

Triple-Sealed Bearings for Ball Bearing Units



NSK Triple-Sealed Bearings for Ball Bearing Units

These reliable triple-sealed bearings are dustproof and waterproof. They ensure a longer bearing life even when exposed to heavy airborne dust and splashes of foul water.



Features

Better dustproofing and waterproofing ensure a longer bearing life.

Triple-sealed bearings feature a secure bearing seal with three lips. This special seal offers reliable dustproofing and waterproofing superior to those of standard bearings used in bearing units. In addition, it ensures a longer service life, even when exposed to heavy airborne dust and splashes of foul water.

Reduces maintenance cost.

A bearing life longer than that of a standard bearing unit configurations means extended maintenance intervals, greatly reduced maintenance costs (of inspection, relubrication, replacement, etc.), and increased availability of machinery.

Decreases price of the bearing unit and contributes to more compact machinery.

The triple-sealed bearing unit replaces conventional covered bearing units in certain operating conditions, greatly decreasing the cost of bearing units. In addition, if the cover is not required, the machinery can be made more compact.

Secure balled setscrew

The triple-sealed bearing is mounted on the shaft with balled setscrew, which features an embedded ball in its tip. Compared with knurled cup point or cup-point setscrews, the balled setscrew provides much greater resistance to loosening, as it does not readily loosen due to vibration or impact.

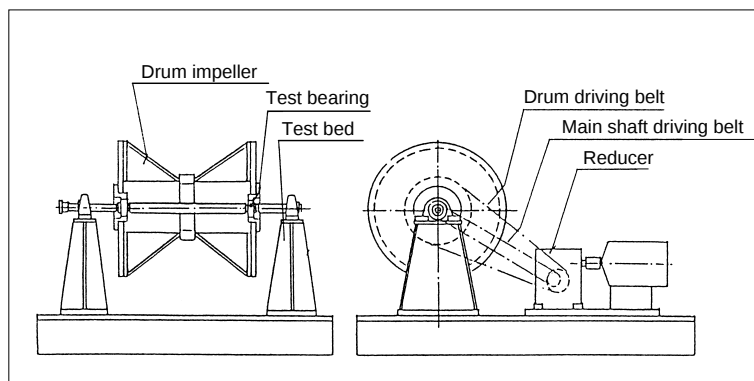
Interchangeability

The triple-sealed bearing unit conforms to the JIS (Japanese Industrial Standard) for UC-type bearings. It is not only ready to use as a relubricable bearing, but it also replaces the conventional bearing units of NSK and other manufacturers. It therefore serves as a ready replacement for existing bearing units.

Dustproofing effectiveness

(1) Dustproofing performance test

An hourglass-shaped drum containing dust (activated alumina) was rotated at 50 rpm. The main shaft was then rotated at 1,750 rpm (d_n value 51,000), while a load of 25 kgf was applied to the test bearings mounted on both sides of the drum. NSK recorded the bearings' normal running time before seizure due to internal dust contamination, and compared the results. (Because the test was performed at room temperature, the speed of the main shaft was set to a much higher range than normally allowable for triple-sealed bearings in order to simulate more severe operating conditions.)



Dustproofing performance test rig

(2) Dustproofing test results

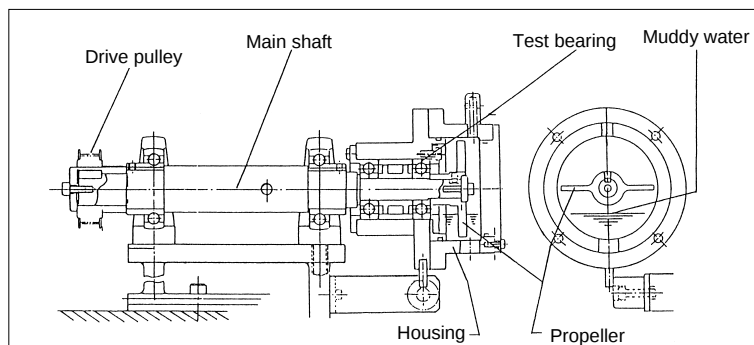
Seal type	Manufacture	Test bearing description	Cross-section of bearing	No. of samples	Average running time
Triple-seal	NSK	UC206D1LLJ		3	5510h
	Company A	Equivalent to UC206D1LLJ		6	1959h
Ordinary seal (rubber seal + flinger)	NSK	UC206D1		6	986h

Note :The dustproofing life of our triple-sealed bearing (UC206D1LLJ) is 2.8 times that of an equivalent bearing from Company A, and is 5.6 times that of our conventional bearing with a standard seal (UC206D1).

