

Types and Features

Types

Water pump bearings come in two types. One is a Ball·Ball type (BWF) and the other is a Ball·Roller type (RWF). The Ball·Roller type design offers a much higher radial load capability of the roller row, which is particularly important when supporting either a fan or a relatively high off-set belt load.

Features

•Newly developed water resistant seals offer five times greater durability.

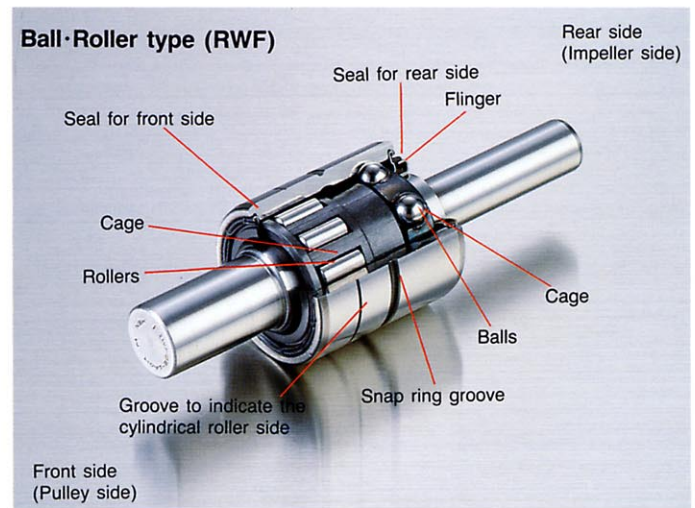
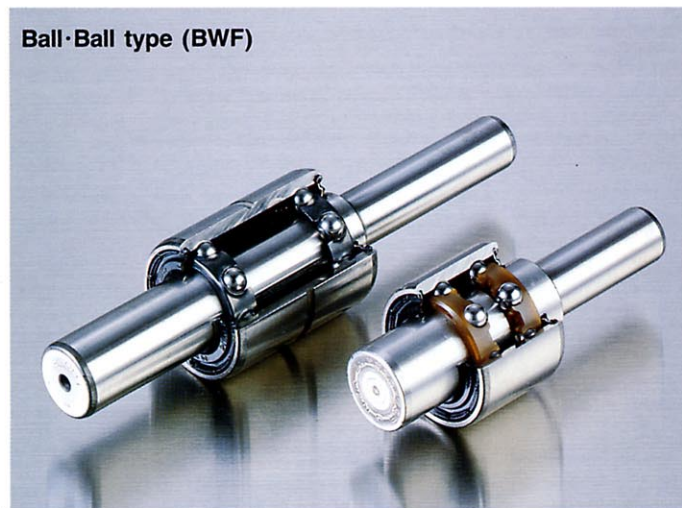
NSK has developed brand-new water resistant seals. As a result, the durability under wet conditions is increased over five times.

•A better grease <WPH> was developed.

NSK has developed an improved grease for water pumps. It is superior in terms of resistance to water, heat, and rust.

•Longer life is achieved by adoption of a new steel material.

The new steel is a low oxygen and high cleanliness steel which has a life three times longer than common bearing steels. Also, the steel is carburized to achieve a much longer life.



Properties

Any water (or water + coolant) entering through the mechanical seal may adversely affect the water pump bearing's effectiveness. If water enters into the bearing, surface fatigue occurs more rapidly due to insufficient oil film formation. Consequently, the bearing life decreases sharply. Therefore, it is very important to prevent water penetration to achieve full bearing life. <High durability water pump bearings> are so named for their high durability and reliability.

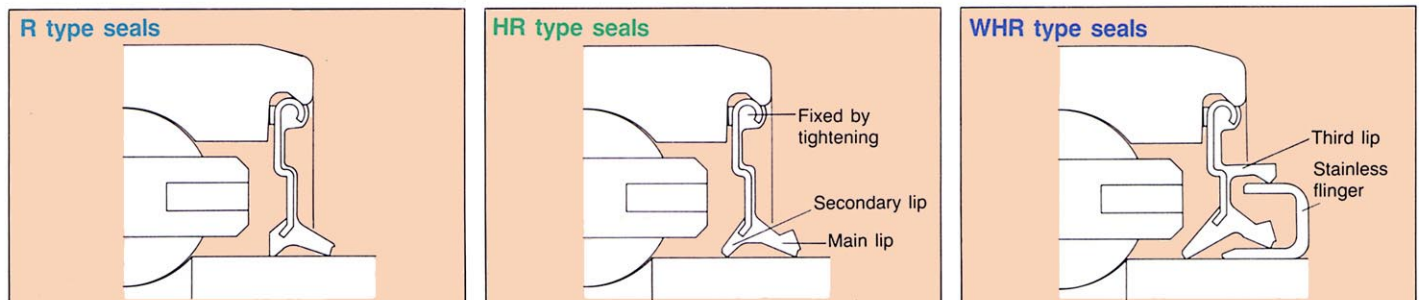


Fig. 1 Kinds of seals

•Seals

<R type seals>

Since rubber seals tightly hug the outer ring recess, water penetration from the outside is prevented completely. A double-lip type seal is adopted, so that water penetration and grease leakage can be minimized.

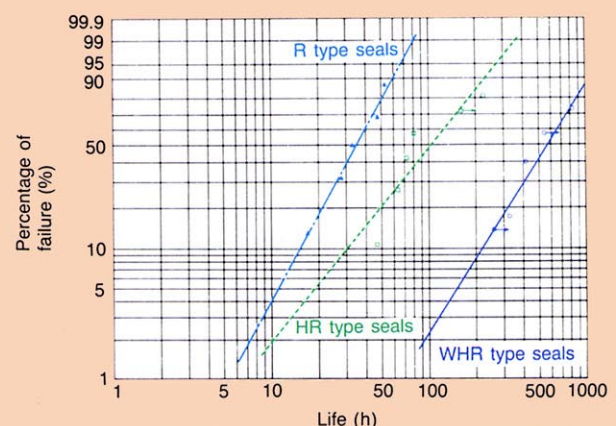
<HR type seals>

The water resistance of the main lips is increased beyond the degree of R type seals. Also, the HR type seal provides improved sealing in environments of engine vibration and unbalanced runout vibration.

<WHR type seals>

The third lip and flinger prevent water penetration remarkably well. The flinger prevents seal wear generated by a rusty surface, thereby increasing reliability.

Fig. 2 Percentage of failure of seals under NSK's accelerated testing conditions

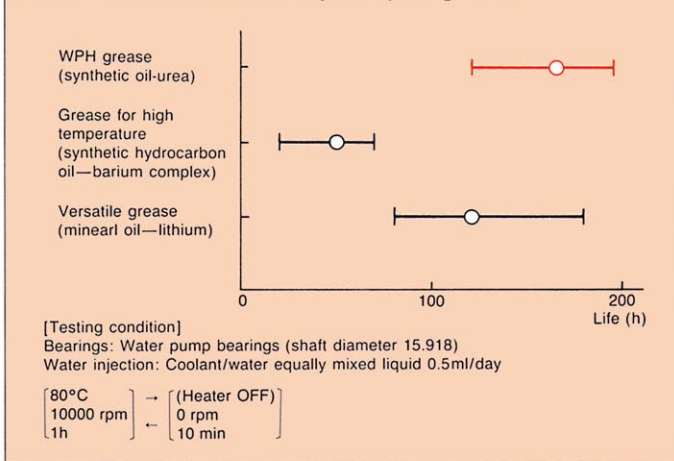


•Grease (WPH grease)

The recent trends toward more powerful and efficient engines require better grease which has higher resistance to heat, load and water. NSK's WPH grease was developed to answer these demands.

