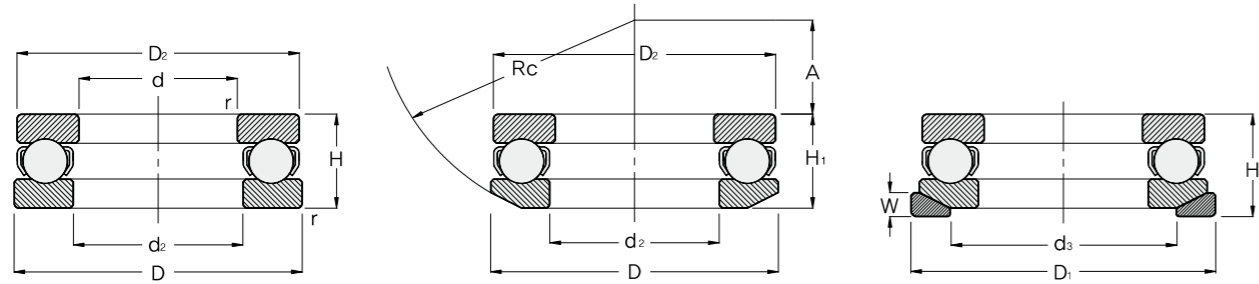
(B)

(C)

Dimensions(mm)						Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	D	H	H ₁	H ₂	r	(A)	(B)	(C)	C	Co	Grease	Oil
110	145	25	-	-	1.5	51122	-	-	8,950	23,500	1,600	2,400
	160	38	40.2	45	2	51222	53222	53222 U	13,900	33,500	1,200	1,900
	190	63	67.2	72	3	51322 X	53322 X	53322 XU	28,800	63,500	900	1,300
	230	95	99.7	109	4	51422 X	53422 X	53422 XU	42,000	97,500	630	950
120	155	25	-	-	1.5	51124	-	-	9,150	26,000	1,600	2,400
	170	39	40.8	46	2	51224	53224	53224 U	14,400	36,500	1,200	1,800
	210	70	74.1	80	3.5	51324 X	53324 X	53324 XU	33,500	78,500	800	1,200
	250	102	107.3	118	5	51424 X	53424 X	53424 XU	49,000	118,000	600	850
130	170	30	-	-	1.5	51126	-	-	10,700	28,600	1,400	2,000
	190	45	47.9	53	2.5	51226 X	53226 X	53226 XU	18,700	46,500	1,100	1,600
	225	75	80.3	86	3.5	51326 X	53326 X	53326 XU	35,500	86,500	750	1,100
	270	110	115.2	128	5	51426 X	53426 X	53426 XU	53,500	134,000	530	800
140	180	31	-	-	1.5	51128 X	-	-	11,000	31,000	1,300	2,000
	200	46	48.6	55	2.5	51228 X	53228 X	53228 XU	18,900	48,500	1,000	1,500
	240	80	84.9	92	3.5	51328 X	53328 X	53328 XU	37,500	95,000	670	1,000
	280	112	117	131	5	51428 X	53428 X	53428 XU	56,500	148,000	530	750
150	190	31	-	-	1.5	51130 X	-	-	11,200	33,000	1,300	1,900
	215	50	53.3	60	2.5	51230 X	53230 X	53230 XU	24,300	62,000	950	1,400
	250	80	83.7	92	3.5	51330 X	53330 X	53330 XU	39,000	101,000	670	1,000
	300	120	125.9	140	5	51430 X	53430 X	53430 XU	63,000	170,000	480	710
160	200	31	-	-	1.5	51132 X	-	-	11,500	35,000	1,200	1,900
	225	51	54.7	61	2.5	51232 X	53232 X	53232 XU	25,400	68,000	900	1,300
	270	87	91.7	100	4	51332 X	53332 X	53332 XU	48,500	124,000	600	900
	320	130	135.3	150	6	51432 X	53432 X	53432 XU	66,000	187,000	450	670
170	215	34	-	-	2	51134 X	-	-	13,800	42,000	1,100	1,700
	240	55	58.7	65	2.5	51234 X	53234 X	53234 XU	28,500	77,000	850	1,200
	280	87	91.3	100	4	51334 X	53334 X	53334 XU	47,500	133,000	600	900
	340	135	141	156	6	51434 X	53434 X	53434 XU	73,000	210,000	430	630
180	225	34	-	-	2	51136 X	-	-	13,800	44,500	1,100	1,700
	250	56	58.2	66	2.5	51236 X	53236 X	53236 XU	28,900	80,500	800	1,200
	300	95	99.3	109	4	51336 X	53336 X	53336 XU	49,000	142,000	560	800
	360	140	148.3	164	6	51436 X	53436 X	53436 XU	76,500	230,000	400	600
190	240	37	-	-	2	51138 X	-	-	17,500	52,500	1,000	1,500
	270	62	65.7	73	3	51238 X	53238 X	53238 XU	32,500	93,500	750	1,100
	320	105	111	121	5	51338 X	53338 X	53338 XU	56,000	165,000	500	750

Dimensions(mm)							Abutment and fillet dimensions(mm)			Weight(kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	W	Rc	A	Dc(min)	dc(Max)	R (Max)	(A)	(B)	(C)	
145	112	-	-	-	-	-	131	124	1	1.10	-	-	51122
160	113	135	165	14	125	65	140	130	1	2.50	2.40	3.00	51222
187	113	150	195	20.5	140	51	158	142	2	7.50	7.50	8.70	51322 X
225	113	170	240	29	180	59	181	159	2.5	20.00	20.00	24.00	51422 X
155	122	-	-	-	-	-	141	134	1	1.15	-	-	51124
170	123	145	175	15	125	61	150	140	1	2.85	2.80	3.55	51224
205	123	165	220	22	160	63	173	157	2	10.50	10.00	12.00	51324 X
245	123	185	260	32	200	70	196	174	3	25.50	25.00	30.00	51424 X
170	132	-	-	-	-	-	154	146	1	1.70	-	-	51126
187	133	160	195	17	140	67	166	154	1.5	4.20	4.10	5.00	51226 X
220	134	177	235	26	160	53	186	169	2	12.50	12.50	15.00	51326 X
265	134	200	280	38	200	58	212	188	3	32.00	31.00	37.50	51426 X
178	142	-	-	-	-	-	164	156	1	1.90	-	-	51128 X
197	143	170	210	17	160	87	176	164	1.5	4.55	4.45	5.65	51228 X
235	144	190	250	26	180	68	199	181	2	16.00	15.50	18.50	51328 X
275	144	206	290	38	225	83	222	198	3	34.50	33.50	40.50	51428 X
188	152	-	-	-	-	-	174	166	1	2.00	-	-	51130 X
212	153	180	225	20.5	160	79	189	176	1.5	5.75	5.60	7.25	51230 X
245	154	200	260	26	200	89.5	209	191	2	16.50	16.00	19.00	51330 X
295	154	225	310	41	225	69	238	212	3	42.50	40.50	48.50	51430 X
198	162	-	-	-	-	-	184	176	1	2.10	-	-	51132 X
222	163	190	235	21	160	74	199	186	1.5	6.25	5.80	8.60	51232 X
265	164	215	280	29	200	77	225	205	2.5	21.50	21.50	25.50	51332 X
315	164	240	330	41.5	250	84	254	226	4	52.00	51.00	60.50	51432 X
213	172	-	-	-	-	-	197	188	1	2.80	-	-	51134 X
237	173	200	250	21.5	180	91	212	198	1.5	7.75	7.40	9.50	51234 X
275	174	220	290	29	225	105	235	215	2.5	22.50	22.50	27.00	51334 X
335	174	255	350	46	250	74	270	240	4	61.00	59.00	70.00	51434 X
222	183	-	-	-	-	-	207	198	1	2.95	-	-	51136 X
247	183	210	260	21.5	200	112	222	208	1.5	8.30	7.70	10.00	51236 X
295	184	240	310	32	225	91	251	229	2.5	28.50	27.50	32.50	51336 X
355	184	270	370	46.5	280	97	286	254	4	70.50	70.00	82.50	51436 X
237	193	-	-	-	-	-	220	210	1	3.80	-	-	51138 X
267	194	230	280	23	200	98	238	222	2	12.00	11.50	14.00	51238 X
315	195	255	330	33	250	104	266	244	3	36.50	37.00	43.00	51338 X

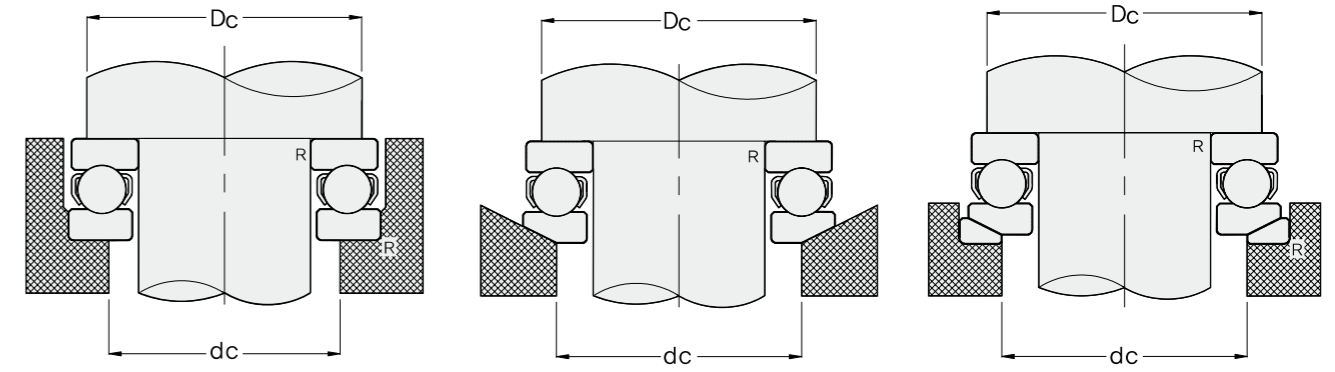
Single Direction



Single Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

(B)

(C)

Dimensions(mm)						Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	D	H	H ₁	H ₂	r	(A)	(B)	(C)	C	Co	Grease	Oil
200	250	37	-	-	2	51140 X	-	-	17,600	54,000	1,000	1,500
	280	62	65.3	74	3	51240 X	53240 X	53240 XU	32,500	93,500	710	1,100
	340	110	118.4	130	5	51340 X	53340 X	53340 XU	61,500	188,000	480	710
220	270	37	-	-	2	51144 X	-	-	18,200	58,500	950	1,400
	300	63	65.6	75	3	51244 X	53244 X	53244 XU	33,500	102,000	710	1,000
240	300	45	-	-	2.5	51148 X	-	-	23,400	77,500	800	1,200
	340	78	81.6	92	3.5	51248 X	53248 X	53248 XU	43,000	139,000	560	850
260	320	45	-	-	2.5	51152 X	-	-	23,800	84,000	800	1,200
	360	79	82.8	93	3.5	51252 X	53252 X	53252 XU	43,500	146,000	560	800
280	350	53	-	-	2.5	51156 X	-	-	32,000	111,000	710	1,000
	380	80	85	94	3.5	51256 X	53256 X	53256 XU	46,000	165,000	530	800
300	380	62	-	-	3	51160 X	-	-	36,500	132,000	600	900
	420	95	100.5	112	4	51260 X	53260 X	53260 XU	55,000	204,000	450	670
320	400	63	-	-	3	51164 X	-	-	37,500	140,000	600	900
	440	95	100.5	112	4	51264 X	53264 X	53264 XU	59,500	226,000	450	670
340	420	64	-	-	3	51168 X	-	-	38,500	148,000	560	850
	460	96	100.3	113	4	51268 X	53268 X	53268 XU	60,500	236,000	430	650
360	440	65	-	-	3	51172 X	-	-	39,000	157,000	560	800
	500	110	116.7	130	5	51272 X	53272 X	53272 XU	72,000	295,000	380	560
380	460	65	-	-	3	51176 X	-	-	43,800	228,400	500	670
400	480	65	-	-	3	51180 X	-	-	44,800	236,500	500	670
420	500	65	-	-	3	51184 X	-	-	44,800	249,800	480	630
440	540	80	-	-	3	51188 X	-	-	54,000	305,900	430	560
460	560	80	-	-	3	51192 X	-	-	54,000	316,100	430	560
480	580	80	-	-	3	51196 X	-	-	55,000	331,400	400	530
500	600	80	-	-	3	511/500	-	-	56,000	341,600	400	530
530	640	85	-	-	3	511/530	-	-	63,200	397,600	360	480
560	670	85	-	-	3	511/560	-	-	64,200	423,100	360	480

Dimensions(mm)							Abutment and fillet dimensions(mm)			Weight(Kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	W	Rc	A	Dc(min)	dc(max)	R(max)	(A)	(B)	(C)	
247	203	-	-	-	-	-	230	220	1	3.95	-	-	51140X
277	204	240	290	23	225	125	248	232	2	12.50	12.00	15.00	51240X
335	205	270	350	38	250	92	282	258	3	43.50	43.50	52.00	51340X
267	223	-	-	-	-	-	250	240	1	4.30	-	-	51144X
297	224	260	310	25	225	118	268	252	2	13.50	13.00	16.00	51244X
297	243	-	-	-	-	-	276	264	1.5	6.95	-	-	51148X
335	244	290	350	30	250	122	299	281	2	23.50	21.50	26.00	51248X
317	263	-	-	-	-	-	296	284	1.5	7.45	-	-	51152X
355	264	305	370	30	280	152	319	301	2	25.50	23.00	29.00	51252X
347	283	-	-	-	-	-	322	308	1.5	12.00	-	-	51156X
375	284	325	390	31	280	143	339	321	2	27.50	25.00	31.50	51256X
376	304	-	-	-	-	-	348	332	2	17.50	-	-	51160X
415	304	360	430	34	320	164	371	349	2.5	43.00	41.50	50.00	51260X
396	324	-	-	-	-	-	368	352	2	19.00	-	-	51164X
435	325	380	450	36	320	157	391	369	2.5	45.50	44.00	53.50	51264X
416	344	-	-	-	-	-	388	372	2	20.00	-	-	51168X
455	345	400	470	36	360	199	411	389	2.5	48.50	45.00	54.50	51268X
436	364	-	-	-	-	-	408	392	2	22.00	-	-	51172X
495	365	430	510	43	360	172	442	418	3	70.00	67.00	81.50	51272X
456	384	-	-	-	-	-	428	412	2	22.50	-	-	51176X
476	404	-	-	-	-	-	448	432	2	23.50	-	-	51180X
495	424	-	-	-	-	-	468	452	2	24.50	-	-	51184X
535	444	-	-	-	-	-	500	480	2.1	40.50	-	-	51188X
555	464	-	-	-	-	-	520	500	2.1	42.00	-	-	51192X
575	484	-	-	-	-	-	540	520	2.1	43.50	-	-	51196X
595	505	-	-	-	-	-	560	540	2.1	45.00	-	-	511/500
635	535	-	-	-	-	-	596	574	2.5	55.00	-	-	511/300
665	565	-	-	-	-	-	626	604	2.5	58.00	-	-	511/560

Single Direction



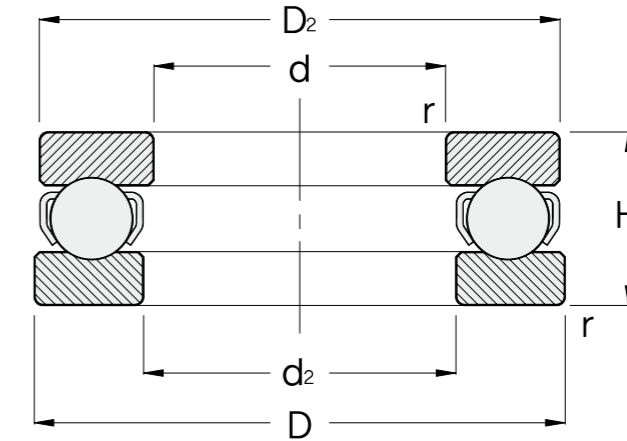
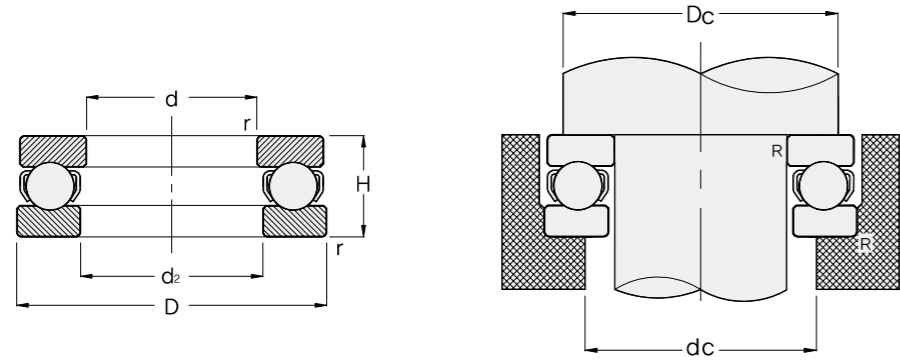
2900

Bearing No	Dimensions(mm)					Abutment and Fillet Dimensions (mm)			Load Rating(Kgf)	
	d	d ₂ (min)	D	H	r	Dc(min)	dc(max)	R(max)	C	Co
2900	10	11	26	12	1	19	17	0.6	995	1,390
2901	12	13	28	12	1	21	19	0.6	1,040	1,540
2902	15	16	31	12	1	24	22	0.6	1,120	1,850
2903	18	19	35	12	1	28	25	0.6	1,130	2,010
2904	20	21	37	12	1	30	27	0.6	1,160	2,160
2904 1/2	22	23	42	14	1	34	30	0.6	1,480	2,820
2905	25	26	45	14	1	37	33	0.6	1,510	3,000
2906	30	32	50	14	1	42	38	0.6	1,580	3,450
2907	35	37	55	16	1	47	43	0.6	2,340	5,050
2908	40	42	60	16	1	52	48	0.6	2,450	5,650
2909	45	47	68	16	1	59	54	0.6	2,540	6,300
2910	50	52	74	18	1	64	60	0.6	3,000	7,650
2911	55	57	78	18	1	69	64	0.6	3,150	8,400
2912	60	62	82	18	1	73	69	0.6	3,200	8,750
2913	65	67	90	20	1	80	75	0.6	3,250	9,550
2914	70	72	95	20	1	85	80	0.6	3,400	10,300
2915	75	77	100	20	1	90	85	0.6	3,500	11,100
2916	80	82	110	22	1	98	92	0.6	4,500	13,800
2917	85	87	115	22	1	103	97	0.6	4,650	14,900
2918	90	92	120	22	1	108	102	0.6	4,700	15,400
2919	95	97	130	25	1	116	109	0.6	5,900	19,100
2920	100	102	135	25	1	121	114	0.6	6,100	20,600
2922	110	112	145	25	1	131	124	0.6	6,850	23,400
2924	120	122	160	27	1	144	136	0.6	7,700	27,300

900

Bearing No	Dimensions(mm)					Abutment and Fillet Dimensions (mm)			Load Rating(Kgf)	
	d	d ₂ (min)	D	H	r	Dc(min)	dc(max)	R(max)	C	Co
900	10	11	25	12	1	19	16	0.6	995	1,390
902	15	16	35	14	1	27	23	0.6	1,510	2,300
904	20	22	40	14	1	32	28	0.6	1,750	3,050
905	25	27	48	15.5	1	39	34	0.6	2,150	4,100
906	30	32	53	15.5	1	44	39	0.6	2,280	4,700
907	35	37	62	18	1	51	46	0.6	3,050	6,350
908	40	42	64	18	1	55	49	0.6	2,840	6,500
909	45	47	73	22	1	62	56	0.6	3,900	9,050
910	50	52	78	22	1	67	61	0.6	4,450	10,500
911	55	57	88	24.5	1	75	68	0.6	5,450	12,900
912	60	62	90	24.5	1	78	72	0.6	4,700	12,400
913	65	67	100	27	1.5	86	79	1	5,500	15,300
914	70	72	103	27	1.5	90	83	1	5,800	16,100
915	75	77	110	27	1.5	96	89	1	6,050	16,900
916	80	82	115	29	1.5	101	94	1	6,800	19,100
917	85	88	125	30.5	1.5	109	101	1	8,700	23,900
918	90	93	135	30.5	1.5	117	108	1	10,200	29,000
920	100	103	150	32.5	1.5	130	120	1	12,100	34,500
922	110	113	160	40	2	140	130	1	14,000	40,500
924	120	123	170	43	2	150	140	1	14,200	42,500