Resistance to muddy water

(1) Muddy water resistance test

Two hundred cubic centimeters of muddy water (Kanto loam type 8; water content 1:10 w/w) was poured into a cylindrical housing where the bearing being tested was installed. The bearing and propeller in front of the bearing were rotated at 500 rpm (d_n value 20,000) by a drive belt, with a vibration of 0.6 G applied to the housing. NSK recorded the running time of the bearing before the test equipment seized due to contamination by muddy water, and then compared the results.



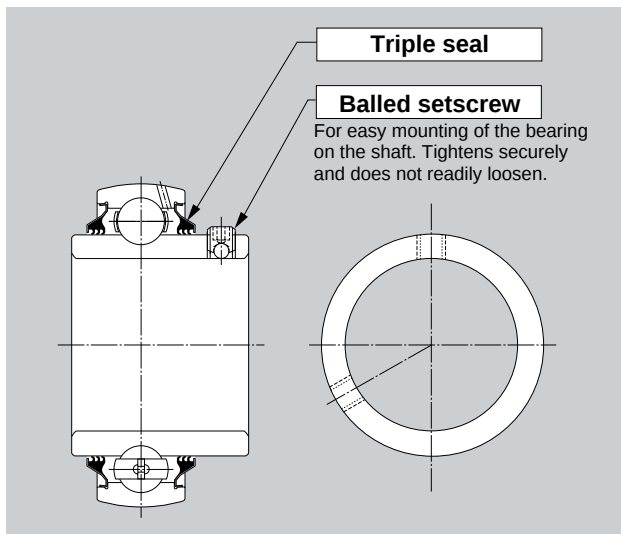
Muddy water resistance test rig

(2) Muddy water resistance test results and tightening torques

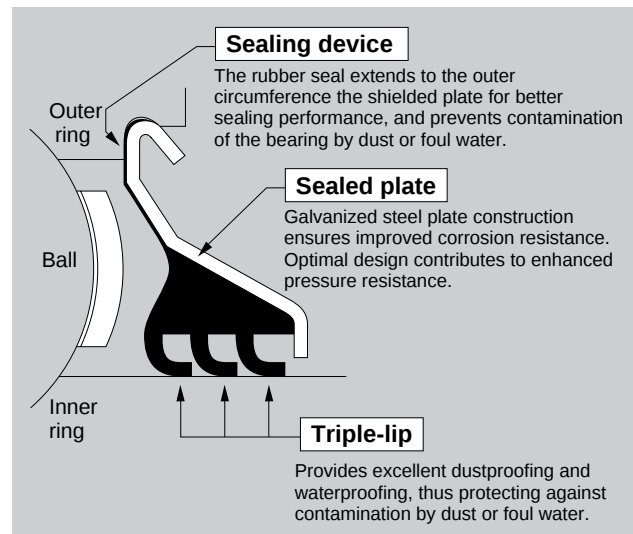
Seal type	Manufacture	Description of test bearing	Cross-section of bearing	Average running time	Tightening torque
Triple-seal	NSK	UC208D1LLJ		3016h (n=2)	16.9N-cm 1.50lbf-inch. (n=5)
	Company A	Equivalent to UC208D1LLJ		51h (n=3)	18.8N-cm 1.66lbf-inch. (n=5)
	Company B	Equivalent to UEL208D1LLJ		1437h (n=3)	23.5N-cm 2.08lbf-inch. (n=3)
	Company C	Equivalent to UEL208D1LLJ		774h (n=3)	58.8N-cm 5.20lbf-inch. (n=3)
Ordinary seal (rubber seal + flinger)	NSK	UC208D1		513h (n=3)	4.4N-cm 0.39lbf-inch. (n=5)
	Company D	Equivalent to UC208D1		287h (n=3)	26.3N-cm 2.32lbf-inch. (n=3)
	Company E	Equivalent to AEL208D1		40h (n=3)	14.7N-cm 1.30lbf-inch. (n=3)

Note :The life of the muddy waterproofing of our triple-sealed bearing (UC208D1LLJ) is 59 times that of an equivalent bearing from Company A, twice that of an equivalent bearing from Company B, and 5.9 times that of our conventional bearing with a standard seal (UC208D1).