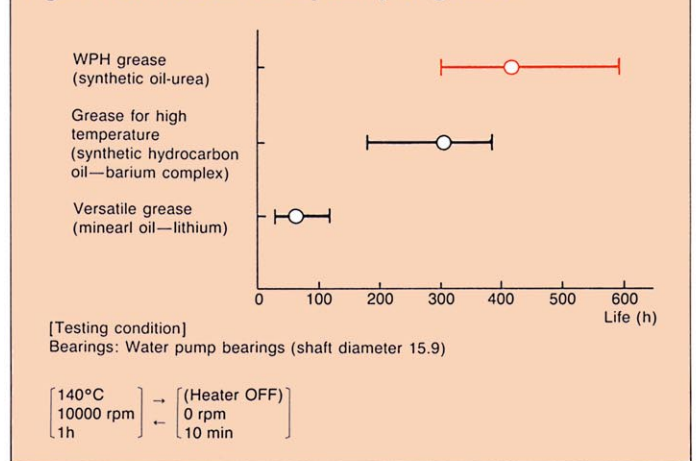
1. The thickener is a urea compound, which ensures proper lubrication for long periods because of its resistance to water and temperature effects.

Fig. 3 Water resistance capability of greases



2. The base oil of WPH is poly-alpha-olefin, which has high anti-oxidation capability and high heat stability. These characteristics result in excellent resistance to grease deterioration and bearing seizure at elevated bearing temperatures.
3. WPH has been shown to be excellent for rust prevention.

Fig. 4 Heat resistance capability of greases



Design and Manufacturing

- NSK high durability water pump bearings incorporate NSK's technology in their design and manufacturing.
- Rollers in the bearings are crowned, thus avoiding edge loading even under an off-set load which would otherwise cause large misalignment. (See Fig. 5 and Fig. 6)

Fig. 5 Distribution of roller surface pressure for general bearings

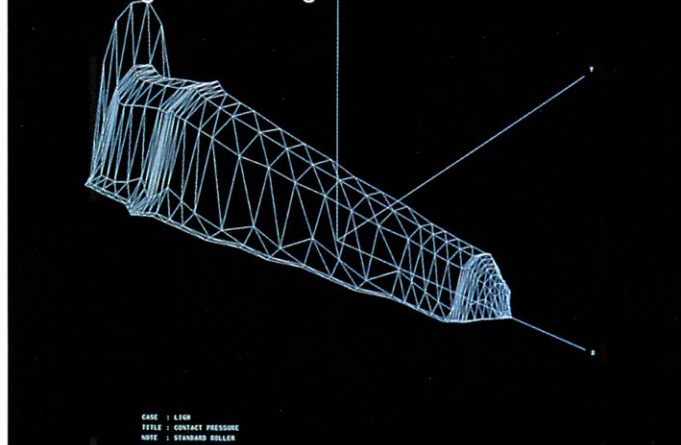


Fig. 6 Distribution of roller surface pressure for NSK water pump bearings

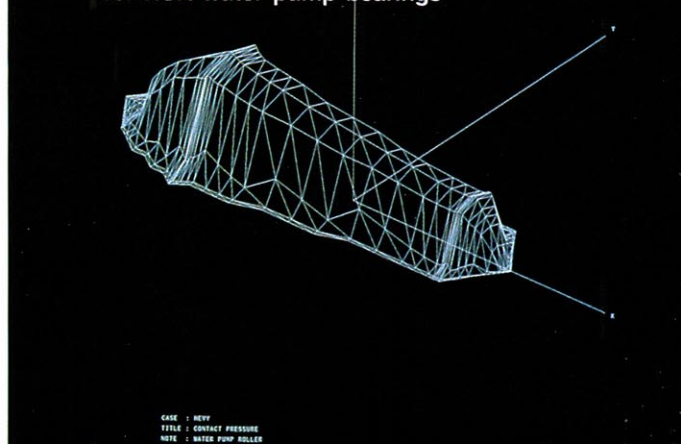
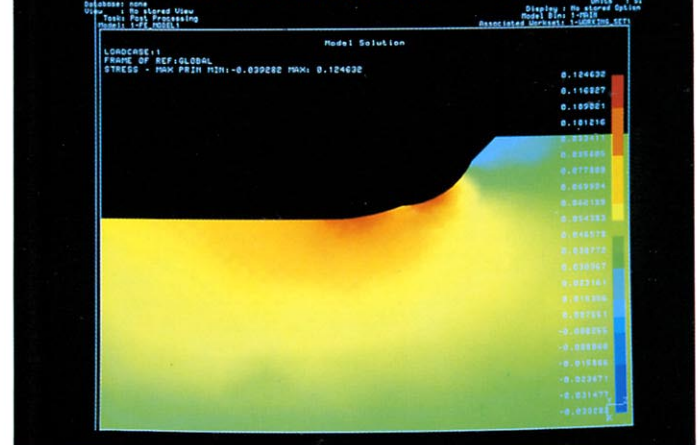


Fig. 7 An example of FEM analysis of shaft stress distribution:



*When using water pumps with cooling fan clutches, NSK recommends the selection of one of the lower resonant bearings which were originally developed by NSK for fan clutches.

- Each chamfer is designed for ease of assembly and to avoid generating an unbalanced load.

Technical specification and bearing number system

Technical specification

(1) Calculation of rating fatigue life

Suppose a number of bearings of the same type are operated individually under the same conditions. After a certain period of time, 10% of them fail as a result of flaking caused by rolling fatigue. In this case, the total number of revolutions is defined as the rating fatigue life, or if the speed is constant, the rating fatigue life is often expressed by the total number of operating hours completed at the time when 10% of the bearings become inoperable due to flaking. It can be calculated by using the equation on the right.

If the amount of the load's off-set is large, it is necessary to investigate and consider the incline of shafts, as well as the effect of the edge load. In such cases please consult NSK.

(2) Standard design dimensions

Standard design dimensions of both Ball·Roller type and Ball·Ball type water pump bearings are described from page 7 to page 10. If other dimensions are required, please consult NSK.

Calculation of rating fatigue life

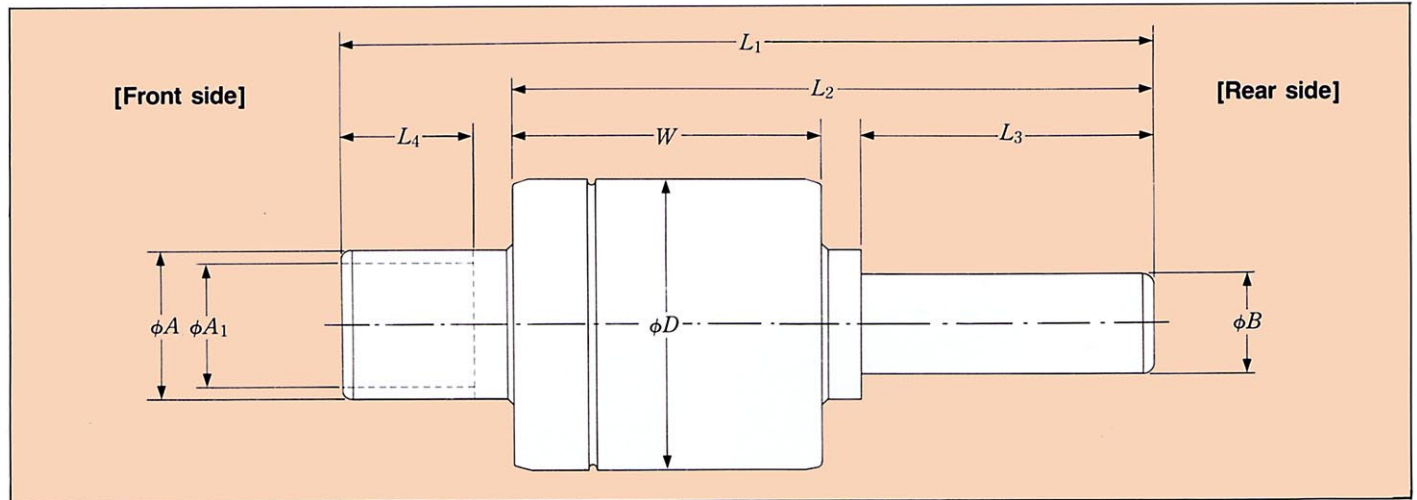
$$\text{Ball bearings} \quad L_h = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3$$