Single Direction



3900

Bearing No	Dimensions(mm)					Abutment and Fillet Dimensions (mm)			Load Rating(Kgf)	
	d	d ₂ (min)	D	H	r	Dc(min)	dc(max)	R(max)	C	Co
3905	25	27	52	16	1.5	42	36	1	2,130	4,100
3906	30	32	60	19	1.5	48	42	1	2,970	5,900
3907	35	37	68	22	1.5	55	48	1	3,950	8,050
3908	40	42	76	25	1.5	62	54	1	4,800	9,700
3909	45	47	85	28	1.5	69	61	1	6,300	13,300
3910	50	52	92	31	1.5	75	67	1	7,600	16,400
3911	55	57	100	33	1.5	82	73	1	8,600	19,400
3912	60	62	106	35	2	88	78	1	9,300	21,300
3913	65	67	112	36	2	93	84	1	10,000	23,300
3914	70	72	120	38	2	100	90	1	11,200	27,200
3915	75	77	128	41	2	107	96	1	12,400	29,800
3916	80	83	136	44	2	114	102	1	14,300	34,500
3917	85	88	145	47	2	121	109	1	16,200	39,500
3918	90	93	155	50	2	129	116	1	18,200	45,000
3920	100	103	172	57	2	143	129	1	20,600	53,000

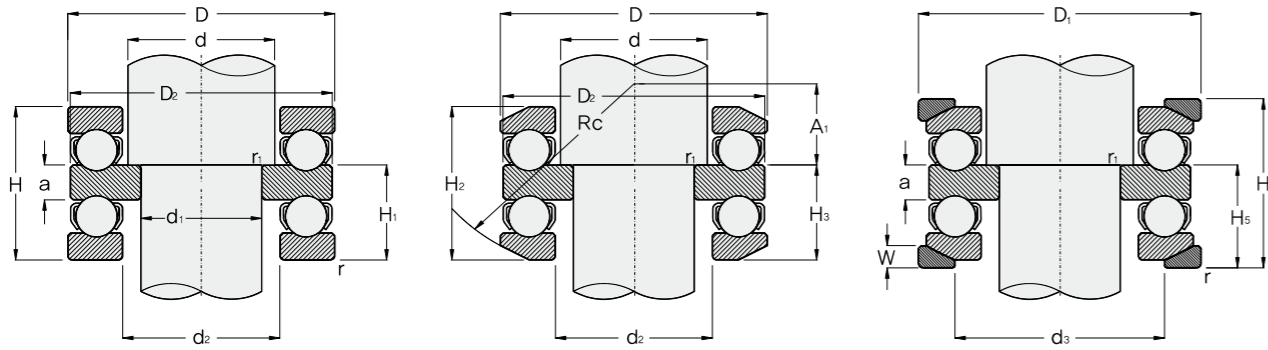
Series 0

Bearing No	Dimensions(mm)						Load Rating(Kgf)	
	d	d ₂	D ₂	D	H	r	C	Co
04	12,700	13,1	31,750	32,544	15,875	0,8	1,300	2,020
05	15,875	16,3	34,925	35,719	15,875	0,8	1,350	2,220
06	19,050	19,4	38,100	38,894	15,875	0,8	1,670	2,810
07	22,225	22,6	41,275	42,069	15,875	0,8	1,790	3,650
08	25,400	25,8	44,450	45,244	15,875	1,6	2,080	3,800
09	28,575	29,0	47,625	48,419	15,875	1,6	2,100	3,850
010	31,750	32,1	52,388	53,181	18,256	1,6	2,180	4,400
011	34,925	35,3	55,562	56,356	18,256	1,6	2,340	5,050
012	38,100	38,5	58,738	59,531	18,256	1,6	2,380	5,350
013	41,275	41,7	61,912	62,706	18,256	1,6	2,440	5,450
014	44,450	44,8	67,469	68,262	19,050	1,6	2,540	6,300
015	47,625	48,4	70,644	71,438	19,050	1,6	2,950	7,250
016	50,800	51,6	74,612	75,406	19,050	2,4	3,000	7,600
017	53,975	54,8	80,962	81,756	22,225	2,4	3,100	7,700
018	57,150	57,9	84,138	84,931	22,225	2,4	3,200	8,750
019	60,325	61,1	90,488	91,281	25,400	2,4	4,400	11,100
020	63,500	64,3	93,662	94,456	25,400	2,4	3,240	9,550
021	66,675	67,5	96,838	97,631	25,400	2,4	4,750	13,000
022	69,850	70,6	101,600	102,394	25,400	2,4	5,680	14,500
023	73,025	73,8	104,775	105,569	25,400	2,4	5,950	16,100
024	76,200	77,8	109,538	111,125	28,575	3,2	6,050	16,900
026	82,550	81,1	120,650	122,238	31,750	3,2	7,650	20,500
028	88,900	90,5	127,000	128,588	31,750	3,2	7,800	21,600
030	95,250	96,8	133,350	134,938	31,750	3,2	7,900	22,700
032	101,600	103,2	146,050	147,638	34,925	3,2	9,500	22,800
036	114,300	115,9	165,100	166,688	44,450	4,8	12,300	35,500

inch

Bearing No	Dimensions(mm)					Load Rating(Kgf)	
	d	d ₂ (min)	D	H	r	C	Co
1/2	12,700	13,5	28	12	1	980	1,370
5/8	15,875	16,5	32	12	1	1,060	1,670
3/4	19,050	20,0	35	12	1	1,150	1,780
7/8	22,225	23,0	42	14	1	1,430	2,750
1	25,400	26,5	45	14	1	1,470	2,930
1 1/4	31,750	32,5	53	16	1	2,300	5,000
1 1/2	38,100	40,0	60	16	1	2,450	5,400
2	50,800	52,0	74	18	1	2,850	7,500

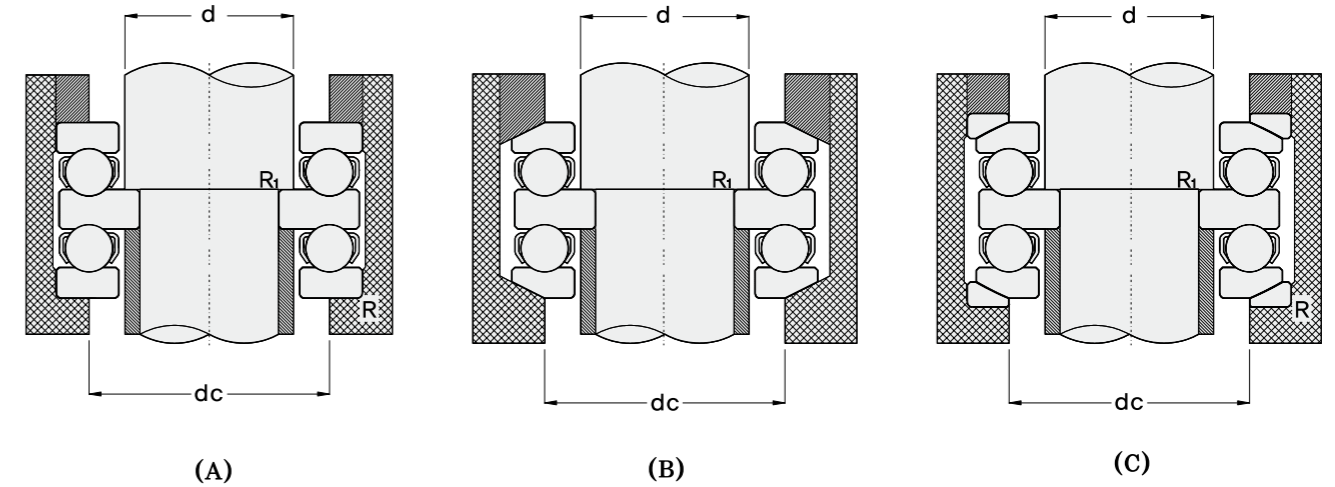
Double Direction



Double Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

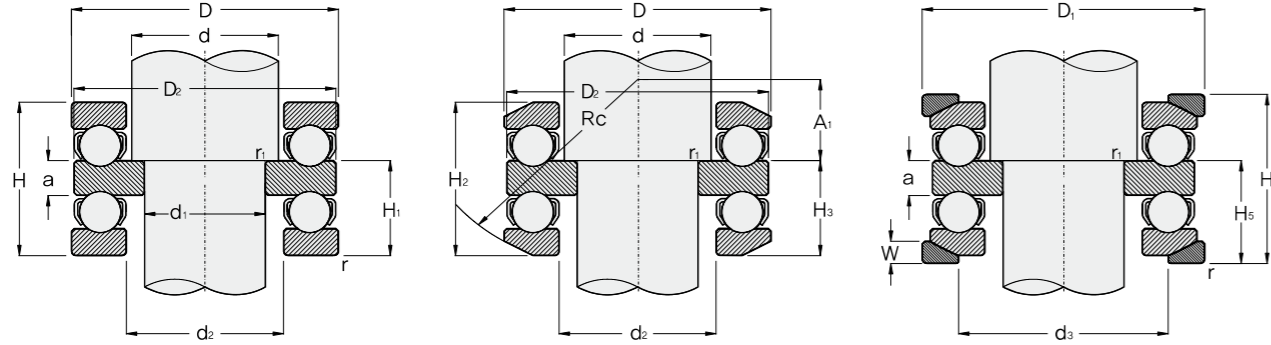
(B)

(C)

Dimensions(mm)								Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	d ₁	D	H	H ₂	H ₄	r	r ₁	(A)	(B)	(C)	C	Co	Grease	Oil
15	10	32	22	24.6	28	1	0.5	52202	54202	54202 U	1,710	2,100	5,000	7,500
20	15	40	26	27.4	32	1	0.5	52204	54204	54204 U	2,290	3,200	4,000	6,000
25	20	47	28	31.4	36	1	0.5	52205	54205	54205 U	2,860	4,250	3,800	5,600
	25	52	34	37.6	42	1.5	0.5	52305	54305	54305 U	3,650	5,200	3,200	4,800
	60	45	49.8	55	55	1.5	1	52405	54405	54405 U	5,700	7,550	2,600	4,000
30	25	52	29	32.6	37	1	0.5	52206	54206	54206 U	3,000	4,900	3,400	5,300
	25	60	38	41.2	46	1.5	0.5	52306	54306	54306 U	4,400	6,650	2,800	4,200
	20	70	52	56.2	62	1.5	1	52406	54406	54406 U	7,450	10,600	2,200	3,400
35	30	62	34	37.8	42	1.5	0.5	52207	54207	54207 U	4,050	6,600	3,000	4,500
	30	68	44	47.2	52	1.5	0.5	52307	54307	54307 U	5,700	8,850	2,500	3,700
	25	80	59	63	69	2	1	52407	54407	54407 U	8,950	13,100	2,000	3,000
40	30	68	36	38.6	44	1.5	1	52208	54208	54208 U	4,850	8,300	2,800	4,200
	30	78	49	54	59	1.5	1	52308	54308	54308 U	7,100	11,400	2,200	3,300
	30	90	65	69.4	77	2	1	52408	54408	54408 U	10,500	15,800	1,700	2,600
45	35	73	37	39.6	45	1.5	1	52209	54209	54209 U	4,900	8,850	2,600	4,000
	35	85	52	56.2	62	1.5	1	52309	54309	54309 U	8,200	13,800	2,000	3,000
	35	100	72	78.8	86	2	1	52409	54409	54409 U	13,000	20,700	1,600	2,400
50	40	78	39	42	47	1.5	1	52210	54210	54210 U	5,000	9,400	2,400	3,600
	40	95	58	64.6	70	2	1	52310	54310	54310 U	9,950	17,000	1,800	2,800
	40	110	78	83.2	92	2.5	1	52410	54410	54410 U	15,000	24,300	1,400	2,200
55	45	90	45	49.6	55	1.5	1	52211	54211	54211 U	7,150	13,400	2,100	3,200
	45	105	64	72.6	78	2	1	52311	54311	54311 U	11,800	20,600	1,600	2,400
	45	120	87	92	101	2.5	1	52411	54411	54411 U	18,500	29,500	1,300	1,900
60	50	95	46	50	56	1.5	1	52212	54212	54212 U	7,300	14,200	2,000	3,000
	50	110	64	70.6	78	2	1	52312	54312	54312 U	12,100	22,200	1,600	2,400
	50	130	93	99	107	2.5	1	52412	54412	54412 U	20,600	33,500	1,200	1,800
65	55	100	47	50.4	57	1.5	1	52213	54213	54213 U	7,700	15,900	1,900	2,800
	55	115	65	71.8	79	2	1	52313	54313	54313 U	12,500	23,800	1,600	2,300
	50	140	101	109.4	119	3	1.5	52413	54413	54413 U	23,800	41,500	1,100	1,600
70	55	105	47	50.6	57	1.5	1.5	52214	54214	54214 U	7,550	15,900	1,900	2,800
	55	125	72	80.4	88	2	1.5	52314	54314	54314 U	14,000	26,400	1,400	2,000
	55	150	107	114.2	125	3	1.5	52414	54414	54414 U	25,700	46,500	1,000	1,500

Dimensions(mm)											Abutment and fillet dimensions(mm)			Weight(kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	H ₁	H ₃	H ₅	a	W	A ₁	R _c	dc (min)	R (max)	R ₁ (max)	(A)	(B)	(C)	
32	17	24	35	13.5	14.8	16.5	5	4	10.5	28	24	0.6	0.3	0.085	0.09	0.12	52202
40	22	30	42	16	16.7	19	6	5	16	36	30	0.6	0.3	0.15	0.15	0.20	52204
47	27	36	50	17.5	19.2	21.5	7	5.5	16.5	40	36	0.6	0.3	0.23	0.24	0.32	52205
52	27	38	55	21	22.8	25	8	6	18	45	38	1	0.3	0.33	0.34	0.43	52305
60	27	42	62	28	30.4	33	11	8	15	50	42	1	0.6	0.63	0.66	0.80	52405
52	32	42	55	18	19.8	22	7	5.5	20	45	42	0.6	0.3	0.28	0.29	0.40	52206
60	32	45	62	23.5	25.1	27.5	9	7	19.5	50	45	1	0.3	0.49	0.49	0.60	52306
70	32	50	75	32	34.1	37	12	9	16	56	50	1	0.6	1.00	0.99	1.25	52406
62	37	48	65	21	22.9	25	8	7	21	50	48	1	0.3	0.42	0.43	0.51	52207
68	37	52	72	27	28.6	31	10	7.5	21	56	52	1	0.3	0.71	0.73	0.90	52307
80	37	58	85	36.5	38.5	41.5	14	10	18.5	64	58	1	0.6	1.45	1.45	1.80	52407
68	42	55	72	22.5	23.8	26.5	9	7	25	56	55	1	0.6	0.54	0.54	0.71	52208
78	42	60	82	30.5	33	35.5	12	8.5	23.5	64	60	1	0.6	1.05	1.10	1.35	52308
90	42	65	95	40	42.2	46	15	12	22	72	65	1	0.6	2.05	2.05	2.55	52408
73	47	60	78	23	24.3	27	9	7.5	23	56	60	1	0.6	0.62	0.61	0.81	52209
85	47	65	90	32	34.1	37	12	10	21	64	65	1	0.6	1.30	1.30	1.60	52309
100	47	72	105	44.5	47.9	51.5	17	12.5	23.5	80	72	1	0.6	2.70	2.80	3.40	52409
78	52	62	82	24	25.5	28	9	7.5	30.5	64	62	1	0.6	0.71	0.69	0.93	52210
95	52	72	100	36	39.3	42	14	11	23	72	72	1	0.6	1.85	1.90	2.35	52310
110	52	80	115	48	50.6	55	18	14	30	90	80	1.5	0.6	3.55	3.80	4.40	52410
90	57	72	95	27.5	29.8	32.5	10	9	32.5	72	72	1	0.6	1.10	1.15	1.50	52211
105	57	80	110	39.5	43.8	46.5	15	11.5	25.5	80	80	1	0.6	2.50	2.65	3.20	52311
120	57	88	125	53.5	56	60.5	20	15.5	22.5	90	88	1.5	0.6	4.70	4.55	5.60	52411
95	62	78	100	28	30	33	10	9	30.5	72	78	1	0.6	1.25	1.25	1.65	52212
110	62	85	115	39.5	42.8	46.5	15	11.5	36.5	90	85	1	0.6	2.70	2.75	3.35	52312
130	62	95	135	57	60	64	21	16	28	100	95	1.5	0.6	6.00	5.80	7.20	52412
110	67	82	105	28.5	30.2	33.5	10	9	38.5	80	82	1	0.6	1.35	1.35	1.75	52213
115	67	90	120	40	43.4	47	15	12.5	34.5	90	90	1	0.6	2.90	3.00	3.65	52313
140	68	100	145	62	66.2	71	23	17.5	34	112	100	2	1	7.50	7.50	9.15	52413
105	72	88	110	28.5	30.3	33.5	10	9	36.5	80	88	1	1	1.50	1.45	1.90	52214
125	72	98	130	44	48.2	52	16	13	39	100	98	1	1	3.90	4.00	4.80	52314
150	73	110	155	65.5	69.1	74.5	24	19.5	28.5	112	110	2	1	9.00	8.85	11.0	52414

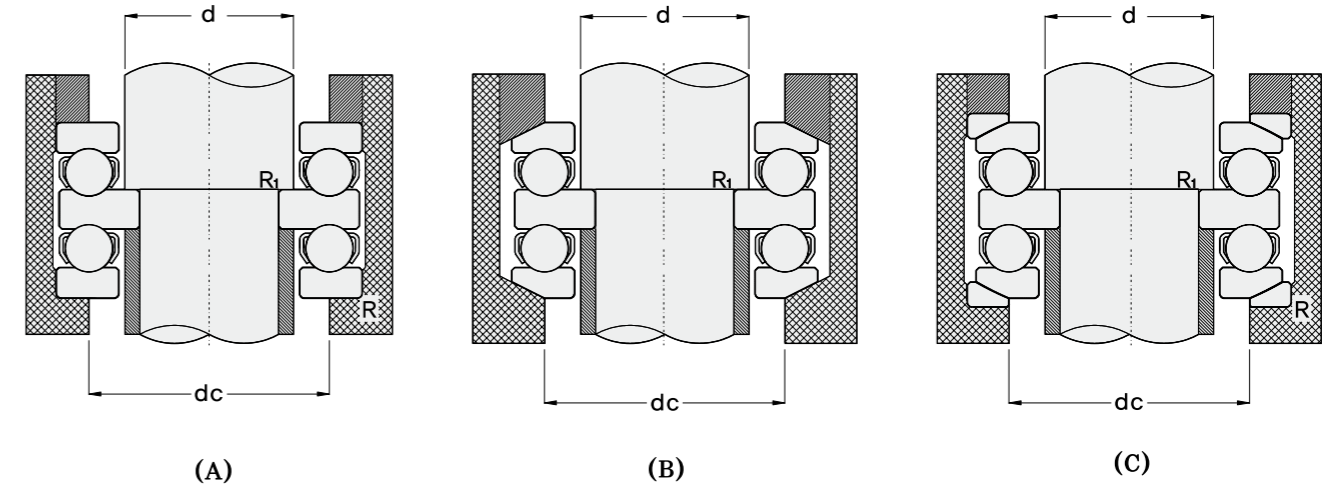
Double Direction



Double Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

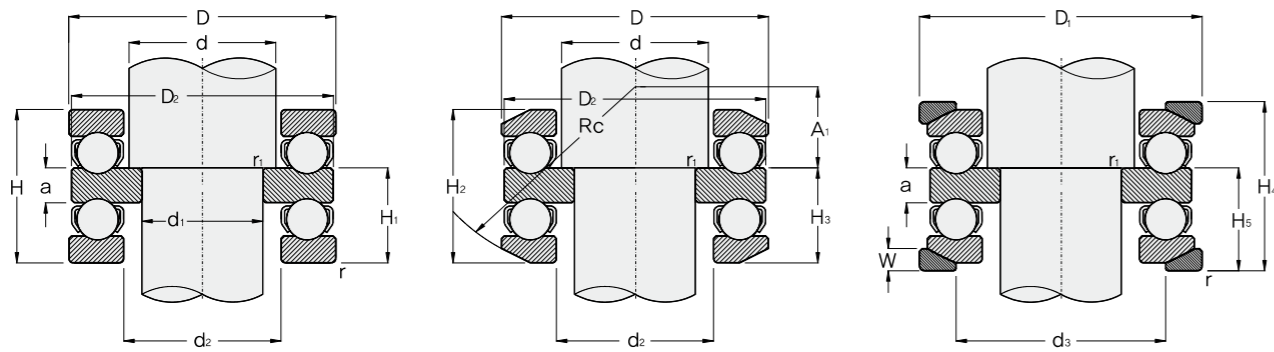
(B)