Construction



Triple-sealed bearing



Triple-seal

Allowable Operating Temperature Range and Speed

The triple-sealed bearing can be used in a temperature range of -15°C to 100°C.

Allowable dn value: 36,000 [dn =bearing bore diameter d (mm) x operating speed n (rpm)]

Typical Applications

Triple-sealed bearing units are suitable for machinery used in locations subjected to splashes of foul water and heavy dust, including machinery used in steel-making, casting, garbage disposal, waterworks and sewage treatment, car washers, laundry washing, food processing, fish processing, construction, transportation, agriculture, textiles, and dyeing.



Sample application :

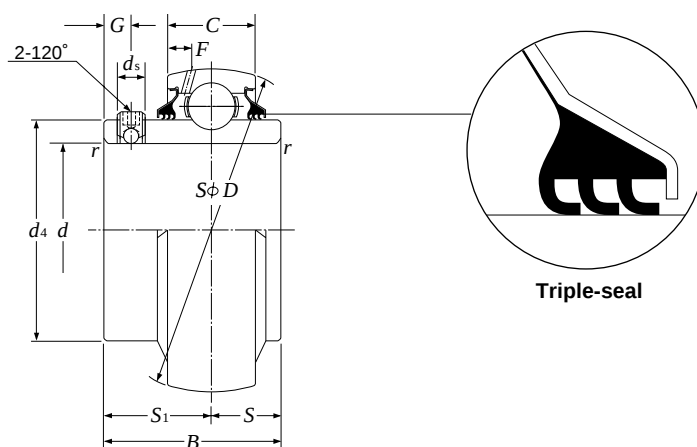
A pillow unit (right) and a square flange unit (left) are used in a conveyor unit operating in an environment with heavy airborne dust.

Special Specifications

The standard prelubrication for bearings in this series is Li-mineral grease. Contact NSK Engineering for optional bearings lubricated with Solid Grease (heat-solidified grease) or food-grade grease, or for bearings made of stainless steel.