$$\text{Roller bearings} \quad L_h = \frac{10^6}{60n} \left(\frac{C}{P}\right)^{\frac{10}{3}}$$

where L_h : Rating fatigue life (h)
 P : Bearing load (N) {kgf}
 C : Basic load rating (N) {kgf}
 n : Bearing speed (rpm)

(3) Accuracy

Both Ball·Ball type and Ball·Roller type of water pump bearings have the same dimensional tolerances as outlined below.

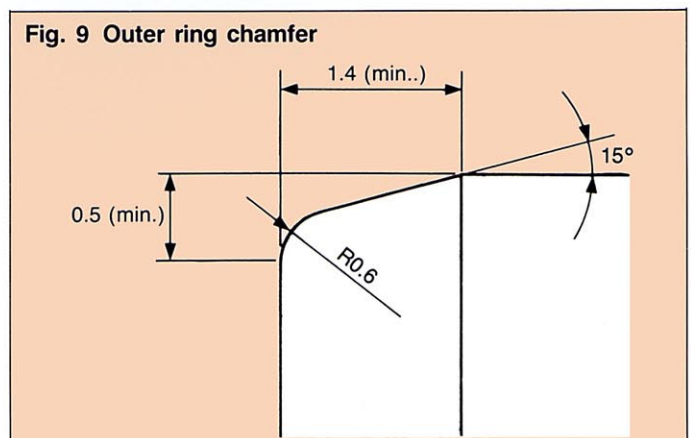
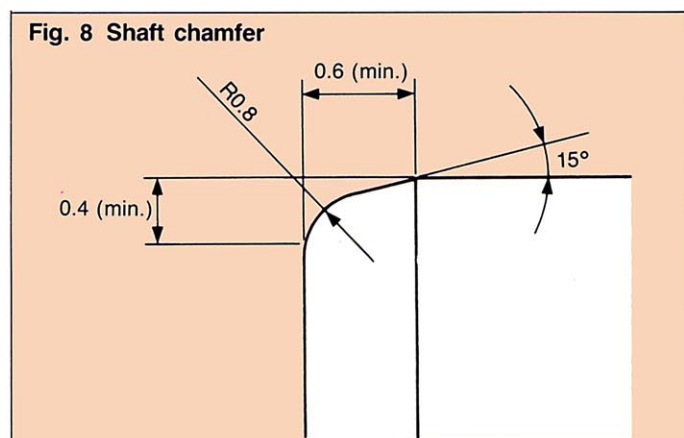


Units: μm

Types of bearings	Tolerance of outside diameter of outer ring D		Tolerance of width of outer ring W		Tolerance of diameter of main shaft A		Tolerance of diameter of front shaft A_1		Tolerance of diameter of rear shaft B		Tolerance of shaft length L_1		Tolerance of front shaft length L_4		Tolerance of rear shaft length L_3		Tolerance of assembled width L_2	
	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low
RWF	0	-13	+150	-150	0	-13	0	-13	0	-13	+250	-250	+250	-250	+250	-250	+150	-150
BWF	All dimensions																	

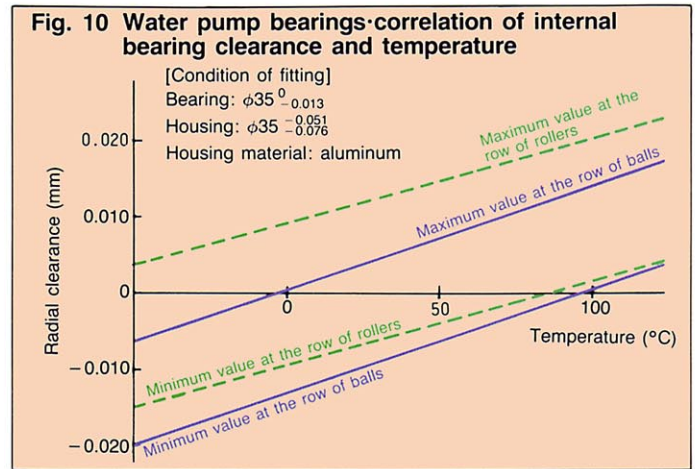
(4) Dimensions of chamfers

Standard chamfer designs and dimensions of NSK water pump bearings are as follows:



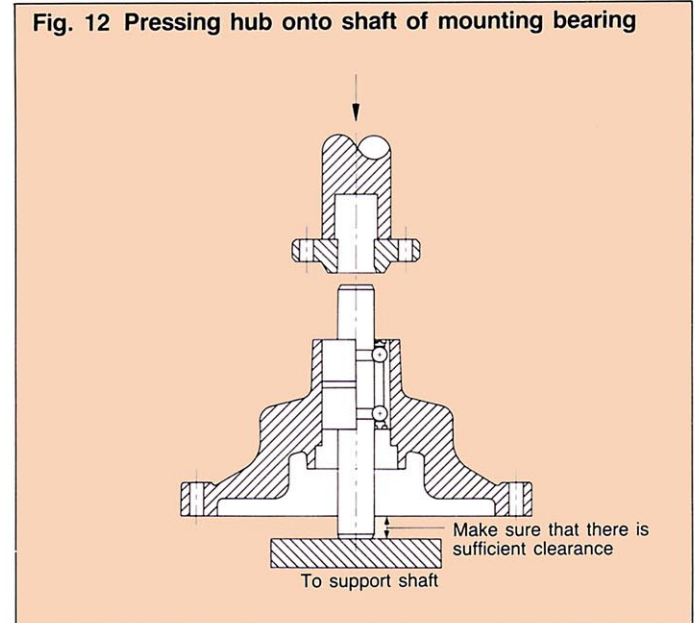
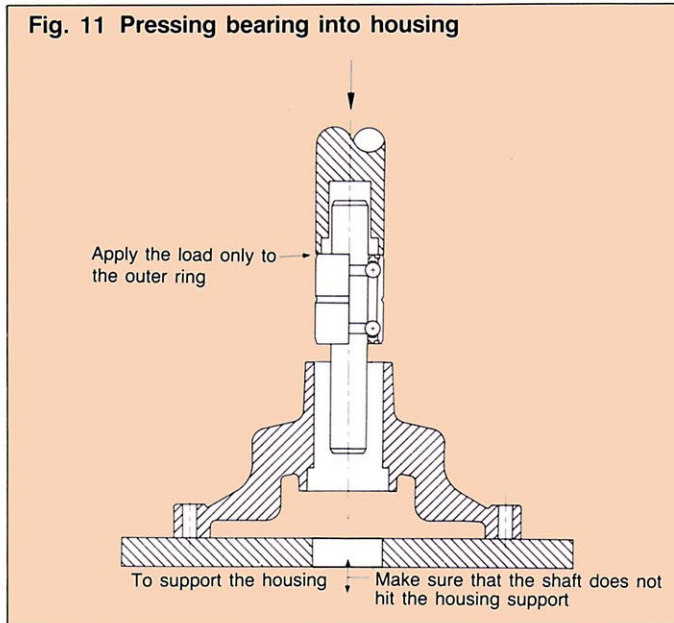
(5) Internal bearing clearances