(C)

Dimensions(mm)								Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	d ₁	D	H	H ₂	H ₄	r	r ₁	(A)	(B)	(C)	C	Co	Grease	Oil
75	60	110	47	49.6	57	1.5	1.5	52215	54215	54215 U	7,950	17,600	1,800	2,700
	60	135	79	87.2	95	2.5	1.5	52315	54315	54315 U	16,200	31,000	1,300	1,900
	60	160	115	123	135	3	1.5	52415	54415	54415 U	25,900	47,500	950	1,400
80	65	115	48	51	58	1.5	1.5	52216	54216	54216 U	8,050	18,400	1,700	2,600
	65	140	79	86.2	95	2.5	1.5	52316	54316	54316 U	16,700	33,000	1,200	1,800
	65	170	120	128.4	140	3.5	1.5	52416	54416	54416 U	27,800	52,500	900	1,400
85	70	125	55	59.2	67	1.5	1.5	52217	54217	54217 U	9,800	22,300	1,600	2,400
	70	150	87	95.2	105	2.5	1.5	52317	54317	54317 U	21,100	41,000	1,100	1,700
	65	180	128	138	150	3.5	2	52417 X	54417 X	54417 XU	31,500	63,500	850	1,300
90	75	135	62	69	76	2	1.5	52218	54218	54218 U	11,600	26,200	1,400	2,200
	75	155	88	97.2	106	2.5	1.5	52318	54318	54318 U	21,900	44,000	1,100	1,600
	70	190	135	143.4	157	3.5	2	52418 X	54418 X	54418 XU	33,500	69,500	800	1,200
100	85	150	67	72.8	81	2	1.5	52220	54220	54220 U	13,700	31,500	1,300	1,900
	85	170	97	105.4	115	2.5	1.5	52320	54320	54320 U	24,300	50,500	1,000	1,500
	80	210	150	160	176	4	2	52420 X	54420 X	54420 XU	38,000	83,000	710	1,100
110	95	160	67	71.4	81	2	1.5	52222	54222	54222 U	13,900	33,500	1,200	1,900
	95	190	110	118.4	128	3	1.5	52322	54322 X	54322 XU	28,800	63,500	900	1,300
	90	230	166	-	-	4	2	52422 X	-	-	42,000	97,500	630	950
120	100	170	68	71.6	82	2	2	52224	54224	54224 U	14,400	36,500	1,200	1,800
	100	210	123	131.2	143	3.5	2	52324 X	54324 X	54324 XU	33,500	78,500	800	1,200
	95	250	177	-	-	5	2.5	52424 X	-	-	52,500	130,000	600	850
130	110	190	80	85.8	96	2.5	2	52226 X	54226 X	54226 XU	18,700	46,500	1,100	1,600
	110	225	130	-	-	3.5	2	52326 X	-	-	35,500	86,500	750	1,100
	100	270	192	-	-	5	3	52426 X	-	-	53,500	134,000	530	800
140	120	200	81	86.2	99	2.5	2	52228 X	54228 X	54228 XU	18,900	48,500	1,000	1,500
	120	240	140	-	-	3.5	2	52328 X	-	-	37,500	95,000	670	1,000
	110	280	196	-	-	5	3	52428 X	-	-	56,500	148,000	530	750
150	130	215	89	95.6	109	2.5	2	52230 X	54230 X	54230 XU	24,300	62,000	950	1,400
	130	250	140	-	-	3.5	2	52330 X	-	-	39,000	101,000	670	1,000
	120	300	209	-	-	5	3	52430 X	-	-	63,000	170,000	480	710
160	140	225	90	97.4	110	2.5	2	52232 X	54232 X	54232 XU	25,400	68,000	900	1,300
	140	270	153	-	-	4	2	52332 X	-	-	48,500	133,000	600	900
	130	320	226	-	-	6	3	52432 X	-	-	66,000	187,000	450	670

Dimensions(mm)													Abutment and fillet dimensions(mm)			Weight(kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	H ₁	H ₃	H ₅	a	W	A ₁	Rc	dc (min)	R (max)	R ₁ (max)	(A)	(B)	(C)			
110	77	92	115	28.5	29.8	33.5	10	9.5	47.5	90	92	1	1	1.55	1.55	2.05	52215		
135	77	105	140	48.5	52.6	56.5	18	15	32.5	100	105	1.5	1	4.85	5.00	6.10	52315		
160	78	115	165	70.5	74.5	80.5	26	21	36.5	125	115	2	1	11.0	11.0	13.5	52415		
115	82	98	120	29	30.5	34	10	10	45	90	98	1	1	1.70	1.65	2.15	52216		
140	82	110	145	48.5	52.1	56.5	18	15	45.5	112	110	1.5	1	5.05	5.20	6.40	52316		
170	83	125	175	73.5	77.7	83.5	27	22	30.5	125	125	2	1	13.0	13.5	16.0	52416		
125	88	105	130	33.5	35.6	39.5	12	11	49.5	100	105	1	1	2.35	2.30	3.00	52217		
150	88	115	155	53	57.1	62	19	17.5	39	112	115	1.5	1	6.45	6.40	8.05	52317		
179.5	88	130	185	78.5	83.5	89.5	29	23	40.5	140	130	2	1	16.6	16.0	19.0	52417 X		
135	93	110	140	38	41.5	45	14	13.5	42	100	110	1	1	3.20	3.25	4.20	52218		
155	93	120	160	53.5	58.1	62.5	19	18	36.5	112	120	1.5	1	6.60	6.75	8.45	52318		
189.5	93	140	195	82.5	86.7	93.5	30	25.5	34.5	140	140	2	1	18.2	18.5	22.5	52418 X		
150	103	125	155	41	43.9	48	15	14	49	112	125	1	1	4.30	4.25	5.4	52220		
170	103	135	175	59	63.2	68	21	18	42	125	135	1.5	1	8.90	8.95	10.5	52320		
209.5	103	155	220	91.5	96.5	104.5	33	27	43.5	160	155	2.5	1	26.5	29.0	32.0	52420 X		
160	113	135	165	41	43.2	48	15	14	62	125	135	1	1	4.50	4.25	5.35	52222		
189.5	113	150	195	67	71.2	76	24	20.5	47	140	150	2	1	13.0	13.5	16.0	52322 X		
229	113	-	-	101.5	-	-	37	-	-	-	159	2.5	1	35.0	-	-	52422 X		
170	123	145	175	41.5	43.3	48.5	15	15	58.5	125	145	1	1	5.25	5.15	6.45	52224		
209.5	123	165	220	75	79.1	85	27	22	58	160	165	2	1	16.5	19.0	23.0	52324 X		
249	123	-	-	108.5	-	-	40	-	-	-	174	3	1.5	44.5	-	-	52424 X		
189.5	133	160	195	49	51.9	57	18	17	63	140	160	1.5	1	7.75	7.50	9.30	52226 X		
224	134	-	-	80	-	-	30	-	-	-	169	2	1	21.5	-	-	52326 X		
269	134	-	-	117	-	-	42	-	-	-	188	3	2	56.5	-	-	52426 X		
199.5	143	170	210	49.5	52.1	58.5	18	17	83.5	160	170	1.5	1	8.35	8.10	10.5	52228 X		
239	144	-	-	85.5	-	-	31	-	-	-	181	2	1	28.0	-	-	52328 X		
279	144	-	-	120	-	-	44	-	-	-	198	3	2	61.0	-	-	52428 X		
214.5	153	180	225	54.5	57.8	64.5	20	20.5	74.5	160	180	1.5	1	10.5	10.0	13.5	52230 X		
249	154	-	-	85.5	-	-	31	-	-	-	191	2	1	29.0	-	-	52330 X		
299	154	-	-	127.5	-	-	46	-	-	-	212	3	2	74.0	-	-	52430 X		
224.5	163	190	235	55	58.7	65	20	21	70	160	190	1.5	1	11.0	10.5	14.0	52232 X		
269	164	-	-	93	-	-	33	-	-	-	205	2.5	1	38.0	-	-	52332 X		
319	164	-	-	138	-	-	50	-	-	-	226	4	2	90.5	-	-	52432 X		

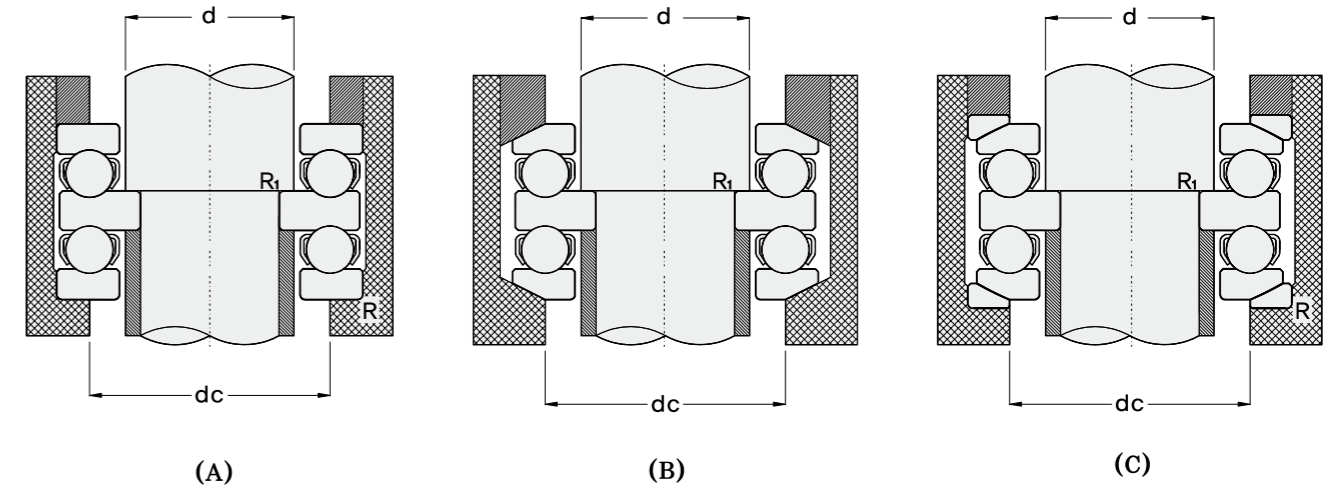
Double Direction



Double Direction(A)

Spherical Housing Washer(B)

Spherical Housing Washer and Seating Ring(C)



(A)

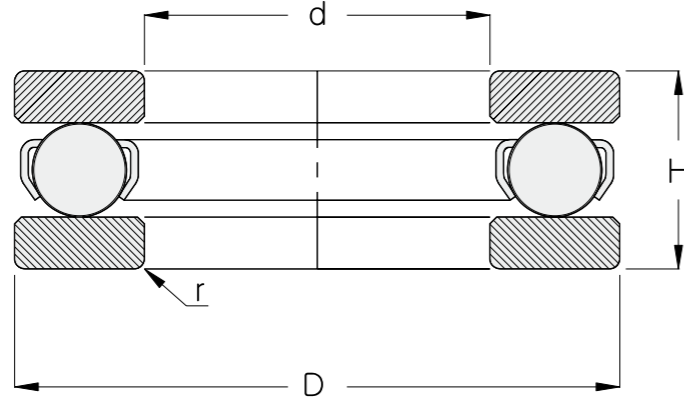
(B)

(C)

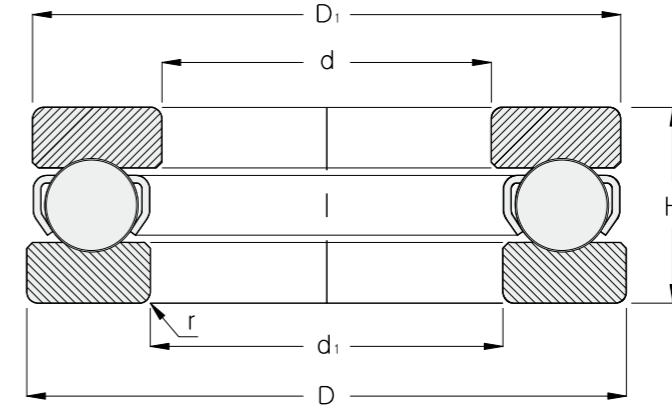
Dimensions(mm)								Bearing Series			Load Rating(Kgf)		Limiting Speed(rpm)	
d	d ₁	D	H	H ₂	H ₄	r	r ₁	(A)	(B)	(C)	C	Co	Grease	Oil
170	150	240	97	104.4	117	2.5	2	52234 X	54234 X	54234 XU	28,500	77,000	850	1,200
	150	280	153	-	-	4	2	52334 X	-	-	47,500	133,000	600	900
	135	340	236	-	-	6	3.5	52434 X	-	-	73,000	210,000	430	630
180	150	250	98	102.4	118	2.5	3	52236 X	54236 X	54236 XU	28,900	80,500	800	1,200
	150	300	165	-	-	4	3	52336 X	-	-	49,000	142,000	560	800
	140	360	245	-	-	6	4	52436 X	-	-	76,500	230,000	400	600
190	160	270	109	116.4	131	3	3	52238 X	54238 X	54238 XU	32,500	93,500	750	1,100
	160	320	183	-	-	5	3	52338 X	-	-	56,000	165,000	500	750
200	170	280	109	115.6	133	3	3	52240 X	54240 X	54240 XU	32,500	93,500	710	1,100
	170	340	192	-	-	5	3	52340 X	-	-	61,500	188,000	480	710
220	190	300	110	115.2	134	3	3	52244 X	54244 X	54244 XU	33,500	102,000	710	1,000

Dimensions(mm)											Abutment and fillet dimensions(mm)			Weight(kg)			Bearing No
D ₂	d ₂	d ₃	D ₁	H ₁	H ₃	H ₅	a	W	A ₁	Rc	d _c (min)	R (max)	R ₁ (max)	(A)	(B)	(C)	
239.5	173	200	250	59	62.7	69	21	21.5	87	180	200	1.5	1	14.0	12.5	16.5	52234X
279	174	-	-	93	-	-	33	-	-	-	215	2.5	1	39.5	-	-	52334X
339	174	-	-	143	-	-	50	-	-	-	240	4	2	108	-	-	52434X
249	183	210	260	59.5	61.7	69.5	21	21.5	108.5	200	210	1.5	2	15.0	16.0	19.5	52236X
299	184	-	-	101	-	-	37	-	-	-	229	2.5	2	50.5	-	-	52336X
359	184	-	-	148.5	-	-	52	-	-	-	254	4	2.5	126	-	-	52436X
269	194	230	280	66.5	70.2	77.5	24	23	93.5	200	230	2	2	21.5	20.0	25.5	52238X
319	195	-	-	111.5	-	-	40	-	-	-	244	3	2	65.5	-	-	52338X
279	204	240	290	66.5	69.8	78.5	24	23	120.5	225	240	2	2	23.0	21.0	27.5	52240X
339	205	-	-	117	-	-	42	-	-	-	258	3	2	77.5	-	-	52340X
299	224	260	310	67	69.6	79	24	25	114	225	260	2	2	24.0	23.0	29.5	52244X

SST-Type

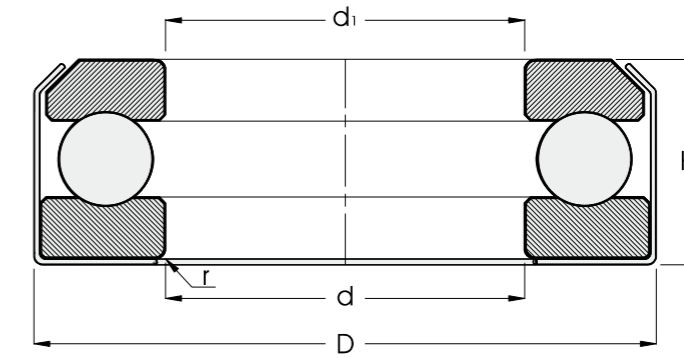
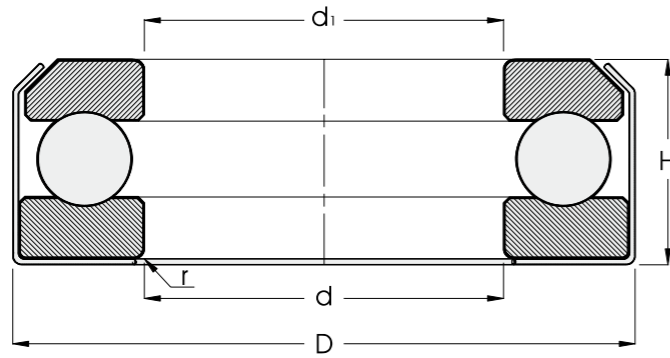


SST-DSG Type



Bearing No	Dimensions(mm)				Ball		Load rating(kgf)		Note
	D	d	H	r	Size	Q'ty	C	Co	
SST-620	6	2	3	0.15	1.0mm	6	16	30	
SST-725	7	2.5	3.5	0.15	1.5mm	6	22	42	
SST-830	8	3	3.5	0.2	1.5mm	7	25	49	
SST-940	9	4	4	0.2	1.6mm	8	27	56	
SST-1040	10	4	4.5	0.2	2.1mm	7	69	154	
SST-1150	11	5	4.5	0.2	2.1mm	8	76	176	
SST-1260	12	6	4.5	0.2	2.1mm	9	82	198	
SST-1570	15	7	5	0.2	3.0mm	8	144	360	
SST-1680	16	8	5	0.3	3.0mm	9	156	405	
SST-1790	17	9	5	0.3	3.0mm	10	167	450	
SST-1810	18	10	5.5	0.3	2.5mm	12	136	375	

Bearing No	Dimensions(mm)						Ball		Load rating (kgf)		Note
	D	D ₁	d	d ₁	H	r	Size	Q'ty	C	Co	
SST-830DSG	8	8	3	3.1	3.5	0.2	2.0mm	7	63	140	
SST-1040DSG	10	10	4	4.1	4.5	0.2	2.0mm	8	69	160	
SST-1050DSG	10	10	5	5.1	4	0.2	2.0mm	9	75	180	
SST-1260DSG	12	12	6	6.2	4.5	0.2	2.1mm	9	82	198	
SST-1570DSG	15	15	7	7.2	5.5	0.3	3/32	9	103	255	
SST-1680DSG	16	16	8	8.2	5	0.3	3.0mm	9	156	405	
SST-1790DSG	17	17	9	9.2	5	0.3	3.0mm	9	156	405	
SST-1810DSG	18	18	10	10.2	5.5	0.3	1/8	12	209	604	
SST-418DSG	6.3500	6.2990	2.3800	2.4300	2.3800	0.13	3/64	8	27	56	4T MPB
SST-518DSG	7.9375	7.8800	3.1750	3.2300	3.1750	0.20	1/16	8	45	100	5T MPB
SST-632DSG	9.5250	9.4740	4.7625	4.810	3.8100	0.20	1/16	8	45	100	6T MPB
SST-718DSG	11.112	11.061	3.1750	3.226	4.7625	0.30	3/32	6	78	170	7T MPB