Triple-sealed ball bearings for Ball bearing unit Type UC2...LLJ

Cylindrical bore with setscrew



Shaft dia. mm inch.	Bearing ^① number	Nominal dimensions												basic load ratings		mass
		<i>d</i>	<i>D</i>	<i>B</i>	<i>C</i>	<i>r_s</i> ^② min.	mm <i>S</i>	inch. <i>S</i> ₁	<i>G</i>	<i>d_s</i>	<i>d</i> ₄	<i>F</i>	N dynamic <i>C_r</i>	lbf static <i>C_{0r}</i>	kg lb	
12 1/2	UC201D1LLJ UC201-008D1LLJ	12 0.5000	47 1.8504	31 1.2205	17 0.6693	0.6 0.024	12.7 0.500	18.3 0.720	4.5 0.177	M5×0.8 No.10-32UNF	29.6 1.1654	4.7 0.185	12 800 2 890	6 650 1 500	0.21 0.46	
15 9/16 5/8	UC202D1LLJ UC202-009D1LLJ UC202-010D1LLJ	15 0.5625 0.6250	47 1.8504	31 1.2205	17 0.6693	0.6 0.024	12.7 0.500	18.3 0.720	4.5 0.177	M5×0.8 No.10-32UNF	29.6 1.1654	4.7 0.185	12 800 2 890	6 650 1 500	0.20 0.44 0.42	
17 11/16	UC203D1LLJ UC203-011D1LLJ	17 0.6875	47 1.8504	31 1.2205	17 0.6693	0.6 0.024	12.7 0.500	18.3 0.720	4.5 0.177	M5×0.8 No.10-32UNF	29.6 1.1654	4.7 0.185	12 800 2 890	6 650 1 500	0.18 0.39	
20 3/4	UC204D1LLJ UC204-012D1LLJ	20 0.7500	47 1.8504	31 1.2205	17 0.6693	1 0.039	12.7 0.500	18.3 0.720	4.5 0.177	M5 0.8 No.10-32UNF	29.6 1.1654	4.7 0.185	12 800 2 890	6 650 1 500	0.17 0.39	
25 13/16 7/8 15/16 1	UC205D1LLJ UC205-013D1LLJ UC205-014D1LLJ UC205-015D1LLJ UC205-100D1LLJ	25 0.8125 0.8750 0.9375 1.0000	52 2.0472	34.1 1.3425	17 0.6693	1 0.039	14.3 0.563	19.8 0.780	5 0.197	M5×0.8 No.10-32UNF	33.9 1.3346	4.5 0.177	14 000 3 150	7 850 1 770	0.20 0.53 0.51 0.46 0.44	
30 1 1/16 1 1/8 1 3/16 1 1/4	UC206D1LLJ UC206-101D1LLJ UC206-102D1LLJ UC206-103D1LLJ UC206-104D1LLJ	30 1.0625 1.1250 1.1875 1.2500	62 2.4409	38.1 1.5000	19 0.7480	1 0.039	15.9 0.626	22.2 0.874	5 0.197	M6×0.75 1/4-28UNF	40.8 1.6063	4.6 0.181	19 500 4 400	11 300 2 540	0.33 0.82 0.77 0.73 0.66	
35 1 1/4 1 5/16 1 3/8 1 7/16	UC207D1LLJ UC207-104D1LLJ UC207-105D1LLJ UC207-106D1LLJ UC207-107D1LLJ	35 1.2500 1.3125 1.3750 1.4375	72 2.8346	42.9 1.6890	20 0.7874	1.5 0.059	17.5 0.689	25.4 1.000	6 0.236	M6×0.75 1/4-28UNF	46.8 1.8425	4.6 0.181	25 700 5 750	15 300 3 450	0.49 1.21 1.15 1.08 1.01	
40 1 1/2 1 9/16	UC208D1LLJ UC208-108D1LLJ UC208-109D1LLJ	40 1.5000 1.5625	80 3.1496	49.2 1.9370	21 0.8268	1.5 0.059	19 0.748	30.2 1.189	8 0.315	M8×1 5/16-24UNF	53 2.0866	4.5 0.177	29 100 6 550	17 800 4 000	0.65 1.52 1.46	
45 1 5/8 1 11/16 1 3/4	UC209D1LLJ UC209-110D1LLJ UC209-111D1LLJ UC209-112D1LLJ	45 1.6250 1.6875 1.7500	85 3.3465	49.2 1.9370	22 0.8661	1.5 0.059	19 0.748	30.2 1.189	8 0.315	M8×1 5/16-24UNF	57.5 2.2638	4.9 0.193	32 500 7 350	20 400 4 600	0.70 1.76 1.68 1.57	
50 1 13/16 1 7/8 1 15/16 2	UC210D1LLJ UC210-113D1LLJ UC210-114D1LLJ UC210-115D1LLJ UC210-200D1LLJ	50 1.8125 1.8750 1.9375 2.0000	90 3.5433	51.6 2.0315	24 0.9449	1.5 0.059	19 0.748	32.6 1.283	9 0.354	M8×1 5/16-24UNF	62.4 2.4567	5.9 0.232	35 000 7 900	23 200 5 200	0.80 2.03 1.92 1.81 1.69	

① These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".

② Minimum allowable dimension for chamfer dimension r.

Note:

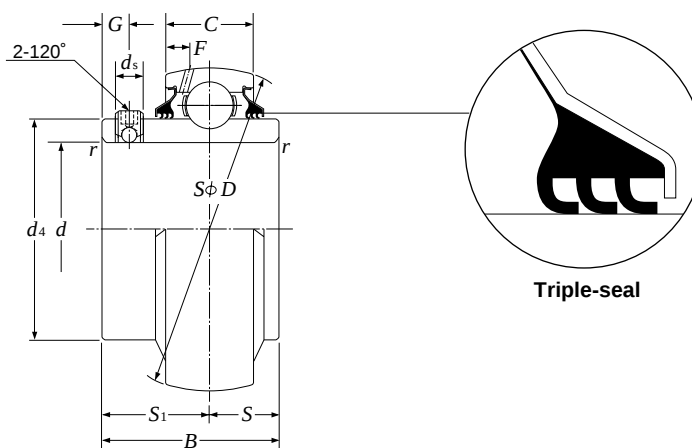
1) For shaft tolerances, see the Ball Bearing Units catalog.

2) The precision of ball bearings is as specified in JIS B 1558 "Ball bearings for rolling bearing units."