The internal clearance in rolling bearings in operation greatly influences bearing performance in terms of fatigue life, vibration, noise, heat-generation, etc. Consequently, the selection of a proper internal clearance is one of the most important tasks. Theoretically, the longest bearing life can be expected when the clearance is slightly negative. However, it is difficult to achieve such an ideal condition, and an excessive negative clearance will greatly shorten the bearing life. Therefore, a clearance of zero or a slightly positive amount, instead of a negative one, should be selected in general. The clearance of water pump bearings is normally selected within the range between 0.010 mm—0.040 mm, but it may be necessary to change this range depending on the interference, rigidity, material, and temperature of the housing. Please consult NSK for further information on this topic.



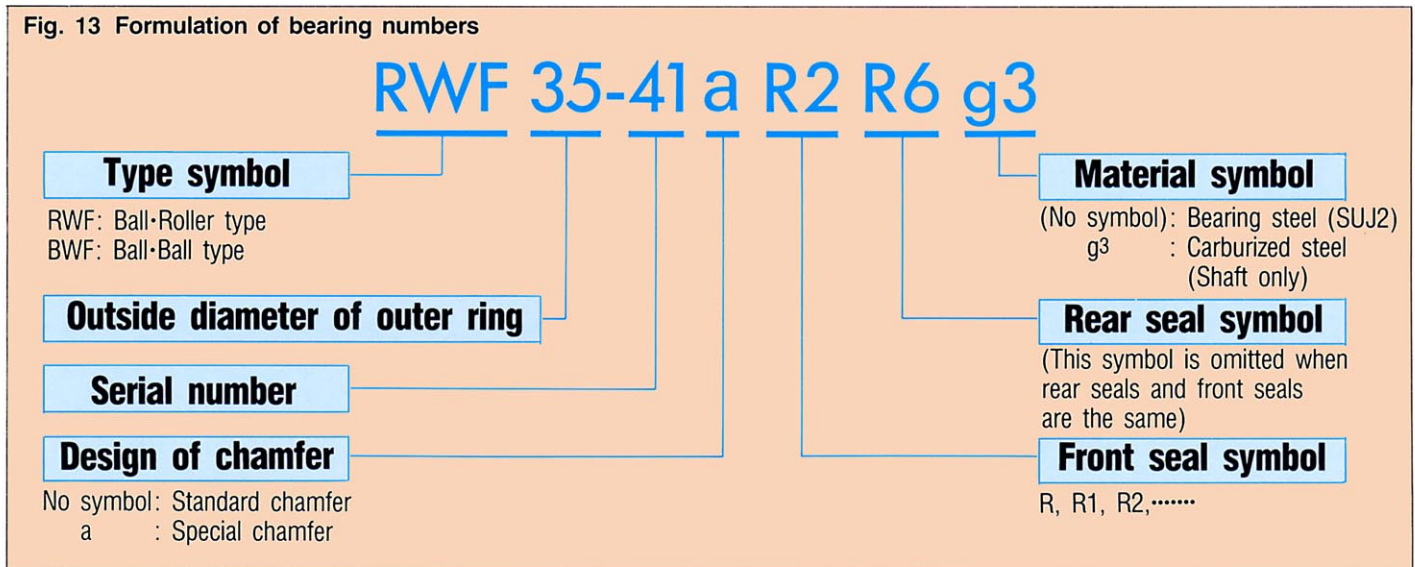
(6) Mounting

The mounting of bearings deserves careful attention, because the entry of dust and debris on bearing raceways or rolling elements can cause excessive noise, vibration and premature failure. Also, proper tools and assembly techniques should be used to prevent the transmission of forces between the bearing shaft and the outer ring.

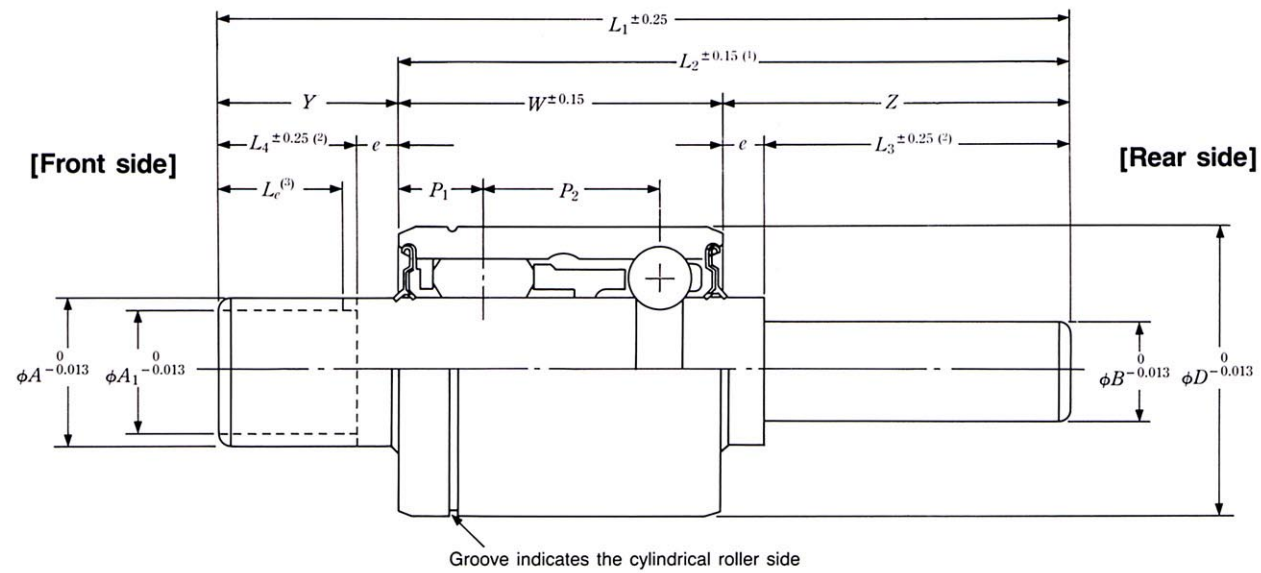


Bearing numbering system

The water pump bearing numbering system is outlined in Fig. 13. The dimensions for each bearing number are shown in the design tables on pages 7 to 18.



