

For New Technology Network

**NTN**®

NTN corporation

# Triple-Sealed Bearings for Bearing Units

CAT. No. 3905 / E



# NTN Triple-Sealed Bearings for 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. (Patent pending)

### **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 NTN's unique 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.

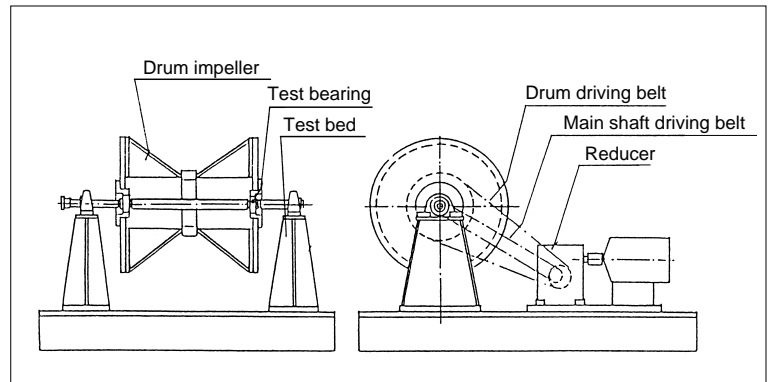
### **Interchangeability**

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 NTN 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 ( $dn$  value 51,000), while a load of 25 kgf was applied to the test bearings mounted on both sides of the drum. NTN 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

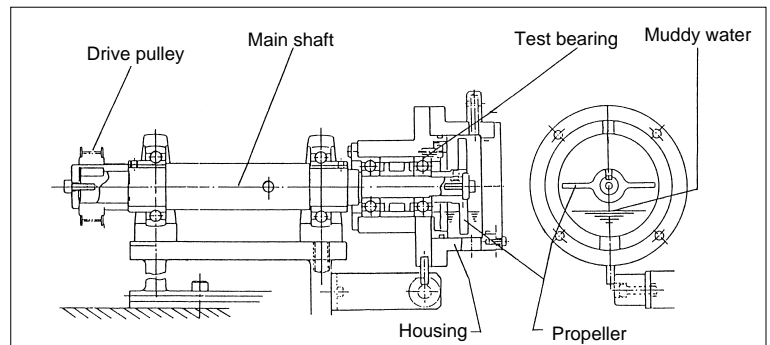
Seal type	Manufacture	Test bearing description	Cross-section of bearing	No. of samples	Average running time
Triple-seal	NTN	UC206D1LLJ		3	5510h
	Company A	Equivalent to UC206D1LLJ		6	1959h
Ordinary seal (rubber seal + flinger)	NTN	UC206D1		6	986h

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 ( $dn$  value 20,000) by a drive belt, with a vibration of 0.6 G applied to the housing. NTN recorded the running time of the bearing before the test equipment seized due to contamination by muddy water, and then compared the results.