3) Contact NSK Engineering for information on tapered bore ball bearings or ball bearings with bores in English measurements.

Triple-sealed ball bearings for Ball bearing unit Type UC2...LLJ

Cylindrical bore with setscrew



Shaft dia. mm inch.	Bearing ^① number	Nominal dimensions											basic load ratings		mass kg lb
		d	D	B	C	r _s ^② mm min.	S	S ₁	G	d _s	d ₄	F	N dynamic C _r	lbf static C _{or}	
55 2 2 ¹ / ₁₆ 2 ¹ / ₈ 2 ³ / ₁₆	UC211D1LLJ UC211-200D1LLJ UC211-201D1LLJ UC211-202D1LLJ UC211-203D1LLJ	55 2.0000 2.0625 2.1250 2.1875	100 3.9370	55.6 2.1890	25 0.9843	2 0.079	22.2 0.874	33.4 1.315	9 0.354	M8×1 ⁵ / ₁₆ -24UNF	69 2.7165	6.0 0.236	43 500 9 750	29 200 6 550	1.08 2.71 2.60 2.46 2.34
60 2 ¹ / ₄ 2 ⁵ / ₁₆ 2 ³ / ₈ 2 ⁷ / ₁₆	UC212D1LLJ UC212-204D1LLJ UC212-205D1LLJ UC212-206D1LLJ UC212-207D1LLJ	60 2.2500 2.3125 2.3750 2.4375	110 4.3307	65.1 2.5630	27 1.0630	2 0.079	25.4 1.000	39.7 1.563	10 0.394	M10×1.25 ³ / ₈ -24UNF	77 3.0315	6.2 0.244	52 500 11 800	36 000 8 150	1.53 3.66 3.50 3.33 3.17
65 2 ¹ / ₂ 2 ⁹ / ₁₆	UC213D1LLJ UC213-208D1LLJ UC213-209D1LLJ	65 2.5000 2.5625	120 4.7244	65.1 2.5630	32 1.2598	2 0.079	25.4 1.000	39.7 1.563	10 0.394	M10×1.25 ³ / ₈ -24UNF	82.5 3.2480	8.7 0.343	57 500 12 900	40 000 9 000	1.85 4.26 4.09
70 2 ⁵ / ₈ 2 ¹¹ / ₁₆ 2 ³ / ₄	UC214D1LLJ UC214-210D1LLJ UC214-211D1LLJ UC214-212D1LLJ	70 2.6250 2.6875 2.7500	125 4.9213	74.6 2.9370	33 1.2992	2 0.079	30.2 1.189	44.4 1.748	12 0.472	M10×1.25 ³ / ₈ -24UNF	87 3.4252	8.8 0.346	62 000 14 000	44 000 9 900	2.10 5.09 4.87 4.65
75 2 ¹³ / ₁₆ 2 ⁷ / ₈ 2 ¹⁵ / ₁₆ 3	UC215D1LLJ UC215-213D1LLJ UC215-214D1LLJ UC215-215D1LLJ UC215-300D1LLJ	75 2.8125 2.8750 2.9375 3.0000	130 5.1181	77.8 3.0630	34 1.3386	2 0.079	33.3 1.311	44.5 1.752	12 0.472	M10×1.25 ³ / ₈ -24UNF	93 3.6614	9.0 0.354	66 000 14 900	49 500 11 100	2.35 5.73 5.49 5.25 4.98
80 3 ¹ / ₁₆ 3 ¹ / ₈ 3 ³ / ₁₆	UC216D1LLJ UC216-301D1LLJ UC216-302D1LLJ UC216-303D1LLJ	80 3.0625 3.1250 3.1875	140 5.5118	82.6 3.2520	35 1.3780	2.5 0.098	33.3 1.311	49.3 1.941	12 0.472	M10×1.25 ³ / ₈ -24UNF	98.1 3.8622	9.5 0.374	72 500 16 300	53 000 11 900	2.80 6.57 6.28 6.00
85 3 ¹ / ₄ 3 ⁵ / ₁₆ 3 ⁷ / ₁₆	UC217D1LLJ UC217-304D1LLJ UC217-305D1LLJ UC217-307D1LLJ	85 3.2500 3.3125 3.4375	150 5.9055	85.7 3.3740	36 1.4173	2.5 0.098	34.1 1.343	51.6 2.031	12 0.472	M12×1.5 ¹ / ₂ -20UNF	106.4 4.1890	10.1 0.398	83 500 18 700	64 000 14 300	3.37 7.92 7.60 6.97
90 3 ¹ / ₂	UC218D1LLJ UC218-308D1LLJ	90 3.5000	160 6.2992	96 3.7795	37 1.4570	2.5 0.098	39.7 1.563	56.3 2.217	12 0.472	M12×1.5 ¹ / ₂ -20UNF	111.6 4.3937	9.8 0.386	96 000 21 600	71 500 16 100	4.36 9.88

① These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".