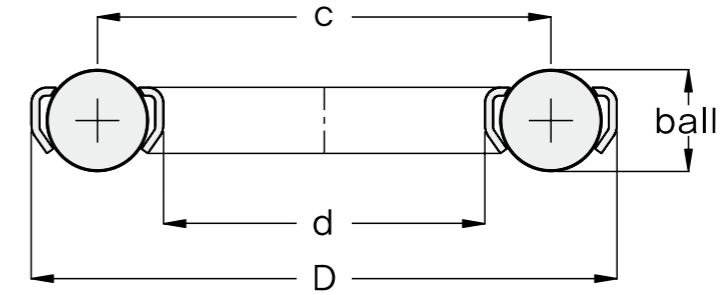
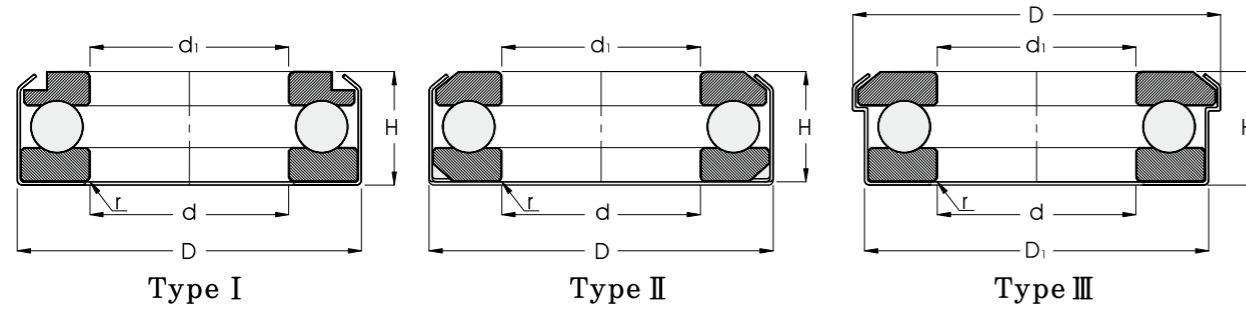


Bearing No	Dimensions(mm) . Tolerance(μ m)				
	d $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	d ₁ $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	D $\begin{smallmatrix} +200 \\ -250 \end{smallmatrix}$	H ± 250	r
T-19	18,6	19,30	39	14,30	2
T-20	20	20,50	40	14,30	2
T-21	21	21,50	41,60	14,30	2
T-22	22	22,50	43,60	14,80	2
T-23	23,40	23,90	42,50	15,80	2
T-94B	23,544	24,044	48,201	15,088	2
T-25-1	25	25,50	46	15,80	2
T-2847	28	28,50	47	16	2
T-28	28	28,50	53	16,50	2
T-110B	28,729	29,229	53,181	15,875	2
T-113B(81T-3123B)	28,729	29,229	55,562	15,875	2
T-30	30,10	30,60	52	16	2
T-126B(7EQ-O)	31,904	32,404	55,562	15,875	2
T-3558	35	35,50	58	17	2
T-151	38,40	38,90	72	22	2
T-40-3	40,20	40,70	75,60	20	2
T-909	45	45,50	74,50	23	2
T-50	50	50,50	80,40	23,50	2
T-60	60	61,50	100	26,10	2
T0722PX1	35	35,50	65	19	2
TK-35	35,40	35,90	65	16,2	2
TK-35S	35,40	35,90	65,88	10,7	2
TAG45-1	45	45,50	72	15	2
TAG47-1	47	47,50	78	23	2
TH15-6631	50	50,50	75,60	19	2

Bearing No	Dimensions(mm) . Tolerance(μ m)				
	d $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	d ₁ $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	D $\begin{smallmatrix} +200 \\ -250 \end{smallmatrix}$	H ± 250	r
F-20	20	20,50	38,10	10,50	2
F-35A	35	35,50	65	18,30	2
F-38Z-5	38,103	38,603	65,881	18,60	2
F-50-4	50	50,50	75,60	18,80	2
Y-22-1	22	22,50	40	13	2
Y-25-3	25	25,50	45	13,80	2
Y-28-2DB	28	28,50	54,50	9	2
Y-45	45	45,50	72,50	22	2
7037	22,60	23,10	36,30	8	2
3073	28,207	28,707	55,562	15,748	2
25TAG11	25	25,50	43,50	11,80	2
20TAG12	20	22	41,50	14,80	2
25TAG12	25	25,50	48,70	15,80	2
28TAG12	28	28,50	51,60	15,80	2
30TAG12	30	30,50	53	17	2
32TAG12	32,20	32,50	57	17	2
35TAG12	35	35,50	65	19	2
40TAG12	40	40,50	70	20	2
25,4KP	25,40	25,40	62	19	2
51102-1	15 $\begin{smallmatrix} 0 \\ -10 \end{smallmatrix}$	15,50	29	9,50	2
51104-1	20 $\begin{smallmatrix} 0 \\ -10 \end{smallmatrix}$	20,50	36,60	10,80	2
51106-1	30 $\begin{smallmatrix} 0 \\ -10 \end{smallmatrix}$	30,50	48,60	11,80	2
51108-1	40 $\begin{smallmatrix} 0 \\ -10 \end{smallmatrix}$	40,5	61,60	13,8	2

KING PIN THRUST BALL BEARINGS

PRESSED STEEL RETAINERS



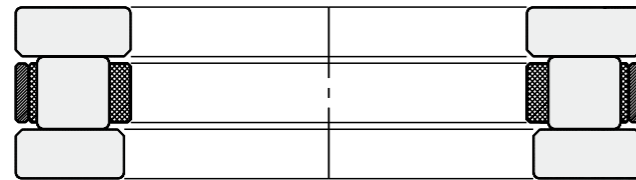
Bearing NO	Dimensions(mm)·Tolerance(μm)					Type
	d $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	d ₁ $\begin{smallmatrix} +200 \\ 0 \end{smallmatrix}$	D $\begin{smallmatrix} +200 \\ -250 \end{smallmatrix}$	H $\begin{smallmatrix} +250 \\ - \end{smallmatrix}$	r	
T-40S-3	40,2	40,70	70	18,8	2	I
TAG21-1	21	21,50	41,5	14,3	2	I
TAG20-4	20	20,50	37,20	10,70	2	I
T5082 RS	50	50,20	82	18,80	2	I
T3563RS ²	35	35,50	62,70	16,80	2	I
F-28S-1	28,15	28,65	53	16,40	2	I
T4072RS	40	40,50	72,50	19	2	I
25TAG11C	25	25,50	43,50	11,80	2	I
25TAG001	25	25,50	43,50	15,80	2	I
28TAG12A	28	28,50	51,60	15,80	2	I
Y-30Z-1B	30,50	31,00	55,80	15,90	2	II
Y-38	38,103	38,603	65,88	19,431	2	II
T5082 2RS	50,20	50,30	82	22	2	II
F-280	28	28,50	54,50	14	2	III
T-28RO-1	28	28,50	54,5	9,3	2	III

RET NO	Dimensions(mm)					RET NO	Dimensions(mm)				
	d	D	C	Ball			d	D	C	Ball	
				Q'ty	Size				Q'ty	Size	
51100	11	23	17	9	3/16	51200	10,4	25,6	18	7	1/4
1	13	25	19	10	3/16	1	12,4	27,6	20	8	1/4
2	15,5	27,5	21,5	11	3/16	2	15,4	31,6	23,5	10	1/4
3	17,5	29,5	23,5	13	3/16	3	18,2	33,8	26	11	1/4
4	20,8	34,2	27,5	13	7/32	4	21,4	38,4	30	12	9/32
5	25,7	41,3	33,5	14	1/4	5	26,6	45,4	36	13	5/16
6	30,7	46,3	38,5	16	1/4	6	31,4	50,6	41	15	5/16
7	35,7	51,3	43,5	18	1/4	7	37,3	59,7	48,5	14	3/8
8	41,3	58,7	50	20	9/32	8	41,2	66,8	54	13	7/16
9	45,6	64,4	55	18	5/16	9	46,2	71,8	59	14	7/16
10	50,6	69,4	60	20	5/16	10	51,2	76,8	64	15	7/16
11	56,1	76,9	66,5	20	11/32	11	56,6	88,4	72,5	16	1/2
12	61,3	83,7	72,5	20	3/8	12	61,6	93,4	77,5	17	1/2
13	66,3	88,7	77,5	21	3/8	13	66,6	98,4	82,5	18	1/2
14	71,3	93,7	82,5	23	3/8	14	71,6	103,4	87,5	19	1/2
15	76,3	98,7	87,5	24	3/8	15	76,6	108,4	92,5	21	1/2
16	80,8	104,2	92,5	25	3/8	16	81,6	113,4	97,5	22	1/2
17	85,8	109,2	97,5	27	3/8	17	85,8	124,2	105	17	5/8
18	91,3	118,7	105	25	7/16	18	91,6	133,4	112,5	17	11/16
20	101,6	133,4	117,5	27	1/2	20	102,4	147,6	125	17	3/4
22	111,6	143,4	127,5	29	1/2	22	112,4	157,6	135	18	3/4
24	121,6	153,4	137,5	31	1/2	24	122,4	167,6	145	20	3/4
26	132,6	167,4	150	30	9/16						
28	142,6	177,4	160	30	9/16	51305	27,3	49,7	38,5	11	3/8
30	152,6	187,4	170	32	9/16	6	32,2	57,8	45	11	7/16
						7	36,7	66,3	51,5	10	1/2
						8	42,2	75,8	59	11	9/16
						9	45,6	84,4	65	11	5/8
						10	51,6	93,4	72,5	11	11/16

원통로울러 스러스트 베어링의 특성 CYLINDRICAL ROLLER THRUST BEARING

원통로울러 스러스트 베어링은 높은 하중 및 충격 하중에 견딜 수 있는 견고한 구조이다. 베어링이 단순한 기하학적 형상을 가지고 있으므로 여러 개의 복합사용이 가능하다

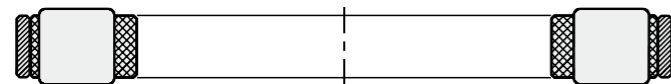
Cylindrical roller thrust bearings provide rigid bearing mountings which have a high load carrying capacity and are insensitive to shock loads. The simple geometrical form of the bearing components permits a multitude of combinations



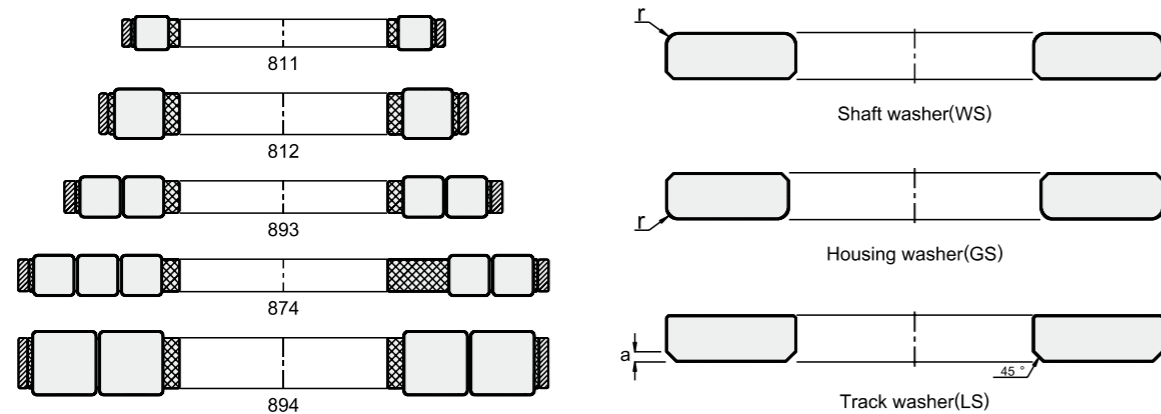
Cylindrical roller thrust bearing
811, 812, 893, 874, 894

베어링의 지지용 와셔는 스러스트 니들 로울러와 케이지의 결합체와 흔히 함께 사용되는 트랙 와셔 및 스러스트 와셔를 원통로울러와 케이지의 결합체와도 함께 사용할 수 있다.

the ground washer of the cylindrical roller thrust bearings can be completed with thrust needle roller and cage assemblies or, in the case of less exacting mountings, track and thrust washers commonly used with thrust needle roller and cage assemblies can be combined with thrust cylindrical roller and cage assemblies.



Thrust cylindrical roller & cage assembly(K)



원통로울러 스러스트 베어링은 스러스트 볼 베어링이나 니들 로울러 스러스트 베어링으로서는 하중 용량이 부족한 경우에 사용된다. 또한 단순한 기하학적 형상을 가지므로 높은 정밀도가 얻어진다.

Cylindrical roller thrust bearings are applied where the load carrying capacity of thrust ball bearings and needle roller thrust bearings is insufficient. The simple geometrical shape of the bearing components makes a high degree of accuracy possible.

베어링의 설계 Design

원통로울러 스러스트 베어링 811, 812, 893, 874, 894 계열은 스러스트 원통 로울러와 케이지의 결합체, 샤프트 와셔(WS) 및 하우징 와셔(GS)로 구성된다. 베어링의 필수 부품은 원통로울러와 케이지의 결합체(K,811 K,812 K,874 K,893 K,894)이다. 만약 축 방향의 지지면이 열처리되고 연삭되었을 경우 로울러와 접촉하여 구름면으로 사용 가능하다. 로울러의 치수가 정밀한 공차로 제작되므로 균일한 하중분포가 가능하다. 또한 로울러는 모서리 응력을 제거하기 위하여 개선된 선 접촉을 한다. Complete WBC cylindrical roller thrust bearings of series 811 and 812 consist of thrust cylindrical roller and cage assembly, the shaft washer(WS) and the housing washer(GS). The vital part of the bearing is the thrust cylindrical roller and cage assembly (series K.811 and K.812). If the axial back-up or support surfaces are hardened and ground they can be used as raceways for the roller set resulting in compact bearing mountings. The close tolerance range of the rollers ensures a uniform load distribution. The rollers feature a modified line contact to eliminate edge stressing.

베어링 케이지 Bearing Cages

원통로울러 스러스트 베어링은 기계가공 경금속 케이지(LPB) 또는 황동케이지(MB, MPB)로 제작된다. 이들 케이지는 120℃까지의 온도에서 장기간 사용이 가능하다. 오일 윤활의 경우, 온도가 장기간 100℃를 초과하면 오일에 함유된 어떠한 첨가제가 케이지 수명에 나쁜 영향을 줄 수 있다. 또한 오래된 오일도 이러한 온도에서는 케이지 수명에 영향을 주므로 오일교환 주기를 엄격하게 준수하여야 한다.

Cylindrical roller thrust bearings are fitted with moulded cages of glass fiber reinforced light metal(LPB) or brass(MB, MPB). These cages withstand constant temperatures of 120℃ and can operate for several hours at temperatures. In case of oil lubrication, if the temperature is higher than 100℃, it has influence on the cage life.

샤프트 와셔 및 하우징 와셔 Shaft and housing washers

샤프트 와셔 WS,811 WS,812 WS,893 WS,874 WS,894 및 하우징 와셔 GS,811 GS,812 GS,893 GS,874 GS,894는 원통로울러 스러스트 베어링 811, 812, 893, 874, 894 계열에 속한다. 와셔는 열처리된 베어링강으로 제작되며 구름면은 정밀연삭과 램핑을 한다. 원통로울러 스러스트 베어링의 회전정도, 형상 및 치수공차는 스러스트 베어링 허용공차와 같다. Shaft washers WS.811 and WS.812 and housing washers GS.811 and GS.812 relate to the thrust cylindrical roller and cage assemblies of series K.811 and K.812. The washers are made of hardened rolling bearing bearing steel, the raceway surfaces are ground and lapped. The running, form, and dimensional tolerances correspond to the tolerances of thrust bearings.

트랙와셔 Track washers

트랙와셔(LS)는 스러스트 원통로울러와 케이지의 결합체 K,811과 스러스트 니들 로울러와 케이지의 결합체 AXK에 사용된다. 와셔는 열처리된 베어링 강으로 제작되며 구름면은 정밀 연삭되어 있다. 트랙와셔의 사용은 정밀안내가 필요 없는 경우에만 가능하며 낮은 회전 또는 선회용 용도로서 조립 시 비용이 절감된다.

The washers of series LS are suitable for thrust cylindrical roller and cage assemblies of series K.811 and thrust needle roller and cage assemblies of series AXK. They are made of hardened rolling bearing steel, the raceways are precision ground. Hence, the use of track washers is recommended only for applications where an accurate guidance is not required. At low speeds or slewing operation, however, track washers provide particularly economical bearing mountings.

스러스트 와셔 Thrust washers

스러스트 와셔(AS)는 스러스트 원통 로울러와 케이지의 결합체 K,811과 스러스트 니들 로울러와 케이지의 결합체 AXK에 사용된다. 스러스트 와셔는 열처리된 스프링강으로 제작되며 구름면은 폴리싱 되어 있다. 와셔는 상관기계부품 지지면이 구름면과 같이 정밀 가공되어 있지 않거나 보통급의 회전정도가 필요한 경우 사용된다.

The stamped washers of series AS can be used for thrust cylindrical roller and cage assemblies of series K.811 and thrust needle roller and cage assemblies of series AXK. The washers are made of hardened spring steel, the raceway surfaces are polished. The washers are used if the back-up surfaces of adjacent machine members do not qualify as raceways and the requirements on the running accuracy are moderate.

동 정격 하중 Equivalent dynamic load

$$P = Fa \text{ kN}$$

정 정격 하중 Equivalent static load

$$Po = Fa \text{ kN}$$

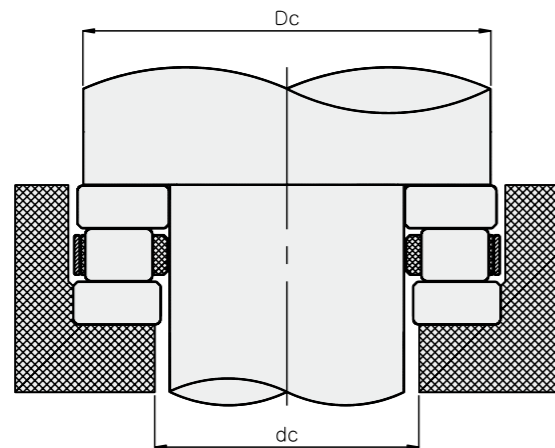
원통로울러 스러스트 베어링의 주변치수 Abutment dimensions of cylindrical roller thrust bearings.

스러스트 원통 로울러와 케이지 결합체가 상관 기계부품의 지지면에 직접 사용되는 경우 구름면 폭은 트랙와셔의 치수와 일치하여야 한다.

스러스트 원통 로울러 베어링 지지면의 직경 Dc와 dc는 구름면의 경계선만큼 유지되어야 한다.

Shaft and housing tolerances for the mounting of complete cylindrical roller thrust bearings and thrust cylindrical roller and cage assemblies are indicated as below

If the thrust cylindrical roller and cage assemblies run directly on the back-up surface of a machine member the width of raceway surfaces should be in accordance with the dimensions Specified for the corresponding track washers. In any case the dimensions Dc and dc must be maintained as boundary lines of the raceways.



스러스트 원통 로울러 베어링 지지면의 직경

The back-up Surface diameter of Cylindrical Roller Thrust Bearing

원통 로울러 스러스트 베어링의 축 및 하우징 와셔의 지지면은 로울러 결합체의 전체폭(Dc와 dc) 이상 되어야 한다.

로울러 결합체를 지지하는 얇은 스러스트 와셔의 경우, 반드시 로울러의 전 길이를 초과하여 지지 되어야 한다.

베어링 와셔는 축 또는 하우징 턱과 완전히 접촉되도록 모서리 부분에서 완전한 맞춤이 되어야 한다.

The surfaces backing the shaft and housing washers of complete cylindrical roller thrust bearings should support the roller assembly over its width (dimension Dc and dc) With thin thrust washers support of the roller assembly over the entire roller length is mandatory. The bearing washers should closely fit the shaft or housing shoulder; they must not be allowed to foul the shoulder fillet.