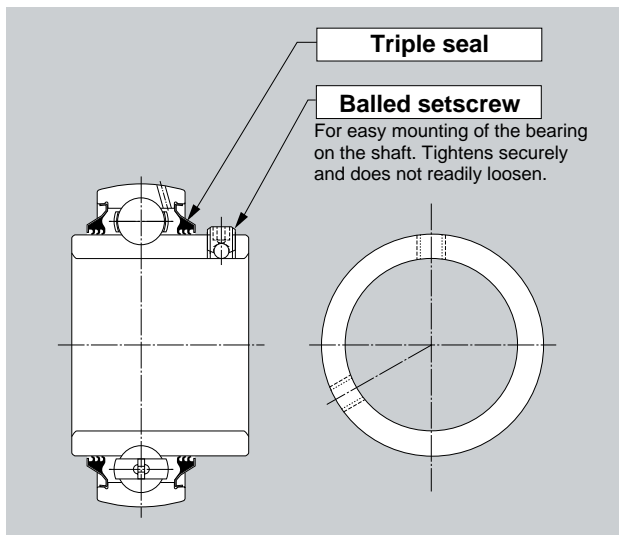
Muddy water resistance test rig

### (2) Muddy water resistance test results and tightening torques

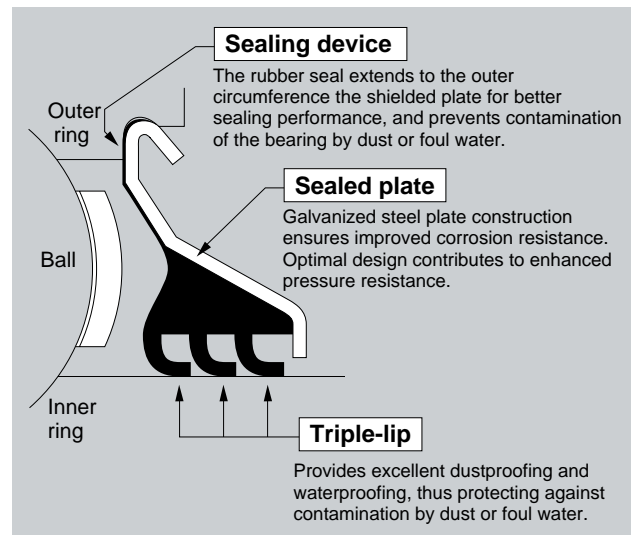
Seal type	Manufacture	Description of test bearing	Cross-section of bearing	Average running time	Tightening torque
Triple-seal	NTN	UC208D1LLJ		3016h ( $n=2$ )	16.9N-cm 1.50lbf-inch. ( $n=5$ )
	Company A	Equivalent to UC208D1LLJ		51h ( $n=3$ )	18.8N-cm 1.66lbf-inch. ( $n=5$ )
	Company B	Equivalent to UEL208D1LLJ		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)	NTN	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 :

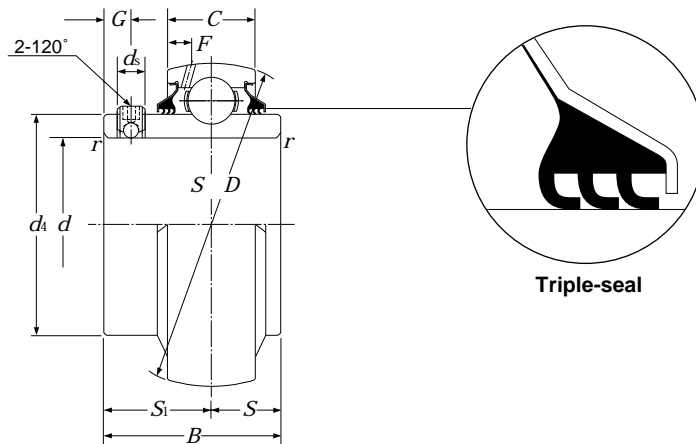
A pillow unit (right) and a square flange unit (left) are used in a conveyor unit operating in an environment with heavy airborne dust.

## Special Specifications

The standard prelubrication for bearings in this series is Li-mineral grease. Contact NTN 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 bearing unit Type UC2...LLJ