② Minimum allowable dimension for chamfer dimension r.

Note:

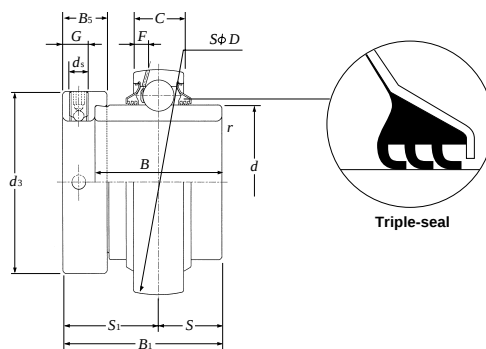
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3) Contact NSK Engineering for information on tapered bore ball bearings or ball bearings with bores in English measurements.

Triple-sealed ball bearings for Ball bearing unit Type REL2...LLJ

Cylindrical bore with eccentric locking collar



Shaft dia. mm inch	Bearing number	Nominal dimensions													basic load ratings		mass kg lb
		d	D	B ₁	B	C	mm r _s ② min.	inch. S	S ₁	G	d _s	d ₃	B ₅	F	N dynamic C _r	lbf static C _{0r}	
20 3/4	REL204D1LLJ	20	47	43.7	34.2	15	1	17.1	26.6	4.8	M6×0.75	33	13.5	3.2	12 800	6 650	0.22
	REL204-012D1LLJ	0.7500	1.8504	1.720	1.3465	0.5906	0.039	0.673	1.047	0.189	1/4-28UNF	1.299	0.531	0.126	2 890	1 500	0.43
25 13/16 7/8 15/16 1	REL205D1LLJ	25	52	44.4	34.9	15	1	17.45	26.9	4.8	M6×0.75	38	13.5	3.5	14 000	7 850	0.26
	REL205-013D1LLJ	0.8125															0.59
	REL205-014D1LLJ	0.8750	2.0472	1.748	1.3740	0.5906	0.039	0.687	1.059	0.189	1/4-28UNF	1.496	0.531	0.138	3 150	1 770	0.56
	REL205-015D1LLJ	0.9375															0.53
	REL205-100D1LLJ	1.0000															0.49
30 1 1/16 1 1/8 1 3/16 1 1/4	REL206D1LLJ	30	62	48.4	36.5	18	1	18.25	30.1	6	M8×1	44.5	15.9	4.1	19 500	11 300	0.44
	REL206-101D1LLJ	1.0625															0.92
	REL206-102D1LLJ	1.1250	2.4409	1.906	1.4370	0.7087	0.039	0.720	1.185	0.236	5/16-24UNF	1.752	0.626	0.161	4 400	2 540	0.87
	REL206-103D1LLJ	1.1875															0.82
	REL206-104D1LLJ	1.2500															0.78
35 1 1/4 1 5/16 1 3/8 1 7/16	REL207D1LLJ	35	72	51.1	37.6	19	1.5	18.8	32.3	6.8	M10×1.25	55.5	17.5	4.1	25 700	15 300	0.58
	REL207-104D1LLJ	1.2500															1.41
	REL207-105D1LLJ	1.3125	2.8346	2.012	1.4803	0.7480	0.059	0.740	1.272	0.268	3/8-24UNF	2.185	0.689	0.161	5 750	3 450	1.36
	REL207-106D1LLJ	1.3750															1.31
	REL207-107D1LLJ	1.4375															1.24
40 1 1/2 1 9/16	REL208D1LLJ	40	80	56.3	42.8	22	1.5	21.4	34.9	6.8	M10×1.25	60	18.3	4.5	29 100	17 800	0.78
	REL208-108D1LLJ	1.5000	3.1496	2.217	1.6850	0.8661	0.059	0.843	1.374	0.268	3/8-24UNF	2.362	0.720	0.177	6 550	4 000	1.88
	REL208-109D1LLJ	1.5625															1.80
45 1 5/8 1 11/16 1 3/4	REL209D1LLJ	45	85	56.3	42.8	22	1.5	21.4	34.9	6.8	M10×1.25	63.5	18.3	4.9	32 500	20 400	0.83
	REL209-110D1LLJ	1.6250															2.01
	REL209-111D1LLJ	1.6875	3.3465	2.217	1.6850	0.8661	0.059	0.843	1.374	0.268	3/8-24UNF	2.500	0.720	0.193	7 350	4 600	1.93