Design table (Ball·Roller type <RWF>)

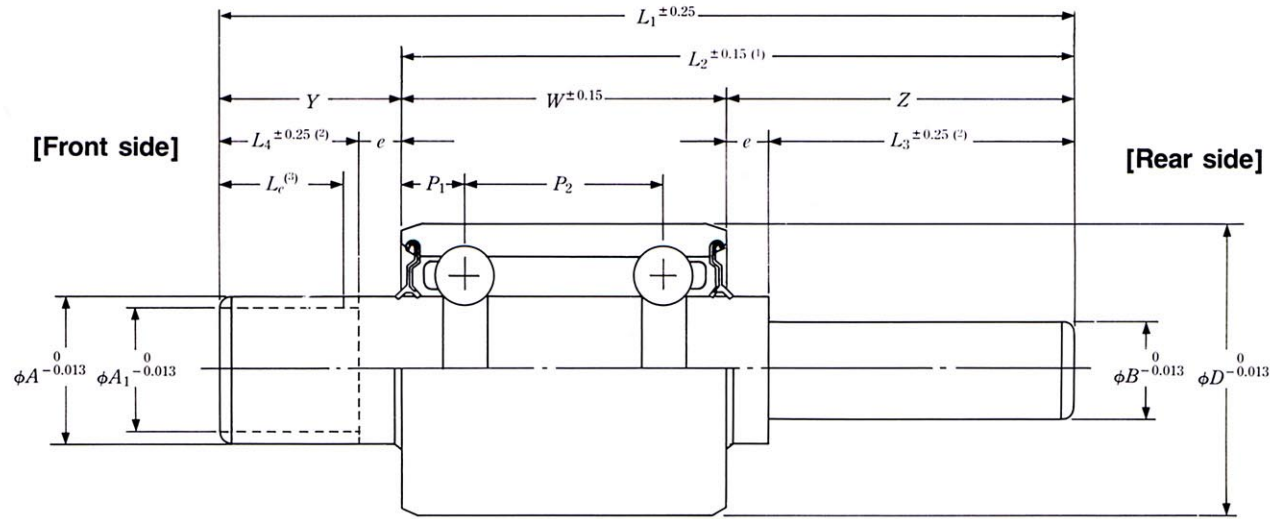


Bearing series numbers	Dimensions (mm)										Basic load ratings									
	Outside dia. of outer ring D	Width of outer ring W	Dia. of main shaft A	Dia. of front shaft A_1	Dia. of rear shaft B	Shaft length (4) (Maximum) L_1	Protrusion from outer ring face (4) (Maximum) Y	Protrusion from the stepped shaft (4) (Maximum) Z	Protrusion of stepped part (5) e	Pitches		Roller row				Ball row				
										P_1	P_2	(N)		{kgf}		(N)		{kgf}		
											C_r	C_{or}	C_r	C_{or}	C_r	C_{or}	C_r	C_{or}		
RWF26	26	30	12	—	—	150	55	55	R type seals:	9.75	14.25	12 800	11 400	1 310	1 160	3 950	1 560	405	159	
	26	39	12	—	12	150	55	55		1.5	9.75	23.25	13 200	11 400	1 310	1 160	3 950	1 560	405	159
RWF28	28	20	17.2	—	12	150	55	55	HR type seals:	2.0	5.25	9.55	6 300	5 250	645	535	5 100	2 400	520	244
RWFS30	30	30	17.2	—	12	150	55	55	2.5	8.75	14.75	13 200	26 000	1 350	1 280	6 000	2 670	615	237	
RWF30	30	29.9	15.918	—	12	150	55	55		8.85	14.28	14 600	12 800	1 490	1 300	6 600	2 760	675	281	
	30	38.84	15.918	—	12	150	55	55		9.8	22.27	17 000	26 000	1 730	1 580	6 600	2 760	675	281	
	30	46	15.918	—	12	150	55	55		9.8	29.43	17 000	26 000	1 730	1 580	6 600	2 760	675	281	
RWF35	35	38.84	18	15.918	12	150	55	55		10.3	21.04	18 500	17 700	1 890	1 810	8 150	3 450	830	355	
	35	46	18	15.918	12	150	55	55		10.3	28.2	18 500	17 700	1 890	1 810	8 150	3 450	830	355	
	35	56	18	15.918	12	150	55	55		10.3	38.2	18 500	17 700	1 890	1 810	8 150	3 450	830	355	
RWF41	41	38.9	20	—	12	150	55	55		12.65	17.74	28 000	27 200	2 860	2 770	9 800	4 250	1 000	430	
RWF42	42	46	22	15.918	12	150	55	55		12.15	24.35	24 900	23 600	2 540	2 410	11 600	5 100	1 180	520	
	42	56	22	15.918	12	150	55	55		12.15	34.35	24 900	23 600	2 540	2 410	11 600	5 100	1 180	520	

- Notes**
- (1) The assembled width (L_2) is considered to be the standard dimension for specifying a design. As shown in the figure, the assembled length (L_2) is the distance between the front end face of an outer ring and the rear end face of a shaft. Please contact NSK, if you want to use a different dimension to specify a design. The tolerance of the assembled width (L_2) refers to the case when there is no axial clearance.
 - (2) The standard shaft length of the front side (L_4) or that of the rear side (L_3) is obtained by subtracting the protrusion of the stepped part (e) from the shaft protrusion (front: Y ; rear: Z).
 - (3) The effective shaft length of the front or rear side (L_c : the length which can assure the tolerance of the shaft diameter) is obtained by subtracting 2.5 mm from the shaft length (from: L_4 ; rear: L_3).
 - (4) The shaft length (L_1), the shaft protrusion of the front side (Y), and the shaft protrusion of the rear side (Z) show their maximum dimension. When you need a dimension larger than these values, please contact NSK.
 - (5) The protrusion of the stepped part (e) shows the minimum length necessary to prevent seals from touching the stepped part.

Remarks When other dimensions than those shown here are necessary, please contact NSK. For actual results of manufacture, please refer to page 11 to page 18.

Dimensional table (Ball·Ball type <BWF>)