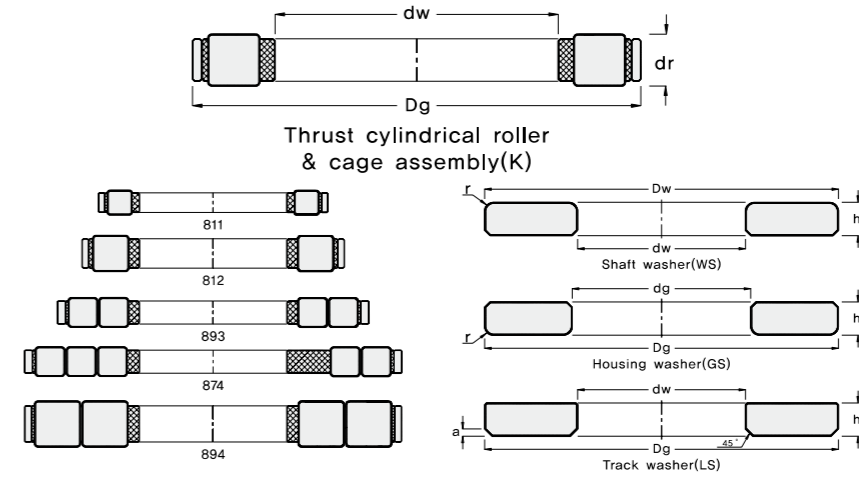
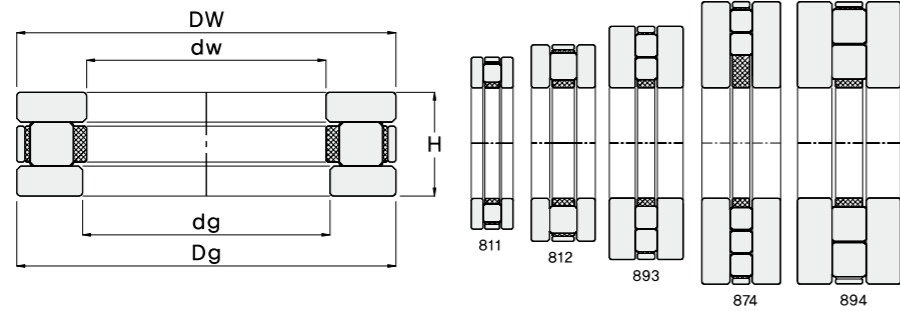
원통로울러 스러스트 베어링의 축 공차 Cylindrical roller Thrust bearing's shaft tolerance

하중형태 <small>Thrust bearings type of load</small>	베어링의 종류 <small>Bearing type</small>	축경 <small>Shaft diameter</small>	작동조건 <small>Operating conditions</small>	공차 <small>tolerance</small>
축방향 하중 <small>Thrust load</small>	스러스트 볼 베어링 <small>thrust ball bearing</small>	전 치수 <small>all sizes</small>		j6
	스러스트 볼 베어링, 복식 <small>thrust ball bearing, double direction</small>	전 치수 <small>all sizes</small>		k6
	원통로울러 스러스트 베어링 또는 샤프트 와셔 있는 스러스트 니들 로울러와 케이지의 결합체 <small>cylindrical roller thrust bearing or thrust needle roller and cage assembly with shaft washer</small>	전 치수 <small>all sizes</small>		h6(j6)
	트랙 와셔나 스러스트 와셔 있는 스러스트 원통 로울러와 케이지의 결합체 또는 스러스트 니들 로울러와 케이지의 결합체 <small>thrust cylindrical roller and cage assembly or thrust needle roller and cage assembly with track or thrust shaft washer</small>	전 치수 <small>all sizes</small>		h10
복합 하중 <small>Combined load</small>	스페리컬 로울러 스러스트 베어링 <small>spherical roller thrust bearing</small>	전 치수 <small>all sizes</small>	샤프트 와셔에 밀점하중 <small>point load on shaft washer</small>	j6
		200mm 이하 <small>up to</small>	샤프트 와셔에 전주의 하중 <small>circumferential load on shaft washer</small>	j6(k6)
		200mm 초과 <small>over</small>		k6(m6)

원통로울러 스러스트 베어링의 하우징 공차 Cylindrical Roller Thrust bearing's housing tolerance

하중형태 <small>Thrust bearings type of load</small>	베어링의 종류 <small>Bearing type</small>	작동조건 <small>Operating conditions</small>	공차 <small>tolerance</small>
축방향 하중 <small>Thrust load</small>	스러스트 볼 베어링 <small>thrust ball bearing</small>	표준 회전 정도 <small>standard running accuracy</small> 높은 회전 정도	E8 H6
	원통로울러 스러스트 베어링 또는 하우징 와셔 있는 스러스트 니들 로울러와 케이지의 결합체 <small>cylindrical roller thrust bearing or thrust needle roller and cage assembly with housing washer</small>		H7(K7)
	트랙 와셔나 스러스트 와셔 있는 스러스트 원통 로울러와 케이지의 결합체 또는 스러스트 니들 로울러와 케이지의 결합체 <small>thrust cylindrical roller and cage assembly or thrust needle roller and cage assembly with track or thrust washer</small>		H11
	스러스트 원통 로울러와 케이지의 결합체 또는 스러스트 니들 로울러와 케이지의 결합체 <small>thrust cylindrical roller and cage assembly or thrust needle roller and cage assembly</small>		H10
복합 하중 하우징 와셔에 밀점 하중 <small>Combined loading point load on housing washer</small>	스페리컬 로울러 스러스트 베어링 <small>spherical roller thrust bearing</small>	중간 하중 <small>normal load</small> 고 하중 <small>high load</small>	E8 G7
			H7
복합 하중 하우징 와셔에 전 주위 하중 <small>Combined loading circumferential load on housing washer</small>	스페리컬 로울러 스러스트 베어링 <small>spherical roller thrust bearing</small>		K7

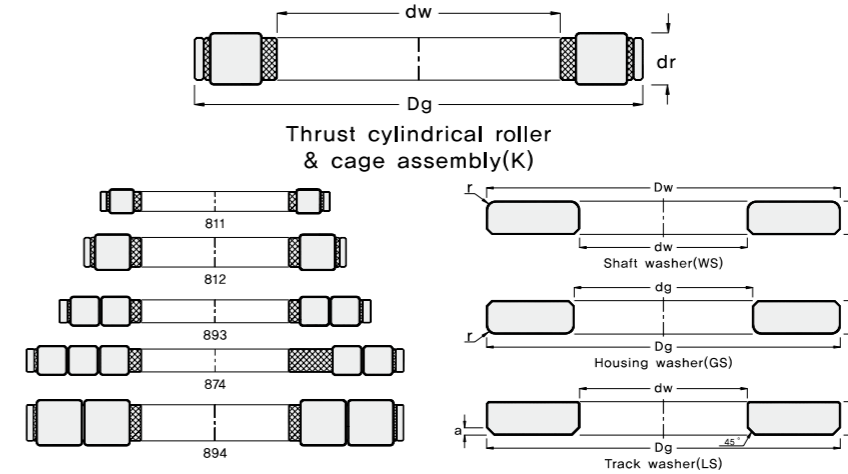
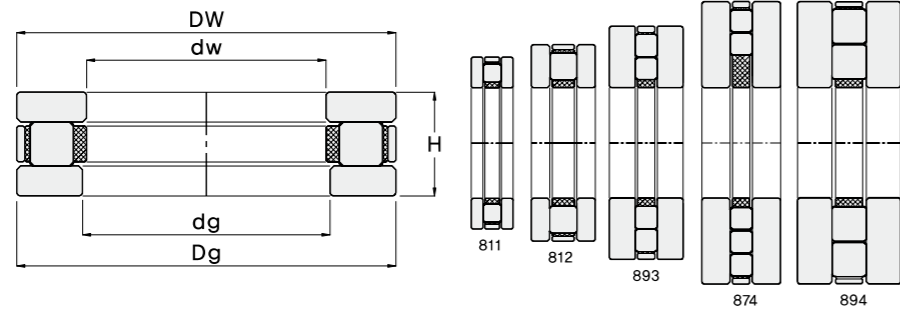
811, 812, 893, 874, 894



Shaft	Dimensions(mm)								
	dw	dg	Dw	Dg	dr	H	h	r	a
15	15	16	28	28	3.5	9	2.75	0.3	0.3
17	17	18	30	30	3.5	9	2.75	0.3	0.3
20	20	21	35	35	4.5	10	2.75	0.3	0.3
25	25	26	42	42	5	11	3	0.6	0.6
30	30	32	47	47	5	11	3	0.6	0.6
	30	32	52	52	7.5	16	4.25	0.6	0.6
	30	32	60	60	5.5	18	6.25	1	1
35	35	37	52	52	5	12	3.50	0.6	0.6
	35	37	62	62	7.5	18	5.25	1	1
	35	37	68	68	6	20	7	1	1
40	40	42	60	60	6	13	3.5	0.6	0.6
	40	42	68	68	9	19	5	1	1
	40	42	78	78	7	22	7.5	1	1
	40	42	90	90	6.5	23	8.25	1.1	1.1
45	45	47	65	65	6	14	4	0.6	0.6
	45	47	73	73	9	20	5.5	1	1
	45	47	85	85	7.5	24	8.25	1	1
	45	47	100	100	7	25	9	1.1	1.1
50	50	52	70	70	6	14	4	0.6	0.6
	50	52	78	78	9	22	6.5	1	1
	50	52	95	95	8	27	9.5	1.1	1.1
	50	52	110	110	8	27	9.5	1.5	1.5
55	55	57	78	78	6	16	5	0.6	0.6
	55	57	90	90	11	25	7	1	1
	55	57	105	105	9	30	10.5	1.1	1.1
	55	57	120	120	8	29	10.5	1.5	1.5
60	60	62	85	85	7.5	17	4.75	1	1
	60	62	95	95	11	26	7.5	1	1
	60	62	110	110	9	30	10.5	1.1	1.1
	60	62	130	130	9	32	11.5	1.5	1.5
	60	62	130	130	14	42	14	1.5	1.5
65	65	67	90	90	7.5	18	5.25	1	1
	65	67	100	100	11	27	8	1	1
	65	67	115	115	9	30	10.5	1.1	1.1
	65	68	140	140	10	34	12	2	2
	65	68	140	140	15	45	15	2	2

Load rating(KN)		Limiting Speed(rpm)		Bearing	Thrust cylindrical roller and cage assembly	Shaft washer	Housing washer	Track washer
C	Co	Grease	Oil					
10.4	24.5	4,500	12,000	81102	K,81102	WS,81102	GS,81102	LS1528
10.8	27	4,300	11,000	81103	K,81103	WS,81103	GS,81103	LS1730
20.4	54	3,800	9,500	81104	K,81104	WS,81104	GS,81104	LS2035
26.5	73.5	3,200	8,000	81105	K,81105	WS,81105	GS,81105	LS2542
28	83	2,600	6,700	81106	K,81106	WS,81106	GS,81106	LS3047
46.5	122	2,400	6,300	81206	K,81206	WS,81206	GS,81206	
69	197	2,700	6,500	89306	K,89306	WS,89306	GS,89306	
26	78	2,200	6,000	81107	K,81107	WS,81107	GS,81107	LS3552
51	143	1,900	5,300	81207	K,81207	WS,81207	GS,81207	
80	237	2,300	5,500	89307	K,89307	WS,89307	GS,89307	
38	116	1,900	5,300	81108	K,81108	WS,81108	GS,81108	LS4060
76.5	220	1,700	4,800	81208	K,81208	WS,81208	GS,81208	
122	385	1,500	4,900	89308	K,89308	WS,89308	GS,89308	
135	480	1,600	4,400	87408	K,87408	WS,87408	GS,87408	
45	153	1,700	4,800	81109	K,81109	WS,81109	GS,81109	LS4565
83	255	1,600	4,500	81209	K,81209	WS,81209	GS,81209	
139	445	1,400	4,400	89309	K,89309	WS,89309	GS,89309	
154	560	1,500	4,000	87409	K,87409	WS,87409	GS,87409	
42.5	143	1,500	4,300	81110	K,81110	WS,81110	GS,81110	LS5070
88	285	1,400	4,000	81210	K,81210	WS,81210	GS,81210	
167	560	1,300	4,000	89310	K,89310	WS,89310	GS,89310	
200	740	1,300	3,600	87410	K,87410	WS,87410	GS,87410	
52	193	1,400	4,000	81111	K,81111	WS,81111	GS,81111	LS5578
106	340	1,200	3,600	81211	K,81211	WS,81211	GS,81211	
184	600	1,300	3,600	89311	K,89311	WS,89311	GS,89311	
222	870	1,200	3,300	87411	K,87411	WS,87411	GS,87411	
67	232	1,200	3,600	81112	K,81112	WS,81112	GS,81112	LS6085
114	365	1,100	3,400	81212	K,81212	WS,81212	GS,81212	
196	670	1,200	3,400	89312	K,89312	WS,89312	GS,89312	
260	1,000	1,100	3,000	87412	K,87412	WS,87412	GS,87412	
390	1,220	900	3,000	89412	K,89412	WS,89412	GS,89412	
68	245	1,100	3,400	81113	K,81113	WS,81113	GS,81113	LS6590
118	390	1,000	3,200	81213	K,81213	WS,81213	GS,81213	
194	670	1,200	2,200	89313	K,89313	WS,89313	GS,89313	
300	1,140	1,000	2,800	87413	K,87413	WS,87413	GS,87413	
445	1,410	850	2,800	89413	K,89413	WS,89413	GS,89413	

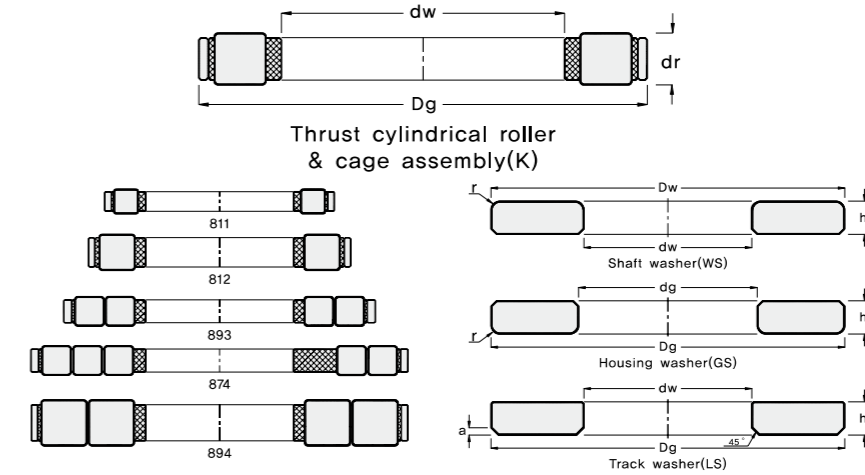
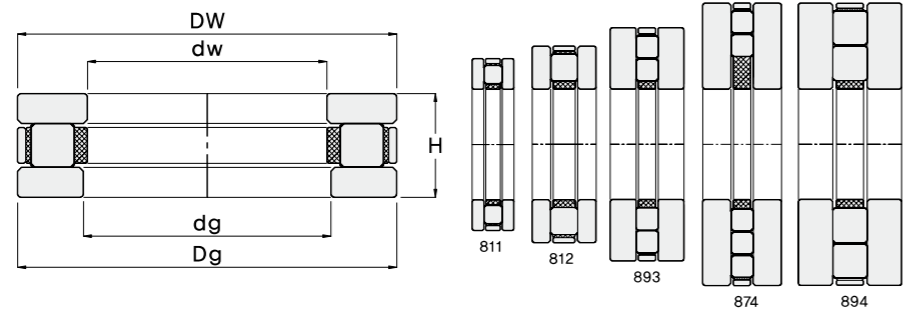
811, 812, 893, 874, 894



Shaft	Dimension(mm)								
	dw	dg	Dw	Dg	dr	H	h	r	a
70	70	72	95	95	7.5	18	5.25	1	1
	70	72	105	105	11	27	8	1	1
	70	72	125	125	10	34	12	1.1	1.1
	70	73	150	150	11	36	12.5	2	2
	70	73	150	150	16	48	16	2	2
75	75	77	100	100	7.5	19	5.75	1	1
	75	77	110	110	11	27	8	1	1
	75	77	135	135	11	36	12.5	1.5	1.5
	75	78	160	160	12	38	13	2	2
	75	78	160	160	17	51	17	2	2
80	80	82	105	105	7.5	19	5.75	1	1
	80	82	115	115	11	28	8.5	1	1
	80	82	140	140	11	36	12.5	1.5	1.5
	80	83	170	170	12	41	14.5	2.1	2.1
	80	83	170	170	18	54	18	2.1	2.1
85	85	87	110	110	7.5	19	5.75	1	1
	85	88	125	125	12	31	9.5	1	1
	85	88	150	150	12	39	13.5	1.5	1.5
	85	88	180	180	13	42	14.5	2.1	2.1
	85	88	180	180	19	58	19.5	2.1	2.1
90	90	92	120	120	9	22	6.5	1	1
	90	93	135	135	14	35	10.5	1.1	1.1
	90	93	155	155	12	39	13.5	1.5	1.5
	90	93	190	190	13	45	16	2.1	2.1
	90	93	190	190	20	60	20	2.1	2.1
100	100	102	135	135	11	25	7	1	1
	100	103	150	150	15	38	11.5	1.1	1.1
	100	103	170	170	13	42	14.5	1.5	1.5
	100	103	210	210	15	50	17.5	3	3
	100	103	210	210	22	67	22.5	3	3
110	110	112	145	145	11	25	7	1	1
	110	113	160	160	15	38	11.5	1.1	1.1
	110	113	190	190	15	48	16.5	2	2
	110	113	230	230	17	54	18.5	3	3
	110	113	230	230	24	73	24.5	3	3
120	120	122	155	155	11	25	7	1	1
	120	123	170	170	15	39	12	1.1	1.1
	120	123	210	210	17	54	18.5	2.1	2.1
	120	123	250	250	18	58	20	4	4
	120	123	250	250	26	78	26	4	4

Load rating(KN)		Limiting speed(rpm)		Bearing	Thrust cylindrical roller and cage assembly	Shaft washer	Housing washer	Track washer
C	Co	Grease	Oil					
71	265	1,000	3,200	81114	K.81114	WS.81114	GS.81114	LS7095
122	415	950	3,000	81214	K.81214	WS.81214	GS.81214	
239	830	1,000	3,000	89314	K.89314	WS.89314	GS.89314	
360	1,380	900	2,600	87414	K.87414	WS.87414	GS.87414	
450	1,390	900	2,600	89414	K.89414	WS.89414	GS.89414	
75	285	950	3,000	81115	K.81115	WS.81115	GS.81115	LS75100
125	440	900	2,800	81215	K.81215	WS.81215	GS.81215	
285	1,010	1,000	2,700	89315	K.89315	WS.89315	GS.89315	
430	1,660	800	2,500	87415	K.87415	WS.87415	GS.87415	
500	1,580	800	2,500	89415	K.89415	WS.89415	GS.89415	
76.5	300	900	2,800	81116	K.81116	WS.81116	GS.81116	LS80105
129	455	850	2,600	81216	K.81216	WS.81216	GS.81216	
305	1,110	950	2,600	89316	K.89316	WS.89316	GS.89316	
450	1,810	750	2,300	87416	K.87416	WS.87416	GS.87416	
560	1,770	750	2,300	89416	K.89416	WS.89416	GS.89416	
76.5	310	850	2,600	81117	K.81117	WS.81117	GS.81117	LS85110
153	550	800	2,400	81217	K.81217	WS.81217	GS.81217	
325	1,140	900	2,500	89317	K.89317	WS.89317	GS.89317	
485	1,920	700	2,200	87417	K.87417	WS.87417	GS.87417	
620	1,980	700	2,200	89417	K.89417	WS.89417	GS.89417	
104	415	800	2,400	81118	K.81118	WS.81118	GS.81118	LS90120
190	670	800	2,400	81218	K.81218	WS.81218	GS.81218	
330	1,200	850	2,400	89318	K.89318	WS.89318	GS.89318	
510	2,090	700	2,100	87418	K.87418	WS.87418	GS.87418	
680	2,200	650	2,100	89418	K.89418	WS.89418	GS.89418	
146	585	750	2,200	81120	K.81120	WS.81120	GS.81120	LS100135
224	815	700	2,000	81220	K.81220	WS.81220	GS.81220	
380	1,400	750	2,100	89320	K.89320	WS.89320	GS.89320	
680	2,800	550	1,900	87420	K.87420	WS.87420	GS.87420	
850	2,850	550	1,900	89420	K.89420	WS.89420	GS.89420	
160	655	700	2,000	81122	K.81122	WS.81122	GS.81122	LS110145
232	865	670	1,900	81222	K.81222	WS.81222	GS.81222	
500	1,870	650	1,900	89322	K.89322	WS.89322	GS.89322	
810	3,350	490	1,700	87422	K.87422	WS.87422	GS.87422	
1,000	3,400	480	1,700	89422	K.89422	WS.89422	GS.89422	
160	680	670	1,900	81124	K.81124	WS.81124	GS.81124	LS120155
245	950	630	1,800	81224	K.81224	WS.81224	GS.81224	
640	2,420	550	1,700	89324	K.89324	WS.89324	GS.89324	
960	4,100	420	1,600	87424	K.87424	WS.87424	GS.87424	
1,160	4,000	430	1,600	89424	K.89424	WS.89424	GS.89424	