	REL209-112D1LLJ	1.7500															1.84
50 1 13/16 1 7/8 1 15/16 2	REL210D1LLJ	50	90	62.7	49.2	22	1.5	24.6	38.1	6.8	M10×1.25	69.5	18.3	4.3	35 000	23 200	0.96
	REL210-113D1LLJ	1.8125															2.42
	REL210-114D1LLJ	1.8750	3.5433	2.469	1.9370	0.8661	0.059	0.969	1.500	0.268	3/8-24UNF	2.736	0.720	0.169	7 900	5 200	2.32
	REL210-115D1LLJ	1.9375															2.21
	REL210-200D1LLJ	2.0000															2.05
55 2 2 1/16 2 3/8 2 3/16	REL211D1LLJ	55	100	71.4	55.5	24	2	27.8	43.6	8	M10×1.25	76	20.7	4.6	43 500	29 200	1.29
	REL211-200D1LLJ	2.0000															3.21
	REL211-201D1LLJ	2.0625	3.9370	2.811	2.1850	0.9449	0.079	1.094	1.717	0.315	3/8-24UNF	2.992	0.815	0.181	9 750	6 550	3.05
	REL211-202D1LLJ	2.1250															2.95
	REL211-203D1LLJ	2.1875															2.83
60 2 1/4 2 5/16 2 3/8 2 7/16	REL212D1LLJ	60	110	77.8	61.9	27	2	31	46.8	8	M10×1.25	84	22.3	6.2	52 500	36 000	1.83
	REL212-204D1LLJ	2.2500															4.29
	REL212-205D1LLJ	2.3125	4.3307	3.063	2.4370	1.0630	0.079	1.220	1.843	0.315	3/8-24UNF	3.307	0.878	0.245	11 800	8 150	4.13
	REL212-206D1LLJ	2.3750															3.96
	REL212-207D1LLJ	2.4375															3.79
65 2 1/2 2 9/16	REL213D1LLJ	65	120	85.7	68.3	27	2	34.2	51.5	8.7	M10×1.25	97	23.8	6.2	57 500	40 000	2.46
	REL213-208D1LLJ	2.5000	4.7244	3.374	2.6890	1.0630	0.079	1.346	2.028	0.343	3/8-24UNF	3.819	0.937	0.245	12 900	9 000	5.43
	REL213-209D1LLJ	2.5625															5.26
70 2 5/8 2 11/16 2 3/4	REL214D1LLJ	70	125	85.7	68.3	28	2	34.2	51.5	8.7	M10×1.25	97	23.8	6.6	62 000	44 000	2.45
	REL214-210D1LLJ	2.6250															5.63
	REL214-211D1LLJ	2.6875	4.9213	3.374	2.6890	1.1024	0.079	1.346	2.028	0.343	3/8-24UNF	3.819	0.937	0.260	14 000	9 900	5.41
	REL214-212D1LLJ	2.7500															5.14
75 2 9/16 2 7/8 2 15/16 3	REL215D1LLJ	75	130	92.0	74.6	29	2	37.3	54.7	8.7	M10×1.25	102	23.8	6.5	66 000	49 500	2.66
	REL215-213D1LLJ	2.8125															6.35
	REL215-214D1LLJ	2.8750	5.1181	3.622	2.9370	1.1417	0.079	1.469	2.154	0.343	3/8-24UNF	4.016	0.937	0.256	14 900	11 100	6.11
	REL215-215D1LLJ	2.9375															5.87
	REL215-300D1LLJ	3.0000															5.56

① These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".

② Minimum allowable dimension for chamfer dimension r .

Note: 1) For shaft tolerances, see Ball Bearing Units catalog.

2) UEL series (UEL204–UEL215) are also available with eccentric locking collars.