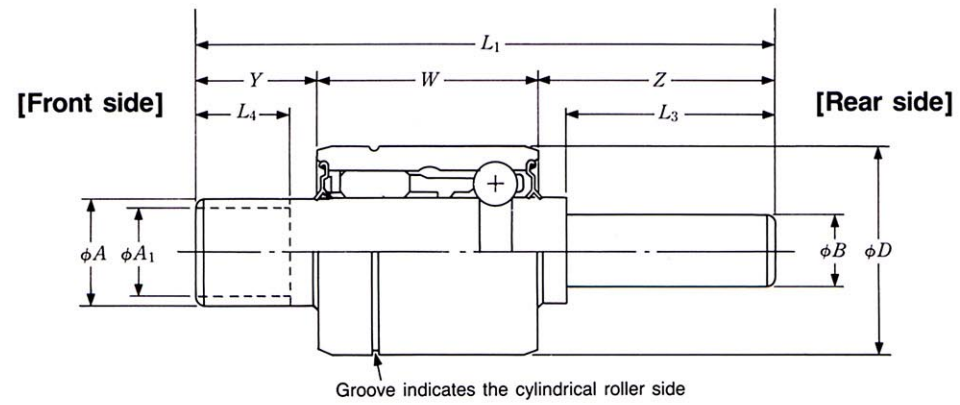


Bearing series numbers	Dimensions (mm)										Basic load ratings (One row)				
	Outside dia. of outer ring D	Width of outer ring W	Dia. of main shaft A	Dia. of front shaft A_1	Dia. of rear shaft B	Shaft length ⁽⁴⁾ (Maximum) L_1	Protrusion from outer ring face ⁽⁴⁾ (Maximum) Y	Protrusion from the stepped shaft ⁽⁴⁾ (Maximum) Z	Protrusion of stepped part ⁽⁵⁾ e	Pitches		(N)		{kgf}	
										P_1	P_2	C_r	C_{or}	C_r	C_{or}
BWF24	24	15	10	—	—	150	55	55	R type seals:	4	7	3 300	1 200	340	122
	24	31.5	10	—	—	150	55	55	1.5	12	19.5	3 300	1 200	340	122
BWF26	26	30	12	—	—	150	55	55	HR type seals:	6	18	3 950	1 560	405	159
	26	39	12	—	—	150	55	55	2.0	6	27	3 950	1 560	405	159
BWF28	28	15.9	17.2	(12)	12	150	55	55	WHR type seals:	5.2	5.5	5 100	2 400	520	244
	28	20	17.2	(12)	12	150	55	55	2.5	5.2	9.6	5 100	2 400	520	244
BWFS30	30	23	17.2	—	12	150	55	55		6.5	10	6 000	2 670	615	273
BWF30	30	30	15.918	(12)	12	150	55	55		6	18	6 000	2 640	610	269
	30	38.89	15.918	(12)	12	150	55	55		5.945	27	6 000	2 640	610	269
	30	45.9	15.918	(12)	12	150	55	55		6.45	33	6 000	2 640	610	269
BWF35	35	29.9	17.5	15.918	12	150	55	55		6.95	16	8 150	3 450	830	355
	35	38.89	17.5	15.918	12	150	55	55		7.195	24.5	8 150	3 450	830	355
	35	38.89	18	15.918	12	150	55	55		7.195	24.5	8 150	3 450	830	355
	35	46	17.5	15.918	12	150	55	55		7.195	31.61	8 150	3 450	830	355
	35	46	18	15.918	12	150	55	55		7.195	31.61	8 150	3 450	830	355
BWF40	40	46	19	17	12	150	55	55		8	30	9 800	4 250	995	430

Notes (1) The assembled width (L_2) is considered to be the standard dimension for specifying a design. As shown in the figure, the assembled length (L_2) is the distance between the front end face of an outer ring and the rear end face of a shaft. Please contact NSK, if you want to use a different dimension to specify a design. The tolerance of the assembled width (L_2) refers to the case when there is no axial clearance.
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 (4) The shaft length (L_1), the shaft protrusion of the front side (Y), and the shaft protrusion of the rear side (Z) show their maximum dimension. When you need a dimension larger than these values, please contact NSK.
 (5) The protrusion of the stepped part (e) shows the minimum length necessary to prevent seals from touching the stepped part.

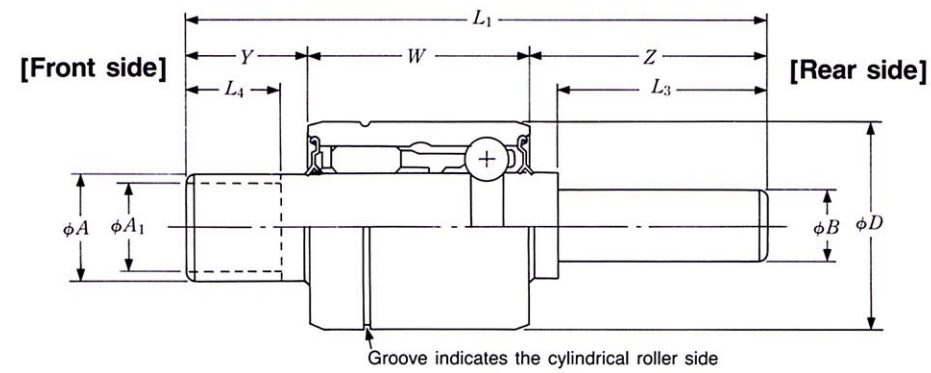
Remarks When other dimensions than those shown here are necessary, please contact NSK. For actual results of manufacture, please refer to page 11 to page 18.

Dimensional table (Ball·Roller type <RWF>)



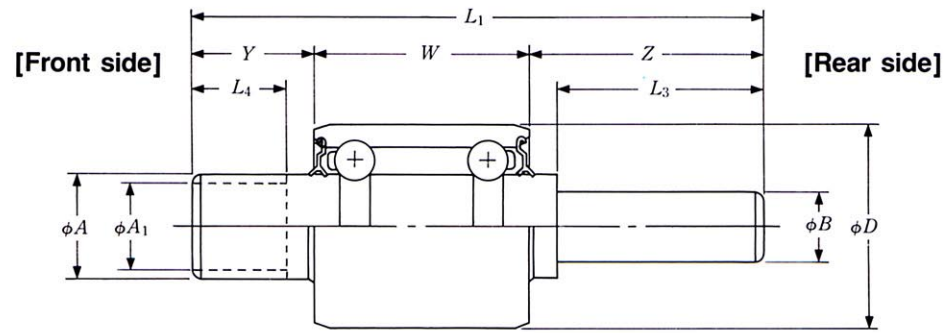
Dimensions (mm)											Bearing numbers
D	W	A	A ₁	B	L ₁	Y	Z	L ₄	L ₃		
30	38.84	15.918	—	12	112	30.025	43.135	—	40.5	RWF30-2R	
30	38.84	15.918	—	12	124	42.025	43.135	—	40.5	RWF30-5R	
30	38.84	15.918	—	12	124	42.025	43.135	—	40.5	RWF30-5aRR6	
30	38.84	15.918	—	12	101	25	37.16	—	34.5	RWF30-8aR	
30	38.84	15.918	—	12	114	25.025	50.135	—	47.5	RWF30-10aR	
30	38.84	15.918	—	12	114	25.025	50.135	—	47.5	RWF30-10aRR6	
30	38.84	15.918	—	—	67.8	27.16	1.8	—	—	RWF30-17a1R	
30	38.84	15.918	—	12	82.6	11.2	32.56	—	29.9	RWF30-19AR	
30	38.84	15.918	—	12	88	12.5	36.66	—	34	RWF30-23AR1	
30	38.84	15.918	—	12	106	30	37.16	—	34.5	RWF30-29aRR6g3	
30	38.84	15.918	—	12	106	30	37.16	—	34.5	RWF30-29aRg3	
30	38.84	15.918	—	12	105.2	20.5	45.86	—	41.31	RWF30-31aR	
30	38.84	15.918	—	12	112	30	43.16	—	40.5	RWF30-32aR	
30	38.84	15.918	—	12	112	30	43.16	—	40.5	RWF30-32aR6	
30	38.84	15.918	—	12	106.8	20.5	47.46	—	42.91	RWF30-33aR	
30	38.84	15.918	—	12	92.5	16.5	37.16	—	34.5	RWF30-37aRR6	
30	38.84	15.918	—	12	93	18.5	35.66	—	32.61	RWF30-40R	
30	38.84	15.918	—	12	113.9	20	55.06	—	48.4	RWF30-41R	
30	38.84	15.918	—	12	91	13.5	38.66	—	36	RWF30-44aR	
30	38.84	15.918	—	12	106.2	18.5	48.86	—	41	RWF30-45aR	
30	38.84	15.918	—	12	123.3	20.5	63.96	—	55.8	RWF30-46aR	
30	38.84	15.918	—	12	118.9	20	60.06	—	52.9	RWF30-48aR	
30	38.84	15.918	—	12	96.7	20.5	37.36	—	34.31	RWF30-49aR	
30	38.84	15.918	—	12	122.4	33.5	50.06	—	47.01	RWF30-52R	
30	38.84	15.918	12	—	92.5	35.66	18	32.61	—	RWF30-53R	
30	38.84	15.918	—	12	103	16.5	47.66	—	43	RWF30-55R	
30	38.84	15.918	—	—	68.39	25.05	4.5	—	—	RWF30-58R	
30	38.84	15.918	—	12	92.5	16.5	37.16	—	34.5	RWF30-63aRR6	
46	46	15.918	—	12	123.3	20.5	56.8	—	53.8	RWF30-65aR	
30	38.84	15.918	—	12	93.05	20	34.21	—	32.21	RWF30-67R	
30	38.84	15.918	—	12	90.2	15.5	35.86	—	33.86	RWF30-68aR	
30	38.84	15.918	—	12	93	18.5	35.66	—	32.61	RWF30-69R	
30	38.84	15.918	—	12	96.5	16.5	41.16	—	38.5	RWF30-70aRR6	
30	38.84	15.918	—	12	94.6	16	39.76	—	36.76	RWF30-74R	
30	38.84	15.918	—	12	93	18.5	35.66	—	32.66	RWF30-75aR	