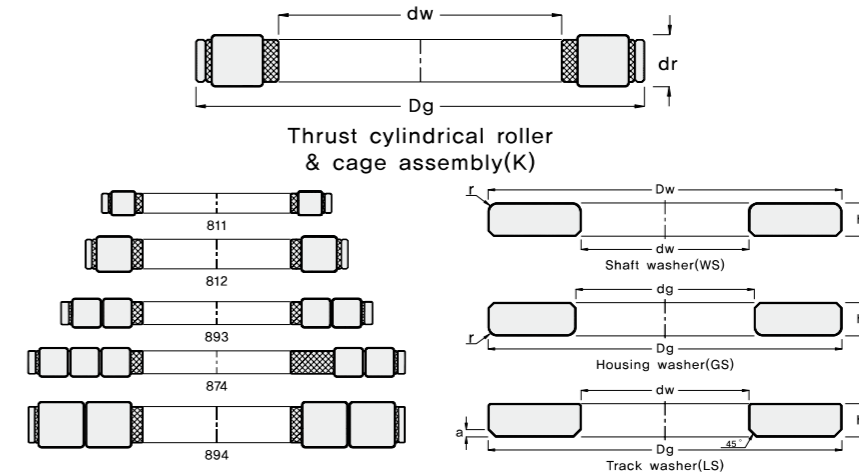
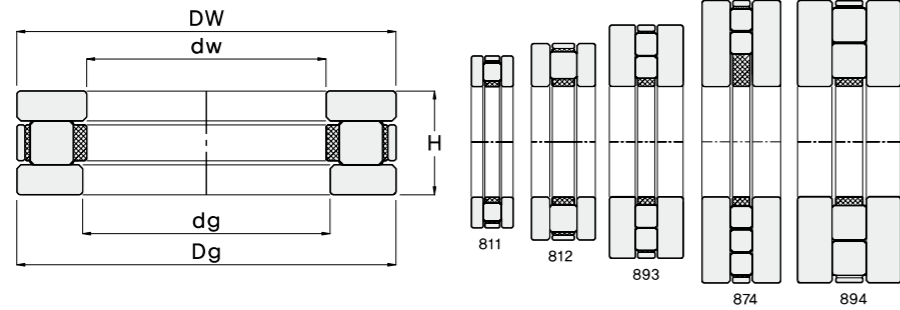
811, 812, 893, 874, 894



Shaft	Dimensions(mm)								
	dw	dg	Dw	Dg	dr	H	h	r	a
130	130	132	170	170	12	30	9	1	1
	130	133	187	190	19	45	13	1.5	1.5
	130	134	225	225	18	58	20	2.1	2.1
	130	134	270	270	19	63	22	4	4
	130	134	270	270	28	85	28.5	4	4
140	140	142	178	180	12	31	9.5	1	1
	140	143	197	200	19	46	13.5	1.5	1.5
	140	144	240	240	19	60	20.5	2.1	2.1
	140	144	280	280	19	63	22	4	4
	140	144	280	280	28	85	28.5	4	4
150	150	152	188	190	12	31	9.5	1	1
	150	153	212	215	21	50	14.5	1.5	1.5
	150	154	250	250	19	60	20.5	2.1	2.1
	150	154	300	300	21	67	23	4	4
	150	154	300	300	30	90	30	4	4
160	160	162	198	200	12	31	9.5	1	1
	160	163	222	225	21	51	15	1.5	1.5
	160	164	270	270	21	67	23	3	3
	160	164	320	320	22	73	25.5	5	5
	160	164	320	320	32	95	31.5	5	5
170	170	172	213	215	14	34	10	1.1	1.1
	170	173	237	240	22	55	16.5	1.5	1.5
	170	174	280	280	21	67	23	3	3
	170	174	340	340	24	78	27	5	5
	170	174	340	340	34	103	34.5	5	5
180	180	183	222	225	14	34	10	1.1	1.1
	180	183	247	250	22	56	17	1.5	1.5
	180	184	300	300	24	73	24.5	3	3
	180	184	360	360	25	82	28.5	5	5
	180	184	360	360	36	109	36.5	5	5
190	190	193	237	240	15	37	11	1.1	1.1
	190	194	267	270	26	62	18	2	2
	190	195	320	320	26	78	26	4	4
	190	195	380	380	26	85	29.5	5	5
	190	195	380	380	38	115	38.5	5	5
200	200	203	247	250	15	37	11	1.1	1.1
	200	204	277	280	26	62	18	2	2
	200	205	340	340	28	85	28.5	4	4
	200	205	400	400	28	90	31	5	5
	200	205	400	400	40	122	41	5	5

Load rating(KN)		Limiting Speed(rpm)		Bearing	Thrust cylindrical roller and cage assembly	Shaft washer	Housing washer	Track washer
C	Co	Grease	Oil					
183	780	600	1,700	81126	K.81126	WS.81126	GS.81126	LS130170
365	1,400	560	1,600	81226	K.81226	WS.81226	GS.81226	
710	2,700	490	1,600	89326	K.89326	WS.89326	GS.89326	
1,050	4,550	400	1,400	87426	K.87426	WS.87426	GS.87426	
1,330	4,600	400	1,400	89426	K.89426	WS.89426	GS.89426	
196	865	560	1,600	81128	K.81128	WS.81128	GS.81128	LS140180
375	1,460	530	1,500	81228	K.81228	WS.81228	GS.81228	
820	3,200	430	1,500	89328	K.89328	WS.89328	GS.89328	
1,110	4,950	370	1,400	87428	K.87428	WS.87428	GS.87428	
1,380	4,950	370	1,400	89428	K.89428	WS.89428	GS.89428	
204	930	530	1,500	81130	K.81130	WS.81130	GS.81130	LS150190
455	1,800	500	1,400	81230	K.81230	WS.81230	GS.81230	
840	3,350	410	1,400	89330	K.89330	WS.89330	GS.89330	
1,260	5,500	350	1,300	87430	K.87430	WS.87430	GS.87430	
1,570	5,700	340	1,300	89430	K.89430	WS.89430	GS.89430	
212	980	500	1,400	81132	K.81132	WS.81132	GS.81132	LS160200
465	1,900	500	1,400	81232	K.81232	WS.81232	GS.81232	
970	3,900	380	1,300	89332	K.89332	WS.89332	GS.89332	
1,450	6,600	310	1,200	87432	K.87432	WS.87432	GS.87432	
1,780	6,500	310	1,200	89432	K.89432	WS.89432	GS.89432	
265	1,220	500	1,400	81134	K.81134	WS.81134	GS.81134	
510	2,080	480	1,300	81234	K.81234	WS.81234	GS.81234	
1,000	4,050	360	1,300	89334	K.89334	WS.89334	GS.89334	
1,620	7,300	290	1,100	87434	K.87434	WS.87434	GS.87434	
1,990	7,400	280	1,100	89434	K.89434	WS.89434	GS.89434	
275	1,290	480	1,300	81136	K.81136	WS.81136	GS.81136	
520	2,160	450	1,200	81236	K.81236	WS.81236	GS.81236	
1,260	5,100	310	1,200	89336	K.89336	WS.89336	GS.89336	
1,860	8,600	260	1,100	87436	K.87436	WS.87436	GS.87436	
2,210	8,200	270	1,100	89436	K.89436	WS.89436	GS.89436	
315	1,500	450	1,200	81138	K.81138	WS.81138	GS.81138	
655	2,650	430	1,100	81238	K.81238	WS.81238	GS.81238	
1,420	5,700	290	1,100	89338	K.89338	WS.89338	GS.89338	
1,990	9,300	250	1,000	87438	K.87438	WS.87438	GS.87438	
2,450	9,200	250	1,000	89438	K.89438	WS.89438	GS.89438	
325	1,600	450	1,200	81140	K.81140	WS.81140	GS.81140	
695	2,900	430	1,100	81240	K.81240	WS.81240	GS.81240	
1,630	6,600	270	1,100	89340	K.89340	WS.89340	GS.89340	
2,290	10,700	220	950	87440	K.87440	WS.87440	GS.87440	
2,700	10,200	230	950	89440	K.89440	WS.89440	GS.89440	

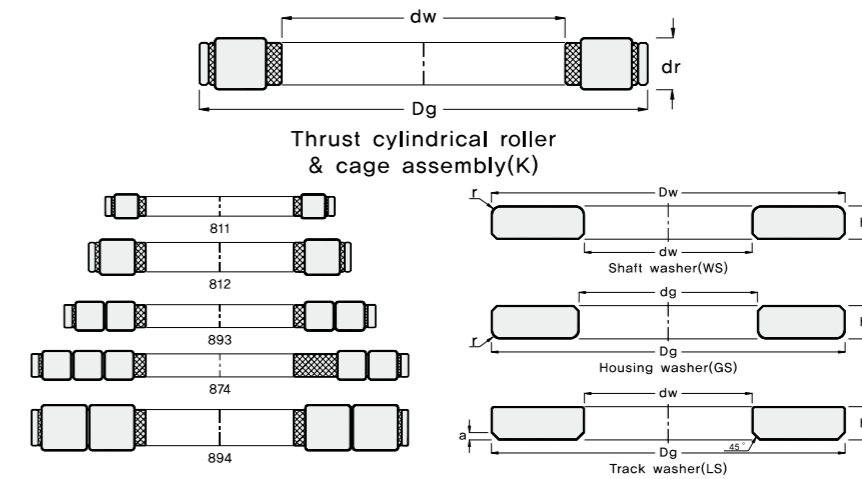
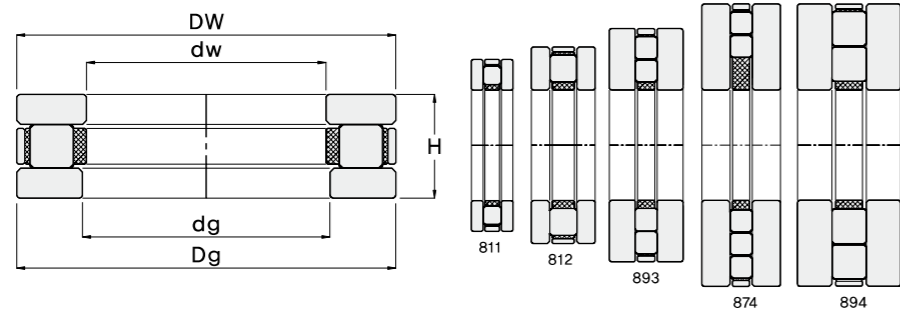
811, 812, 893, 874, 894



Shaft	Dimensions(mm)								
	dw	dg	Dw	Dg	dr	H	h	r	a
220	220	223	267	270	15	37	11	1,1	1,1
	220	224	297	300	26	63	18,5	2	2
	220	225	420	420	40	122	41	6	6
240	240	243	297	300	18	45	13,5	1,5	1,5
	240	244	335	340	32	78	23	2,1	2,1
	240	245	440	440	40	122	41	6	6
260	260	263	317	320	18	45	13,5	1,5	1,5
	260	264	355	360	32	79	23,5	2,1	2,1
	260	265	480	480	44	132	44	6	6
280	280	283	347	350	22	53	15,5	1,5	1,5
	280	284	375	380	32	80	24	2,1	2,1
	280	285	520	520	48	145	48,5	6	6
300	300	304	376	380	25	62	18,5	2	2
	300	304	415	420	38	95	28,5	3	3
	300	305	540	540	48	145	48,5	6	6
320	320	324	396	400	25	63	19	2	2
	320	325	435	440	38	95	28,5	3	3
340	340	344	416	420	25	64	19,5	2	2
	340	345	455	460	38	96	29	3	3
360	360	364	436	440	25	65	20	2	2
	360	365	495	500	45	110	32,5	4	4
380	380	384	456	460	25	65	20	2	2
	380	385	515	520	45	112	33,5	4	4
400	400	404	476	480	25	65	20	2	2
	400	405	535	540	45	112	33,5	4	4
420	420	424	495	500	25	65	20	2	2
	420	425	575	580	52	130	39	5	5
440	440	444	535	540	32	80	24	2,1	2,1
	440	445	595	600	52	130	39	5	5
460	460	464	555	560	32	80	24	2,1	2,1
	460	465	615	620	52	130	39	5	5
480	480	484	575	580	32	80	24	2,1	2,1
	480	485	645	650	56	135	39,5	5	5
500	500	505	595	600	32	80	24	2,1	2,1
	500	505	665	670	56	135	39,5	5	5
530	530	535	635	640	34	85	25,5	3	3
	530	535	705	710	60	140	40	5	5

Load rating(KN)		Limiting Speed(rpm)		Bearing	Thrust cylindrical roller and cage assembly	Shaft washer	Housing washer	Track washer
C	Co	Grease	Oil					
355	1,830	430	1,100	81144	K,81144	WS,81144	GS,81144	
710	3,050	400	1,000	81244	K,81244	WS,81244	GS,81244	
2,900	11,500	210	900	89444	K,89444	WS,89444	GS,89444	
465	2,360	380	950	81148	K,81148	WS,81148	GS,81148	
980	4,250	360	900	81248	K,81248	WS,81248	GS,81248	
3,000	12,200	190	850	89448	K,89448	WS,89448	GS,89448	
500	2,650	360	900	81152	K,81152	WS,81152	GS,81152	
1,040	4,650	340	850	81252	K,81252	WS,81252	GS,81252	
3,550	14,600	170	800	89452	K,89452	WS,89452	GS,89452	
670	3,450	340	850	81156	K,81156	WS,81156	GS,81156	
1,060	4,900	320	800	81256	K,81256	WS,81256	GS,81256	
4,200	17,400	160	700	89456	K,89456	WS,89456	GS,89456	
800	4,000	300	750	81160	K,81160	WS,81160	GS,81160	
1,400	6,200	280	700	81260	K,81260	WS,81260	GS,81260	
4,300	18,400	150	700	89460	K,89460	WS,89460	GS,89460	
865	4,500	280	700	81164	K,81164	WS,81164	GS,81164	
1,430	6,550	260	670	81264	K,81264	WS,81264	GS,81264	
850	4,500	260	670	81168	K,81168	WS,81168	GS,81168	
1,500	7,100	240	630	81268	K,81268	WS,81268	GS,81268	
900	4,900	240	630	81172	K,81172	WS,81172	GS,81172	
1,960	9,150	220	600	81272	K,81272	WS,81272	GS,81272	
880	4,900	240	630	81176	K,81176	WS,81176	GS,81176	
2,000	9,500	200	560	81276	K,81276	WS,81276	GS,81276	
915	5,100	220	600	81180	K,81180	WS,81180	GS,81180	
2,080	10,000	200	560	81280	K,81280	WS,81280	GS,81280	
930	5,400	200	560	81184	K,81184	WS,81184	GS,81184	
2,600	12,200	190	530	81284	K,81284	WS,81284	GS,81284	
1,340	7,350	190	530	81188	K,81188	WS,81188	GS,81188	
2,650	12,900	180	500	81288	K,81288	WS,81288	GS,81288	
1,370	7,800	180	500	81192	K,81192	WS,81192	GS,81192	
2,700	13,400	170	480	81292	K,81292	WS,81292	GS,81292	
1,400	8,000	180	500	81196	K,81196	WS,81196	GS,81196	
3,050	15,000	160	450	81296	K,81296	WS,81296	GS,81296	
1,430	8,500	170	480	811/500	K,811/500	WS,811/500	GS,811/500	
3,100	15,600	160	450	812/500	K,812/500	WS,812/500	GS,812/500	
1,630	9,500	160	450	811/530	K,811/530	WS,811/530	GS,811/530	
3,550	18,000	150	430	812/530	K,812/530	WS,812/530	GS,812/530	

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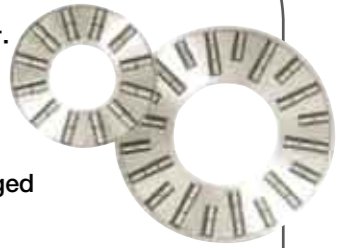


Shaft	Dimensions(mm)								
	dw	dg	Dw	Dg	dr	H	h	r	a
560	560	565	665	670	34	85	25.5	3	3
	560	565	745	750	60	150	45	5	5
600	600	605	705	710	34	85	25.5	3	3
	600	605	795	800	64	160	48	5	5

Load rating(KN)		Limiting Speed(rpm)		Bearing	Thrust cylindrical roller and cage assembly	Shaft washer	Housing washer	Track washer
C	Co	Grease	Oil					
1,660	10,000	150	430	811/560	K,811/560	WS,811/560	GS,811/560	
3,600	18,600	140	400	812/560	K,812/560	WS,812/560	GS,812/560	
1,700	10,600	140	400	811/600	K,811/600	WS,811/600	GS,811/600	
4,050	21,200	130	380	812/600	K,812/600	WS,812/600	GS,812/600	

WONIL BEARING INDUSTRY CO.,LTD.

WBC



- WBC 텐덤 스러스트 베어링은 일직선상에 병렬로 조합된 여러 개의 원통 로울러 스러스트 베어링에 내·외륜(Ring,Washer,Bush)등 의 부품을 최적의 조건으로 조합하여 설계하였습니다.
- WBC 텐덤 스러스트 베어링은 좁은 공간에서 높은 하중을 일정하게 받을 수 있으며, 축방향으로 견고하게 지지하면서도 작은 마찰력으로 긴 수명을 유지합니다. 또한 베어링은 주로 오일 윤활에 의하여 구동됩니다.
- WBC 텐덤 스러스트 베어링은 고무 및 프라스틱 산업에서 Single 및 Twin 압출성형기의 기어BOX 및 깊은 홈 드릴머신에 사용됩니다.
- 텐덤 스러스트 베어링의 축 공차 (f6)
- 텐덤 스러스트 베어링의 하우징 공차 (F7)
- WBC Tandem Thrust Bearings consist of various axial cylindrical thrust roller bearings arranged coaxially. It designed the specialized system of matched rings, washers & bushes.
- WBC Tandem Thrust Bearings offer the optimum solution of the following requirements;
 - limited radial space
 - high axial forces
 - long operating life
 - low frictional power
- and, Tandem thrust bearings must always be lubrication by oil circulation,
- WBC Tandem Thrust Bearings have proved themselves, principally in gearboxes for single and twin screw extruders in the rubber and plastics industries. Further possible applications include deep hole drilling machines & friction welding machines.
- The shaft Tolerances of Tandem thrust bearings - f6
- The Housing bore of Tandem Thrust Bearings - F7

WBC TANDEM THRUST BEARING

텐덤 2열(T2AR), 텐덤 3열(T3AR), 텐덤 4열(T4AR), 텐덤 6열(T6AR),
 텐덤 7열(T7AR), 텐덤 8열(T8AR)
 ※텐덤 스러스트 베어링은 전량 주문 생산 합니다.