Dimensional table (Ball·Roller type <RWF>)



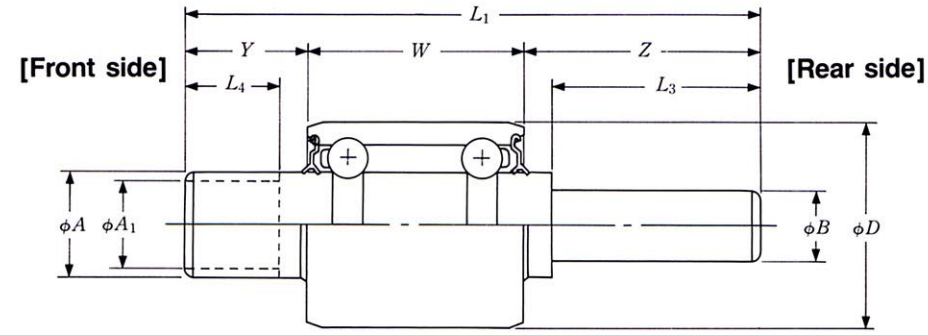
Dimensions (mm)											Bearing numbers
D	W	A	A_1	B	L_1	Y	Z	L_1	L_3		
35	38.84	18	15.918	12	112	30.025	43.135	28.525	40.5	RWF35-1AR	
35	38.84	18	15.918	12	112	30.025	43.135	28.525	40.5	RWF35-1AR1	
35	38.84	18	15.918	12	112	30.025	43.135	28.525	40.5	RWF35-1AaR	
35	38.84	18	15.918	12	112	30.025	43.135	28.525	40.5	RWF35-1AaRR12	
35	46	18	15.918	12	114	27	41	25	38.75	RWF35-3R	
35	46	18	15.918	12	114	27	41	25	38.75	RWF35-3aCRR10	
35	46	18	15.918	12	114	27	41	25	38.75	RWF35-3aR1	
35	46	18	15.918	12	114	27	41	25	38.75	RWF35-3aRR10	
35	46	18	15.918	12	114	27	41	25	38.75	RWF35-3aRR12	
35	46	18	15.918	12	119	30	43	28.5	40	RWF35-5aRR12g3	
35	38.84	18	15.918	12	124	42.025	43.135	40.525	40.75	RWF35-6aR	
35	38.84	18	15.918	12	124	42.025	43.135	40.525	40.75	RWF35-6aRR12	
35	38.84	18	15.918	12	101	25.025	37.135	23.5	34.75	RWF35-9aR	
35	38.84	18	15.918	12	101	25.025	37.135	23.5	34.75	RWF35-9aRR10	
35	38.84	18	15.918	12	101	25.025	37.135	23.5	34.75	RWF35-9aRR12	
35	46	18	15.918	12	100.5	18	36.5	16.25	34	RWF35-14a1R	
35	46	18	15.918	12	100.5	18	36.5	16.25	34	RWF35-14a1RR12	
35	46	18	—	12	114	26.3	41.7	—	37	RWF35-15R	
35	46	18	15.918	12	143.2	43.5	53.7	40.5	50.7	RWF35-18aR	
35	56	18	15.918	12	126	28.5	41.5	26.5	37	RWF35-19AR	
35	46	18	15.918	12	143.2	43.5	53.7	8.7	50.7	RWF35-31aR	
35	38.84	18	15.918	12	92.5	16.5	37.16	14	34.75	RWF35-35aR	
35	38.84	18	15.918	12	92.5	16.5	37.16	14	34.75	RWF35-35aRR12	
35	56	18	15.918	—	89	29	4	27.25	—	RWF35-42aRg3	
35	38.84	18	17.5	12	100.4	15	46.56	15	43.65	RWF35-43XaRR10	
35	46	18	15.918	12	108.5	21.5	41	19.5	38.75	RWF35-45aR	
35	38.84	18	15.918	12	106	30	37.16	28.5	34.75	RWF35-48aRR12	
35	46	18	17	12	112.9	23.9	43	21.65	38.5	RWF35-54R	
35	46	18	17	12	121.5	32.5	43	31	38.5	RWF35-60R	
35	38.84	18	17.5	12	112.22	24.53	48.85	23	45.85	RWF35-66aR	
35	56	18	17.5	12	121.9	20	45.9	18.5	40.5	RWF35-67aR	
35	56	18	15.918	12	125.5	27.25	42	26	39.25	RWF35-69aR17R21g3	
35	38.89	18	15.918	12	99.5	23.5	37.11	21	34.5	RWF35-71aRR12	
35	46	18	15.918	—	78.2	29.7	2.5	14	—	RWF35-75aR17	
35	46	18	17	12	123	34	43	32	38.5	RWF35-77R	
35	29.9	17.5	—	12	96.2	13.6	52.7	—	50.45	RWF35-79R4	
35	38.84	18	15.918	12	112	30	43.16	28.75	40.5	RWF35-82aRR21	
42	46	22	—	16	142	41	55	—	49	RWF42-4RR3 + Y	
42	46	22	15.918	12	119	30	43	29	40.5	RWF42-6aRR4g3	
42	56	22	15.918	—	87.5	27.5	4	26.5	—	RWF42-9aCRR3g3	
42	46	22	19	12	132.45	36.45	50	34.95	45	RWF42-12R	
42	46	22	18	12	112	28.5	37.5	27	35	RWF42-15R	
42	46	22	—	12	144.7	41	57.7	—	51.7	RWF42-17RR3 + Y	
42	46	22	—	12	110.4	23.4	41	—	38.5	RWF42-21aRR4g3	
42	46	22	—	16	142	33	63	—	57	RWF42-30RR3 + Y	

Dimensional table (Ball·Ball type <BWF>)