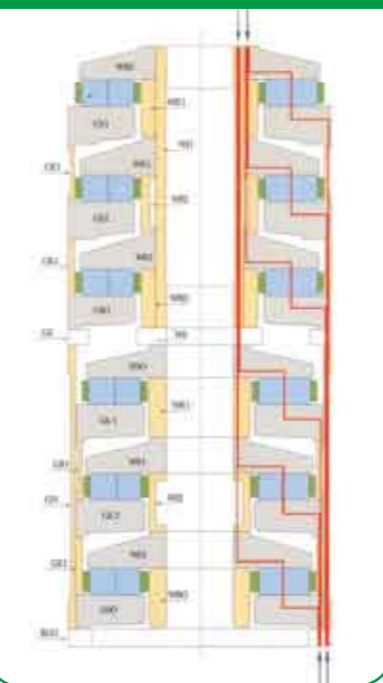
Tandem 2rows(T2AR) Tandem 3rows(T3AR) Tandem 4rows(T4AR) Tandem 6rows(T6AR) Tandem 7rows(T7AR) Tandem 8rows(T8AR)

WBC TANDEM THRUST BEARING 규격표

BEARING NO.	Dimensions			Rows	Load Rating (KN)	
	Inner Diameter	Outer Diameter	Height		c	co
T-1570-4	Ø15	Ø70	153.00	4	328	820
T-2270-3B	Ø22	Ø70	82.00	3	228	589
T-2270-4B	Ø22	Ø70	109.50	4	304	785
T-2270-6(53507)	Ø22	Ø70	182.20	6	456	1,178
T-2390-3A(412)	Ø23	Ø90	97.00	3	417	1,250
T-2390-3B(346)	Ø23	Ø90	97.00	3	419	1,189
T-2390-4A(81684)	Ø23	Ø90	129.50	4	559	1,666
T-2390-4B(58771)	Ø23	Ø90	129.50	4	568	1,585
T-2390-6(53043)	Ø23	Ø90	200.00	6	750	2,439
T-2390-8(81657)	Ø23	Ø90	271.25	8	1,127	3,251
T-25105-6(52548)	Ø25	Ø105	247.00	6	1,299	2,940
T-25105-8	Ø25	Ø105	384.00	8	1,732	3,933
T-2872-6	Ø28	Ø72	161.20	6	483	1,354
T-3092-6	Ø30	Ø92	294.00	6	713	2,079
T-30127-6(52523)	Ø30	Ø127	288.00	6	1,540	5,500
T-33105-3(51909)	Ø33	Ø105	115.00	3	696	1,973
T-33105-4	Ø33	Ø105	153.50	4	928	2,631
T33105-6	Ø33	Ø105	229.00	6	1,393	3,946

※ 기타 텐덤베어링 다량 보유

텐덤 스러스트 베어링의
 하중전달 방향
 Flow of force in the
 Tandem Thrust Bearing



F - 53507



F - 53043



F - 51909



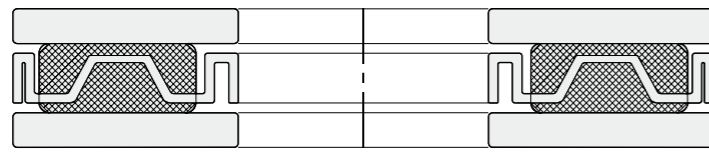
TANDEM
 THRUST BEARING

◎ 스러스트 니들 로울러 베어링의 특성 Thrust Needle Roller and Cage Assemblies

스러스트 니들 로울러 베어링의 로울러와 케이지의 결합체 직경은 스러스트 원통 로울러와 케이지의 결합체 K.811의 직경과 동일하다. 스러스트 니들 로울러와 케이지의 결합체는 매우 좁은 공간에서 높은 하중 및 원활한 구동으로 유용하게 사용된다.

지지면이 구름면으로 적합하지 않을 경우 열처리된 와셔가 사용된다.

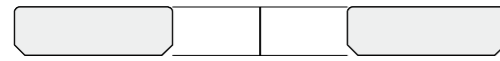
The diameters of the WBC thrust needle roller and cage assemblies correspond to the diameters of thrust cylindrical roller and cage assemblies of series K.811. Thrust needle roller and cage assemblies provide very narrow section bearing mountings. If the back-up surfaces are not suitable as raceways hardened washers are used.



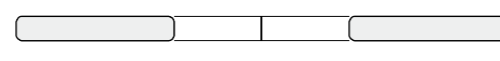
THRUST NEEDLE ROLLER BEARING



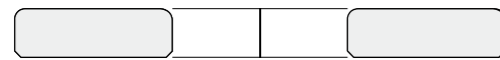
Thrust needle roller & cage assembly (AXK)



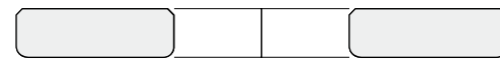
Track washer (LS)



Thrust washer (AS)



Shaft washer (WS.811)



Housing washer (GS.811)

◎ 스러스트 니들 로울러 베어링의 설계 Bearing designs

스러스트 니들 로울러와 케이지 결합체의 케이지는 M형상의 강재와 유사하게 설계되어 있다. 케이지의 한 결합체내의 니들 로울러 직경 공차는 3 μ m이다. 니들 로울러의 직경에 따라서 베어링 조립은 케이지형 니들 로울러 결합체가 지지면에 직접 접촉하는 경우 2mm ~ 5mm의 단면 높이를 갖는다.

지지면이 열처리되지 않은 경우, 트랙와셔(LS) 및 스러스트와셔(AS)가 사용된다. 또한 샤프트와셔(WS.811)와 하우징와셔(GS. 811)도 구름면으로 사용된다.

The cages of the WBC thrust needle roller and cage assemblies are designed similar the M profile steel cages. The diameter tolerance of the needle rollers of any one assembly is 3 microns. Depending on the needle roller diameter the bearing mountings have a section height of 2mm ~ 5mm if the caged needle roller assembly is in direct contact with the back-up surfaces.

스러스트 니들 로울러 베어링의 케이지 (AXK) Cages (AXK)

일반적으로 형상 강재 케이지가 축을 안내한다. 그러나, WBC 스러스트 니들 로울러 베어링의 케이지(AxK) 외경에 의하여 안내되도록 설계되어 있다.

The stamped washer (AS) are made of hardened spring steel, the raceways are polished. The washers are used where the back-up surfaces of adjacent machine members do not qualify as raceways and the requirements on the running accuracy are moderate.

스러스트와셔 (AS) Thrust washers

스러스트와셔는 열처리된 스프링강으로 제작되며 구름면은 폴리싱 되어있다. 와셔는 상관조립부품 지지면이 구름면과 같이 정밀 가공되어 있지 않거나 보통급의 회전정도가 필요한 경우 사용된다.

The stamped washers (AS) are made of hardened spring steel, the raceways are polished. The washers are used where the back-up surfaces of adjacent machine members do not qualify as raceways and the requirements on the running accuracy are moderate.

트랙와셔 (LS) Track washers

트랙와셔(LS)는 스러스트 원통로울러와 케이지의 결합체 K.811과 스러스트 니들 로울러와 케이지의 결합체 AXK에 사용된다.

트랙와셔는 열처리된 구름 베어링강으로 제작되며 내경 및 외경은 선삭가공하며 구름면은 정밀 연마되어 있다. 트랙와셔의 사용은 정밀안내가 필요 없는 경우에만 가능하며 낮은 회전 또는 선회용 용도로 사용된다.

These washers (LS) are made of hardened rolling bearing steel, the raceways are precision ground. Bore and outside diameter are turned. Hence, the use of track washers is recommended for applications where an accurate guidance is not required.

샤프트와셔 (WS) 및 하우징와셔 (GS) Shaft washers and housing washers

샤프트 와셔 WS.811 및 하우징와셔 GS.811는 원통로울러 스러스트 베어링 811 계열에 속한다. 와셔는 열처리된 베어링강으로 제작되며 구름면은 정밀연삭과 랩핑을 한다. 원통로울러 스러스트 베어링의 회전정도, 형상 및 치수공차는 스러스트 베어링 허용공차와 같다.

The shaft washers WS.811 and the housing washers GS.811 relate to the thrust cylindrical roller and cage assemblies of series K.811. The washers are made of hardened rolling bearing steel. The running surfaces are ground and lapped. The dimensional, form and running tolerances correspond to those of thrust bearings.

동 정격 하중

Equivalent dynamic load

정 정격 하중 Equivalent static load

$$P = Fa \text{ kN}$$

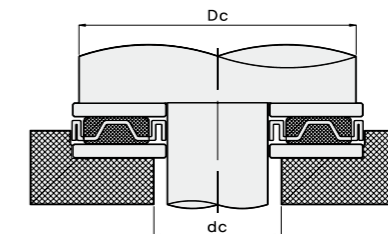
$$Po = Fa \text{ kN}$$

◎ 스러스트 니들 로울러 베어링의 주변치수 Abutment dimensions.

스러스트 니들 로울러와 케이지의 결합체가 기계부품의 지지면에 직접 사용될 경우, 구름면 폭은 니들 로울러와 동일한 치수를 갖는다. 어떠한 경우이든 Dc와 dc는 구름면의 경계선이 되어야 한다. 축은 h8로 가공하고 하우징은 H10으로 가공해야 한다.

전체가 가공되는 샤프트와셔와 하우징와셔는 가능한 한 조립면의 공차와 같이 정밀해야 한다.

If the thrust needle roller and cage assemblies run directly on the back-up surface of a machine member the width of the raceway surfaces should be in accordance with the dimensions specified for the corresponding track washers which fit the needle roller and cage assembly. In any case the dimensions Dc and dc should be maintained as boundary lines of the raceway. The shaft must be machined to h8, the housing bore to H10.

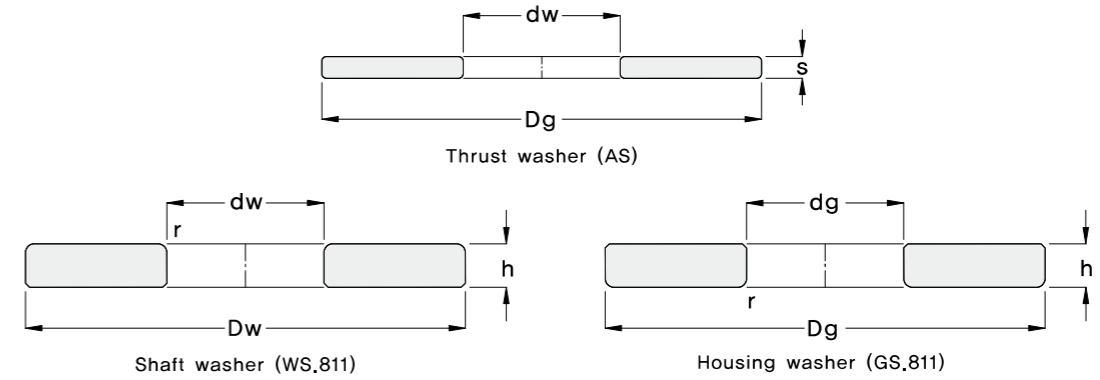
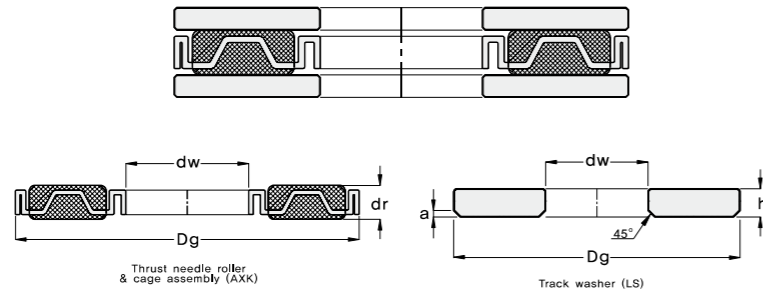


축의 경우 h6(j6), 하우징의 경우 H7(k7), 트랙 와셔와 스러스트 와셔의 조립을 위한 축공차 h10, 하우징 공차 H11 이 사용된다.

샤프트와셔 및 하우징와셔나 트랙 와셔의 뒷면은 폭 전체에 걸쳐 니들 로울러를 지지한다.(치수 Dc 와 dc). 니들 로울러의 전 길이에 걸쳐 니들 로울러와 케이지의 결합체를 지지하기 위하여 스러스트 와셔를 사용해야 한다.

The shaft and the housing washers which are ground all over make accurate machining of the fitting surface possible: shaft to h6(j6), housing bore to H7(k7). For the mounting of track washers and thrust washers the shaft tolerance h10 and the housing tolerance H11 are usual. The surfaces backing the shaft and housing washers or track washers should support the needle roller set over its width (dimension Dc and dc). With thin thrust washers a support of the needle roller and cage assembly over the entire needle roller length is mandatory.

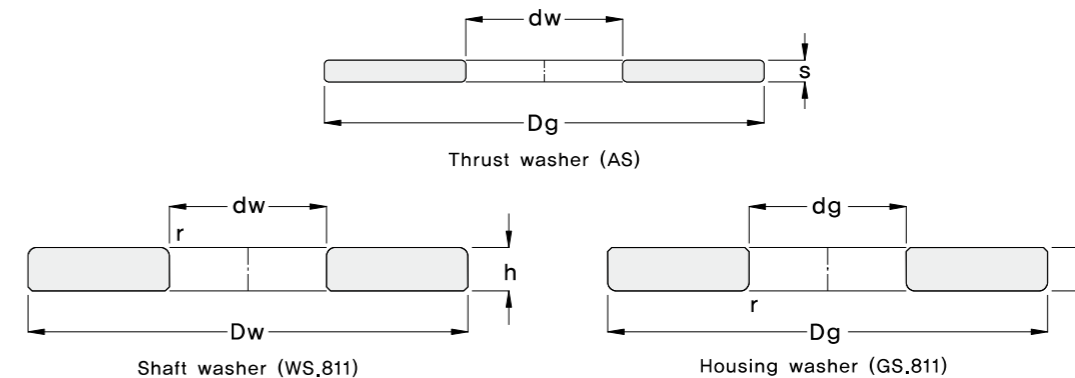
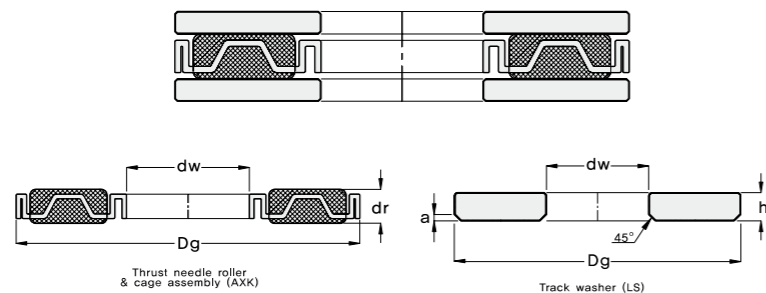
AXK, AS, LS, WS, GS



Shaft	Dimensions(mm)									Weight(kg)				
	dw	dg	Dw	Dg	dr	h	s	a	r	AXK	LS	AS	WS	GS
10	10	11	24	24	2	2.75	1	0.5	0.3	0.003	0.008	0.003	0.008	0.008
12	12	13	26	26	2	2.75	1	0.5	0.3	0.003	0.009	0.003	0.009	0.009
15	15	16	28	28	2	2.75	1	0.5	0.3	0.003	0.009	0.003	0.009	0.009
17	17	18	30	30	2	2.75	1	0.5	0.3	0.003	0.011	0.003	0.011	0.011
20	20	21	35	35	2	2.75	1	0.5	0.3	0.005	0.013	0.005	0.013	0.013
25	25	26	42	42	2	3	1	1	0.6	0.006	0.020	0.007	0.020	0.019
30	30	32	47	47	2	3	1	1	0.6	0.007	0.021	0.008	0.023	0.021
35	35	37	52	52	2	3.5	1	1	0.6	0.008	0.028	0.009	0.030	0.027
40	40	42	60	60	3	3.5	1	1	0.6	0.016	0.041	0.012	0.041	0.038
45	45	47	65	65	3	4	1	1	0.6	0.018	0.049	0.013	0.051	0.048
50	50	52	70	70	3	4	1	1	0.6	0.020	0.053	0.014	0.056	0.051
55	55	57	78	78	3	5	1	1	0.6	0.026	0.087	0.018	0.090	0.083
60	60	62	85	85	3	4.75	1	1.5	1	0.031	0.097	0.022	0.101	0.095
65	65	67	90	90	3	5.25	1	1.5	1	0.034	0.116	0.023	0.120	0.111
70	70	72	95	95	4	5.25	1	1.5	1	0.055	0.123	0.026	0.127	0.120
75	75	77	100	100	4	5.75	1	1.5	1	0.058	0.144	0.028	0.148	0.137
80	80	82	105	105	4	5.75	1	1.5	1	0.060	0.150	0.028	0.155	0.146
85	85	87	110	110	4	5.75	1	1.5	1	0.063	0.160	0.031	0.165	0.153

Load rating(KN)		Limiting Speed(rpm)		Bearing Number				
C	Co	Grease	Oil	Thrust needle roller and cage assembly(AXK)	Track washer(LS)	Thrust washer(AS)	Shaft washer(WS)	Housing washer(GS)
7.80	23.60	5,000	14,000	AXK.1024	LS.1024	AS.1024	WS.81100	GS.81100
8.50	27.00	4,800	13,000	AXK.1226	LS.1226	AS.1226	WS.81101	GS.81101
9.65	33.50	4,500	12,000	AXK.1528	LS.1528	AS.1528	WS.81102	GS.81102
10.20	36.50	4,300	11,000	AXK.1730	LS.1730	AS.1730	WS.81103	GS.81103
11.20	43.00	3,600	9,000	AXK.2035	LS.2035	AS.2035	WS.81104	GS.81104
12.50	54.00	2,800	7,000	AXK.2542	LS.2542	AS.2542	WS.81105	GS.81105
14.00	65.50	2,400	6,300	AXK.3047	LS.3047	AS.3047	WS.81106	GS.81106
15.30	76.50	2,000	5,600	AXK.3552	LS.3552	AS.3552	WS.81107	GS.81107
24.50	110	1,800	5,000	AXK.4060	LS.4060	AS.4060	WS.81108	GS.81108
26.50	125	1,600	4,500	AXK.4565	LS.4565	AS.4565	WS.81109	GS.81109
28.00	137	1,400	4,000	AXK.5070	LS.5070	AS.5070	WS.81110	GS.81110
36.00	196	1,200	3,600	AXK.5578	LS.5578	AS.5578	WS.81111	GS.81111
39.00	240	1,100	3,400	AXK.6085	LS.6085	AS.6085	WS.81112	GS.81112
40.50	260	1,000	3,200	AXK.6590	LS.6590	AS.6590	WS.81113	GS.81113
50.00	260	950	3,000	AXK.7095	LS.7095	AS.7095	WS.81114	GS.81114
51.00	275	900	2,800	AXK.75100	LS.75100	AS.75100	WS.81115	GS.81115
52.00	285	850	2,600	AXK.80105	LS.80105	AS.80105	WS.81116	GS.81116
54.00	300	850	2,600	AXK.85110	LS.85110	AS.85110	WS.81117	GS.81117

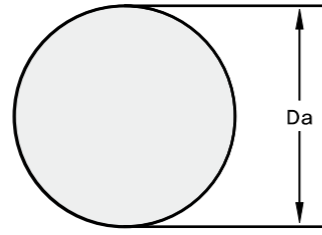
AXK, AS, LS, WS, GS



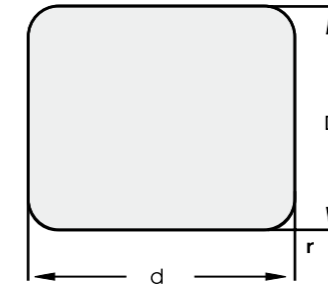
Shaft	Dimensions(mm)										Weight(kg)				
	dw	dg	Dw	Dg	dr	h	s	a	r	AXK	LS	AS	WS	GS	
90	90	92	120	120	4	6.50	1	1.5	1	0.081	0.241	0.038	0.243	0.230	
100	100	102	135	135	4	7.00	1	1.5	1	0.106	0.333	0.050	0.338	0.325	
110	110	112	145	145	4	7.00	1	1.5	1	0.117	0.375	0.055	0.375	0.355	
120	120	122	155	155	4	7.00	1	1.5	1	0.126	0.391	0.059	0.401	0.385	
130	130	132	170	170	5	9.00	1	1.5	1	0.198	0.650	0.074	0.666	0.651	
140	140	142	178	180	5	9.50	1	1.5	1	0.212	0.710	0.078	0.716	0.712	
150	150	152	188	190	5	9.50	1	1.5	1	0.225	0.756	0.083	0.761	0.748	
160	160	162	198	200	5	9.50	1	1.5	1	0.238	0.802	0.088	0.805	0.791	

Load rating(KN)		Limiting Speed(rpm)		Bearing Number				
C	Co	Grease	Oil	Thrust needle roller and cage assembly(AXK)	Track washer(LS)	Thrust washer(AS)	Shaft washer(WS)	Housing washer(GS)
63.00	415.00	800	2,400	AXK,90120	LS,90120	AS,90120	WS,81118	GS,81118
78.00	560.00	700	2,000	AXK,100135	LS,100135	AS,100135	WS,81120	GS,81120
81.50	600.00	670	1,900	AXK,110145	LS,110145	AS,110145	WS,81122	GS,81122
85.00	655.00	630	1,800	AXK,120155	LS,120155	AS,120155	WS,81124	GS,81124
112.00	830.00	560	1,600	AXK,130170	LS,130170	AS,130170	WS,81126	GS,81126
116.00	900.00	530	1,500	AXK,140180	LS,140180	AS,140180	WS,81128	GS,81128
120.00	950.00	500	1,400	AXK,150190	LS,150190	AS,150190	WS,81130	GS,81130
125.00	1,000.00	480	1,300	AXK,160200	LS,160200	AS,160200	WS,81132	GS,81132

STEEL - BALLS



CYLINDRICAL ROLLERS



Nominal dimension (inch)	Basic diameter (mm) Da	Weight 1000 pieces kg	Hardness HRC		Nominal dimension (inch)	Basic diameter (mm) Da	Weight 1000 pieces kg	Hardness HRC	
			Min	Max				Min	Max
0.5mm	0.5000	0.0005	62	67	17/32	13.4938	9.996	61	66
0.6mm	0.6000	0.0008	62	67	9/16	14.2875	11.87	61	66
0.8mm	0.8000	0.0021	62	67	19/32	15.0812	63.96	61	66
1.0mm	1.0000	0.0041	62	67	5/8	15.8750	16.28	61	66
1.2mm	1.2000	0.0070	62	67					
					21/32	16.6688	18.84	61	66
1.5mm	1.5000	0.0137	62	67	11/16	17.4625	21.66	61	66
1/16	1.5875	0.0163	62	67	23/32	18.2562	24.75	61	66
2.0mm	2.0000	0.0326	62	67	3/4	19.0500	28.13	61	66
3/32	2.3812	0.0549	62	67	25/32	19.8438	31.79	61	66
3.0mm	3.0000	0.1098	62	67					
					13/16	20.6375	35.77	61	66
1/8	3.1750	0.1302	61	66	27/32	21.4312	40.05	61	66
					7/8	22.2250	44.66	61	66
5/32	3.9688	0.2543	61	66					
					29/32	23.0188	49.62	61	66
3/16	4.7625	0.4395	61	66	15/16	23.8125	54.93	61	66
					31/32	24.6062	60.61	61	66
7/32	5.5562	0.6979	61	66					
1/4	6.3500	1.042	61	66	1	25.4000	66.67	61	66
					1 1/16	26.9875	79.96	61	66
9/32	7.1438	1.483	61	66					
5/16	7.9375	2.035	61	66	1 1/8	28.5750	94.92	61	66
					1 3/16	30.1625	111.6	60	66
11/32	8.7312	2.708	61	66	1 1/4	31.7500	130.2	60	66
3/8	9.525	3.516	61	66					
					1 5/16	33.3375	150.7	60	66
13/32	10.3188	4.469	61	66	1 3/8	34.9250	173.3	60	66
7/16	11.1125	5.582	61	66	1 7/16	36.5125	198.0	60	66
15/32	11.9062	6.867	61	66	1 1/2	38.1000	225.0	60	66
					1 5/8	41.2750	286.1	60	66
1/2	12.7000	8.333	61	66					
					1 3/4	44.4500	357.3	60	66
					1 7/8	47.6250	439.5	60	66
					2	50.8000	533.3	60	66

Diameter mm D	Length d	Chamfer r	Weight 100 pieces kg	Diameter mm D	Length d	Chamfer r	Weight 100 pieces kg
3	5	0.3	0.027	16	16	0.6	2.48
				16	24	0.6	3.73
3.5	5	0.3	0.037	17	17	0.7	2.97
4	4	0.3	0.039	17	24	0.7	4.2
4	6	0.3	0.058	18	18	0.7	3.57
4	8	0.3	0.078	18	26	0.7	5.1
4.5	6	0.4	0.073	19	19	0.7	4.16
5	5	0.4	0.075	19	28	0.7	6.1
5	8	0.4	0.121	20	20	0.7	4.85
5	10	0.4	0.152	20	30	0.7	7.3
5.5	5.5	0.4	0.1	21	21	0.8	5.6
5.5	8	0.4	0.146	21	30	0.8	8
6	6	0.4	0.13	22	22	0.8	6.4
6	8	0.4	0.178	22	22	0.8	6.4
6	12	0.4	0.261	22	34	0.8	10
6.5	6.5	0.4	0.166	23	23	0.8	7.4
6.5	9	0.4	0.23	23	34	0.8	11.2
7	7	0.4	0.206	24	24	0.8	8.4
7	10	0.4	0.296	24	36	0.8	12.6
7	14	0.4	0.417	25	25	0.8	9.5
7.5	7.5	0.4	0.254	25	36	0.8	13.7
7.5	11	0.4	0.374	26	26	0.8	10.7
8	8	0.4	0.308	26	40	0.8	16.4
8	12	0.4	0.465	28	28	1	13.3
9	9	0.5	0.44	28	44	1	21
9	14	0.5	0.68	30	30	1	16.3
10	10	0.5	0.6	30	48	1	26.2
10	14	0.5	0.85	32	32	1	19.9
11	11	0.5	0.81	32	52	1	32.4
11	15	0.5	1.1	34	34	1	23.9
12	12	0.5	1.04	34	55	1	38.7
12	18	0.5	1.57	36	36	1.2	28.3
13	13	0.6	1.33	36	58	1.2	45.7
13	20	0.6	2.04	38	38	1.2	33.3
14	14	0.6	1.66	38	62	1.2	55
14	20	0.6	2.38	40	40	1.2	38.9
15	15	0.6	2.04	40	65	1.2	63
15	22	0.6	3				

KGF - Ibf 환산표 CONVERSION TABLE

KGF - N 환산표 CONVERSION TABLE

CONVERSION TABLE

CONVERSION TABLE

1kgf=2.2046lbf
1lbf=0.45359kgf

1kgf=9.80665N
1lbf=0.101972kgf

kgf		lbf	kgf		lbf	kgf		lbf
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	56	101,41	35,834	79	174,17
6,350	14	30,865	21,319	47	103,62	36,287	80	176,37
6,804	15	33,069	21,772	48	105,82	36,741	81	178,57
7,257	16	35,274	22,226	49	108,03	37,195	82	180,78
7,711	17	37,479	22,680	50	110,23	37,648	83	182,98
8,165	18	39,683	23,133	51	112,44	38,102	84	185,19
8,618	19	41,888	23,587	52	114,64	38,555	85	187,39
9,072	20	44,092	24,040	53	116,84	39,009	86	189,60
9,525	21	46,297	24,494	54	119,05	39,463	87	191,80
9,979	22	48,502	24,948	55	121,25	39,916	88	194,01
10,433	23	50,706	25,401	56	123,46	40,370	89	196,21
10,886	24	52,911	25,855	57	125,66	40,823	90	198,42
11,340	25	55,116	26,308	58	127,87	41,277	91	200,62
11,793	26	57,320	26,762	59	130,07	41,730	92	202,83
12,247	27	59,525	27,216	60	132,28	42,184	93	205,03
12,701	28	61,729	27,669	61	134,48	42,638	94	207,23
13,154	29	63,934	28,123	62	136,69	43,091	95	209,44
13,608	30	66,139	28,576	63	138,89	43,545	96	211,64
14,061	31	68,343	29,030	64	141,10	43,998	97	213,85
14,515	32	70,548	29,484	65	143,30	44,452	98	216,05
14,969	33	72,753	29,937	66	145,51	44,906	99	218,26

kgf		N	kgf		N	kgf		N
0,1020	1	9,8066	3,4670	34	333,43	6,8321	67	657,05
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	7,0360	69	676,66
0,4079	4	39,227	3,7729	37	362,85	7,1380	70	686,47
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	68,647	4,0789	40	392,27	7,4439	73	715,89
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	421,69	7,7498	76	745,31
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	451,11	8,0558	79	774,73
1,4276	14	137,29	4,7927	47	460,91	8,1577	80	784,53
1,5296	15	147,10	4,8946	48	470,72	8,2597	81	794,34
1,6315	16	156,91	4,9966	49	480,54	8,3617	82	804,15
1,7335	17	166,71	5,0986	50	490,33	8,4636	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	509,95	8,6676	85	833,57
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	8,8715	87	853,18
2,2434	22	215,75	5,6084	55	539,37	8,9735	88	862,99
2,3453	23	225,55	5,7104	56	549,17	9,0755	89	872,79
2,4473	24	235,36	5,8124	57	558,98	9,1774	90	882,60
2,5493	25	245,17	5,9144	58	568,79	9,2794	91	892,41
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	598,21	9,5853	94	921,83
2,9572	29	284,39	6,3222	62	608,01	9,6873	95	931,63
3,0591	30	294,20	6,4242	63	617,82	9,7893	96	941,44
3,1611	31	304,01	6,5262	64	627,63	9,8912	97	951,25
3,2631	32	313,81	6,6282	65	637,43	9,9932	98	961,05
3,3651	33	323,62	6,7301	66	647,24	10,095	99	970,86

온도 환산표 TEMPERATURE CONVERSION TABLE

점도 환산표 VISCOSITY CONVERSION TABLE

CONVERSION TABLE

CONVERSION TABLE

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

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

°C		°F	°C		°F	°C		°F	°C		°F
-62.2	-80	-112.0	13.3	56	132.8	49.4	121	249.8	85.6	186	366.8
-56.7	-70	-94.0	13.9	57	134.6	50.0	122	251.6	86.1	187	368.6
-51.1	-60	-76.0	14.4	58	136.4	50.6	123	253.4	86.7	188	370.4
-45.6	-50	-58.0	15.0	59	138.2	51.1	124	255.2	87.2	189	372.2
-40.0	-40	-40.0	15.6	60	140.0	51.7	125	257.0	87.8	190	374.0
-34.4	-30	-20.0	16.1	61	141.8	52.2	126	258.8	88.3	191	375.8
-28.9	-20	-4.0	16.7	62	143.6	52.8	127	260.6	88.9	192	377.6
-23.3	-10	14.0	17.2	63	145.4	53.3	128	262.4	89.4	193	379.4
			17.8	64	147.2	53.9	129	264.2	90.0	194	381.2
-17.8	0	32.0	18.3	65	149.0	54.4	130	266.0	90.6	195	383.0
-17.2	1	33.8	18.9	66	150.8	55.0	131	267.8	91.1	196	384.8
-16.7	2	35.6	19.4	67	152.6	55.6	132	269.6	91.6	197	386.6
-16.1	3	37.4	20.0	68	154.4	56.1	133	271.4	91.7	198	388.4
-15.6	4	39.2	20.6	69	156.2	56.7	134	273.2	92.2	199	390.2
-15.0	5	41.0	21.1	70	158.0	57.2	135	275.0	93.3	200	392.0
-14.4	6	42.8	21.7	71	159.8	57.8	136	276.8	98.9	210	410.0
-13.9	7	44.6	22.2	72	161.6	58.3	137	278.6	104.4	220	428.0
-13.3	8	46.4	22.8	73	163.4	58.9	138	280.4	110.0	230	446.0
-12.8	9	48.2	23.3	74	165.2	59.4	139	282.2	115.6	240	464.0
-12.2	10	50.0	23.9	75	167.0	60.0	140	284.0	121.1	250	482.0
-11.7	11	51.8	24.4	76	168.8	60.6	141	285.8	126.7	260	500.0
-11.1	12	53.6	25.0	77	170.6	61.1	142	287.6	132.2	270	518.0
-10.6	13	55.4	25.6	78	172.4	61.7	143	289.4	137.8	280	536.0
-10.0	14	57.2	26.1	79	174.2	62.2	144	291.2	143.3	290	554.0
-9.4	15	59.0	26.7	80	176.0	62.8	145	293.0	148.9	300	572.0
-8.9	16	60.8	27.2	81	177.8	63.3	146	294.8	154.4	310	590.0
-8.3	17	62.6	27.8	82	179.6	63.9	147	296.6	160.0	320	608.0
-7.8	18	64.4	28.3	83	181.4	64.4	148	298.4	165.6	330	626.0
-7.2	19	66.2	28.9	84	183.2	65.0	149	300.2	171.1	340	644.0
-6.7	20	68.0	29.4	85	185.0	65.6	150	302.0	177.7	350	662.0
-6.1	21	69.8	30.0	86	186.8	66.1	151	303.8	182.2	360	680.0
-5.6	22	71.6	30.6	87	188.6	66.7	152	305.6	187.8	370	698.0
-5.0	23	73.4	31.1	88	190.4	67.2	153	307.4	193.3	380	716.0
-4.4	24	75.2	31.7	89	192.2	67.8	154	309.2	198.9	390	734.0
-3.9	25	77.0	32.2	90	194.0	68.3	155	311.0	204.4	400	752.0
-3.3	26	78.8	32.8	91	195.8	68.9	156	312.8	210.0	410	770.0
-2.8	27	80.6	33.3	92	197.6	69.4	157	314.6	215.6	420	788.0
-2.2	28	82.4	33.9	93	199.4	70.0	158	316.4	221.1	430	806.0
-1.7	29	84.2	34.4	94	201.2	70.6	159	318.2	226.7	440	824.0
-1.1	30	86.0	35.0	95	203.0	71.1	160	320.0	232.2	450	842.0
-0.6	31	87.8	35.6	96	204.8	71.7	161	321.8	237.8	460	860.0
0.0	32	89.6	36.1	97	206.6	72.2	162	323.6	243.3	470	878.0
0.6	33	91.4	36.7	98	208.4	72.8	163	325.4	248.9	480	896.0
1.1	34	93.2	37.2	99	210.2	73.3	164	327.2	254.4	490	914.0
1.7	35	95.0	37.8	100	212.0	73.9	165	329.0	260.0	500	932.0
2.2	36	96.8	38.3	101	213.8	74.4	166	330.8	265.6	510	950.0
2.8	37	98.6	38.9	102	215.6	75.0	167	332.6	271.1	520	968.0
3.3	38	100.4	39.4	103	217.4	75.6	168	334.4	276.7	530	986.0
3.9	39	102.2	40.0	104	219.2	76.1	169	336.2	282.2	540	1004.0
4.4	40	104.0	40.6	105	221.0	76.7	170	338.0	287.8	550	1022.0
5.0	41	105.8	41.1	106	222.8	77.2	171	339.8	293.3	560	1040.0
5.6	42	107.6	41.7	107	224.6	77.8	172	341.6	298.9	570	1058.0
6.1	43	109.4	42.2	108	226.4	78.3	173	343.4	304.4	580	1076.0
6.7	44	111.2	42.8	109	228.2	78.9	174	345.2	310.0	590	1094.0
7.2	45	113.0	43.3	110	230.0	79.4	175	347.0	315.6	600	1112.0
7.8	46	114.8	43.9	111	231.8	80.0	176	348.8	321.1	610	1130.0
8.3	47	116.6	44.4	112	233.6	80.6	177	350.6	326.7	620	1148.0
8.9	48	118.4	45.0	113	235.4	81.1	178	352.4	332.2	630	1166.0
9.4	49	120.2	45.6	114	237.2	81.7	179	354.2	337.8	640	1184.0
10.0	50	122.0	46.1	115	239.0	82.2	180	356.0	343.3	650	1202.0
10.6	51	123.8	46.7	116	240.8	82.8	181	357.8	348.9	660	1220.0
11.1	52	125.6	47.2	117	242.6	83.3	182	359.6	354.4	670	1238.0
11.7	53	127.4	47.8	118	244.4	83.9	183	361.4	360.0	680	1256.0
12.2	54	129.2	48.3	119	246.2	84.4	184	363.2	365.6	690	1274.0
12.8	55	131.0	48.9	120	248.0	85.0	185	365.0	371.1	700	1292.0

Centistokes (cSt)	Saybolt SUS (sec.)		Redwood R (sec.)		Englar E (deg.)	Centistokes (cSt)	Saybolt SUS (sec.)		Redwood R (sec.)		Englar E (deg.)
	100°F	210°F	50°C	100°C			100°F	210°F	50°C	100°C	
2	32.6	32.8	30.8	31.2	1.14	35	163	164	144	147	4.70
3	36.0	36.3	33.3	33.7	1.22	36	168	170	148	151	4.83
4	39.1	39.4	35.9	36.5	1.31	37	172	173	153	155	4.96
5	42.3	42.6	38.5	39.1	1.40	38	177	178	156	159	5.08
6	45.5	45.8	41.1	41.7	1.48	39	181	183	160	164	5.21
7	48.7	49.0	43.7	44.3	1.56	40	186	187	164	168	5.34
8	52.0	52.4	46.3	47.2	1.65	41	190	192	168	172	5.47
9	55.4	55.8	49.1	50.0	1.75	42	195	196	172	176	5.59
10	58.8	59.2	52.1	52.9	1.84	43	199	201	176	180	5.72
11	62.3	62.7	55.1	56.0	1.93	44	204	205	180	185	5.85
12	65.9	66.4	58.2	59.1	2.02	45	208	210	184	189	5.98
13	69.6	70.1	61.4	62.3	2.12	46	213	215	188	193	6.11
14	73.4	73.9	64.7	65.6	2.22	47	218	219	193	197	6.24
15	77.2	77.7	68.0	69.1	2.32	48	222	224	197	202	6.37
16	81.1	81.7	71.5	72.6	2.43	49	227	228	201	206	6.50
17	85.1	85.7	75.0	76.1	2.54	50	231	233	205	210	6.63
18	89.2	89.8	78.6	79.7	2.64	55	254	256	225	231	7.24
19	93.3	94.0	82.1	83.6	2.76	60	277	279	245	252	7.90
20	97.5	98.2	85.8	87.4	2.87	65	300	302	266	273	8.55
21	102	102	89.5	91.3	2.98	70	323	326	286	294	9.21
22	106	107	93.3	95.1	3.10	75	346	349	306	315	9.89
23	110	111	97.1	98.9	3.22	80	371	373	326	336	10.5
24	115	115	101	103	3.34	85	394	397	347	357	11.2
25	119	120	105	107	3.46	90	417	420	367	378	11.8
26	123	124	109	111	3.58	95	440	443	387	399	12.5
27	128	129	112	115	3.70	100	464	467	408	420	13.2
28	132	133	116	119	3.82	120	556	560	490	504	15.8
29	137	138	120	123	3.95	140	649	653	571	588	18.4
30	141	142	124	127	4.07	160	742	747	653	672	21.1
31	145	146	128	131	4.20	180	834	840	734	757	23.7
32	150	150	132	135	4.32	200	927	933	816	841	26.3
33	154	155	136	139	4.45	250	1,159	1,167	1,020	1,051	32.9
34	159	160	140	143	4.57	300	1,391	1,400	1,224	1,241	39.5

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