Dimensions (mm)										Bearing numbers	
D	W	A	A ₁	B	L ₁	Y	Z	L ₁	L ₃		
30	38.89	15.918	—	12	107.5	21.555	47.055	—	44	BWF30-5R	
30	38.89	15.918	12	12	103.5	21.555	43.055	19.5	40.5	BWF30-6AaRR6	
30	38.89	15.918	—	12	106.7	21.5	46.31	—	42.7	BWF30-10R	
30	38.89	15.918	—	12	105.5	23.5	43.11	—	40.5	BWF30-15aRR6	
30	38.89	15.918	—	—	105.4	16.5	50.01	—	—	BWF30-22R	
30	38.89	15.918	—	12	114.54	29.34	46.31	—	42.7	BWF30-40ER	
30	38.89	15.918	14	12	101	24	38.11	21.8	35.11	BWF30-44R	
30	38.89	15.918	—	—	104.77	26.99	38.89	—	—	BWF30-49R	
30	38.89	15.918	—	—	122.4	33.5	50.01	—	—	BWF30-51BR	
30	38.89	15.918	—	12	93	18.5	35.61	—	32.61	BWF30-56GaR	
30	38.89	15.918	—	12	103.5	21.555	43.055	—	40	BWF30-73AR	
30	38.89	15.918	—	12	112	30	43.11	—	40.5	BWF30-76BaRR6	
30	38.89	15.918	—	—	64.5	3.61	22	—	—	BWF30-80R	
30	38.89	15.918	—	12	103.5	19.555	45.055	—	42	BWF30-88R	
30	38.89	15.918	—	12	124	42	43.11	—	40.5	BWF30-89aRR6	
30	38.89	15.918	—	12	98.5	22.5	37.11	—	33.5	BWF30-119R	
30	38.89	15.918	—	—	115.9	23.81	53.2	—	—	BWF30-121R	
30	38.89	15.918	—	12	84.4	13	32.51	—	29.9	BWF30-122R	
30	38.89	15.918	—	—	112	23.1	50.01	—	—	BWF30-130R	
30	38.89	15.918	15.008	15.008	97.5	22.8	35.81	20	33	BWF30-131R	
30	38.89	15.918	—	12	92.5	16.5	37.11	16.5	34.5	BWF30-137aRR6	
30	38.89	15.918	12	12	115	25.3	50.81	23.1	47.81	BWF30-138R	
30	30	15.918	—	12	78	12	36	—	33.4	BWF30-143AR	
30	38.89	15.918	—	12	99.5	16.5	44.11	—	41.5	BWF30-148R1	
30	38.89	15.918	—	—	78.89	25	15	—	—	BWF30-150R	
30	38.89	15.918	—	12	100	26	35.11	—	32.61	BWF30-151R	
30	38.89	15.918	—	12	122.4	33.5	50.01	—	47	BWF30-158R	
30	38.89	15.918	—	12	94.6	16	39.71	—	36.71	BWF30-159R	
30	38.89	15.918	—	12	91.9	18.5	34.51	—	31.51	BWF30-162R	
30	38.89	15.918	—	12	94.9	16.455	39.555	—	36.5	BWF30-164R	
30	38.89	15.918	—	12	112.69	27	46.8	—	44.3	BWF30-165aR	
30	38.89	15.918	—	12	94.6	19.2	36.51	—	33.51	BWF30-173XR	
30	38.89	15.918	—	12	103	16.5	47.61	—	43	BWF30-174XR	
30	38.89	15.918	—	12	90.2	15.5	35.81	—	32.81	BWF30-175aR	
30	38.89	15.918	12	12	98.5	16.5	43.11	14.5	40.5	BWF30-177aRR6	
30	45.9	15.918	—	12	125.5	20	59.6	—	55.5	BWF30-179aR	
30	38.89	15.918	12	12	98	17	42.11	—	39.11	BWF30-180R	
30	38.89	15.918	—	12	92.5	16.5	37.11	14.5	34.5	BWF30-181aRR6	
30	38.89	15.918	—	12	115.3	20.5	55.91	—	52.91	BWF30-182R	
30	38.89	15.918	—	12	101.8	16.5	46.41	—	43.8	BWF30-185R	
30	38.89	15.918	12	12	92.5	16.5	37.11	14.5	34.5	BWF30-192aR	
30	38.89	15.918	—	12	101.05	24.96	37.2	—	34	BWF30-195R	
30	38.89	15.918	—	12	93.05	20	34.16	—	32.16	BWF30-198XR	
30	30	15.918	—	12	92.5	16.5	46	—	44.3	BWF30-201AR	
30	30	15.918	—	12	86	16.5	39.5	—	37	BWF30-209R	

Dimensional table (Ball·Ball type <BWF>)



Dimensions (mm)										Bearing numbers	
D	W	A	A_1	B	L_1	Y	Z	L_4	L_3		
30	23	17.2	—	12	71.2	13.5	34.7	—	31.7	BWF30-1R	
30	23	17.2	—	12	77.8	15.5	39.3	—	33.3	BWF30-5aR	
30	23	17.2	—	12	77.8	15.5	39.3	—	33.3	BWF30-5aR + Y	
30	23	17.2	—	12	77.8	15.5	39.3	—	33.3	BWF30-5aRR3	
30	23	17.2	—	12	77.8	15.5	39.3	—	33.3	BWF30-5aRR3 + Y	
30	23	17.2	—	12	79	13.5	42.5	—	40	BWF30-6R	
30	23	17.2	—	12	75	13.5	38.5	—	36.5	BWF30-15R	
35	38.89	18	15.918	15.918	122.4	33.5	50.01	31.1	47.6	BWF35-5R	
35	29.9	17.5	—	12	85.5	15.5	40.1	—	36	BWF35-21aR4	
35	29.9	17.5	—	12	79	12	37.1	—	32	BWF35-22aR4	
35	29.9	17.5	—	12	85.5	15.5	40.1	—	37.5	BWF35-26XaR4	
35	29.9	17.5	—	12	85.5	15.5	40.1	—	37.5	BWF35-26XaR4R12	
35	29.9	17.5	—	12	79	12	37.1	—	32	BWF35-27XaR4	
35	29.9	17.5	—	12	79	12	37.1	—	32	BWF35-27XaR4R18	
35	29.9	17.5	—	12	88	16	42.1	—	39.5	BWF35-28XaR4	
35	29.9	17.5	—	12	88	16	42.1	—	39.5	BWF35-28XaR4R18	
35	38.89	17.5	—	12	91	15	37.11	—	34.5	BWF35-32XaR4R11	
35	29.9	17.5	—	12	96.2	13.6	52.7	—	50.2	BWF35-35XR4	
40	46	19	17	12	126.35	30.35	50	27.8	45	BWF40-6DR	
40	46	19	18	13	119	26.5	46.5	24	42	BWF40-17R	
40	46	19	—	12	111	24.3	40.7	—	38.7	BWF40-19R	
40	46	19	—	12	108	18	44	—	42	BWF40-22R	
40	46	19	—	12	110.5	22.6	41.9	—	39.9	BWF40-25R	
40	46	19	—	12	118.5	25	47.5	—	45.5	BWF40-26R	
40	46	19	18	13	125.8	33.3	46.5	30.8	42	BWF40-28R	
40	46	19	12	12	118.5	25	47.5	15.4	45.5	BWF40-31R	
40	46	19	18	13	115.5	26.5	43	24	38.5	BWF40-34R	
40	46	19	18	13	112	28.5	37.5	26	35	BWF40-37R	
40	46	19	—	12	118.5	31.8	40.7	—	38.7	BWF40-38R	
40	46	19	18	13	123.1	33.3	43.8	30.8	39.3	BWF40-40R	
40	46	19	17	12	114.5	28	40.5	25.5	35.5	BWF40-41R	
40	46	19	—	12	110.95	28.9	36.05	—	34.05	BWF40-42aR	
40	46	19	—	12	105.4	20.5	74.95	—	36.9	BWF40-43R	
40	46	19	17	12	116.85	30.35	40.5	27.8	35.5	BWF40-47R	
40	46	19	—	12	103.85	22.3	35.55	—	33.55	BWF40-49aR	
40	46	19	—	12	111.45	28.9	36.55	—	34.55	BWF40-52aR	
40	46	19	17	12	116.45	33.9	36.55	—	34.55	BWF40-55aR	
40	46	19	—	12	120.45	37.9	36.5	—	34.55	BWF40-56aR	
40	46	19	—	12	129.8	29.8	54	27.3	49	BWF40-57R	
40	46	19	—	12	112	28.5	37.5	—	35	BWF40-59R	
40	46	19	18	12	112	28.5	37.5	26	35	BWF40-61R	
40	46	19	—	—	66.8	17.8	3	—	—	BWF40-64aR	