## Cylindrical bore with setscrew



Shaft dia. mm inch.	Bearing <sup>①</sup> number	Nominal dimensions											basic load ratings		mass kg lb
		d	D	B	C	r <sub>s</sub> min. <sup>②</sup>	S mm	S <sub>1</sub> inch.	G	d <sub>s</sub>	d <sub>4</sub>	F	N dynamic G <sub>r</sub>	lbf static C <sub>0r</sub>	
12 ½	UC201D1LLJ	12	47	31	17	0.6	12.7	18.3	4.5	M5 × 0.8	29.6	4.7	12 800	6 650	0.21
	UC201-008D1LLJ	0.5000	1.8504	1.2205	0.6693	0.024	0.500	0.720	0.177	No.10-32UNF	1.1654	0.185	2 890	1 500	0.46
15 ⅝ ⅜	UC202D1LLJ	15	47	31	17	0.6	12.7	18.3	4.5	M5 × 0.8	29.6	4.7	12 800	6 650	0.20
	UC202-009D1LLJ	0.5625	1.8504	1.2205	0.6693	0.024	0.500	0.720	0.177	No.10-32UNF	1.1654	0.185	2 890	1 500	0.44
	UC202-010D1LLJ	0.6250													0.42
17 ⅞	UC203D1LLJ	17	47	31	17	0.6	12.7	18.3	4.5	M5 × 0.8	29.6	4.7	12 800	6 650	0.18
	UC203-011D1LLJ	0.6875	1.8504	1.2205	0.6693	0.024	0.500	0.720	0.177	No.10-32UNF	1.1654	0.185	2 890	1 500	0.39
20 ¾	UC204D1LLJ	20	47	31	17	1	12.7	18.3	4.5	M5 × 0.8	29.6	4.7	12 800	6 650	0.17
	UC204-012D1LLJ	0.7500	1.8504	1.2205	0.6693	0.039	0.500	0.720	0.177	No.10-32UNF	1.1654	0.185	2 890	1 500	0.39
25 1⅜ ⅞ 1⅝ 1	UC205D1LLJ	25	52	34.1	17	1	14.3	19.8	5	M5 × 0.8	33.9	4.5	14 000	7 850	0.20
	UC205-013D1LLJ	0.8125													0.53
	UC205-014D1LLJ	0.8750	2.0472	1.3425	0.6693	0.039	0.563	0.780	0.197	No.10-32UNF	1.3346	0.177	3 150	1 770	0.51
	UC205-015D1LLJ	0.9375													0.46
1	UC205-100D1LLJ	1.0000													0.44
30 1⅛ 1⅝ 1⅜ 1¼	UC206D1LLJ	30	62	38.1	19	1	15.9	22.2	5	M6 × 0.75	40.8	4.6	19 500	11 300	0.33
	UC206-101D1LLJ	1.0625													0.82
	UC206-102D1LLJ	1.1250	2.4409	1.5000	0.7480	0.039	0.626	0.874	0.197	¼-28UNF	1.6063	0.181	4 400	2 540	0.77
	UC206-103D1LLJ	1.1875													0.73
1¼	UC206-104D1LLJ	1.2500													0.66
35 1¼ 1⅝ 1⅜ 1⅞	UC207D1LLJ	35	72	42.9	20	1.5	17.5	25.4	6	M6 × 0.75	46.8	4.6	25 700	15 300	0.49
	UC207-104D1LLJ	1.2500													1.21
	UC207-105D1LLJ	1.3125	2.8346	1.6890	0.7874	0.059	0.689	1.000	0.236	¼-28UNF	1.8425	0.181	5 750	3 450	1.15
	UC207-106D1LLJ	1.3750													1.08
1⅞	UC207-107D1LLJ	1.4375												1.01	
40 1½ 1⅞	UC208D1LLJ	40	80	49.2	21	1.5	19	30.2	8	M8 × 1	53	4.5	29 100	17 800	0.65
	UC208-108D1LLJ	1.5000	3.1496	1.9370	0.8268	0.059	0.748	1.189	0.315	⅝-24UNF	2.0866	0.177	6 550	4 000	1.52
	UC208-109D1LLJ	1.5625													1.46
45 1⅝ 1⅞ 1¾	UC209D1LLJ	45	85	49.2	22	1.5	19	30.2	8	M8 × 1	57.5	4.9	32 500	20 400	0.70
	UC209-110D1LLJ	1.6250													1.76
	UC209-111D1LLJ	1.6875	3.3465	1.9370	0.8661	0.059	0.748	1.189	0.315	⅝-24UNF	2.2638	0.193	7 350	4 600	1.68
	UC209-112D1LLJ	1.7500													1.57
50 1⅞ 1⅝ 1⅞ 2	UC210D1LLJ	50	90	51.6	24	1.5	19	32.6	9	M8 × 1	62.4	5.9	35 000	23 200	0.80
	UC210-113D1LLJ	1.8125													2.03
	UC210-114D1LLJ	1.8750	3.5433	2.0315	0.9449	0.059	0.748	1.283	0.354	⅝-24UNF	2.4567	0.232	7 900	5 200	1.92
	UC210-115D1LLJ	1.9375													1.81
2	UC210-200D1LLJ	2.0000													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:

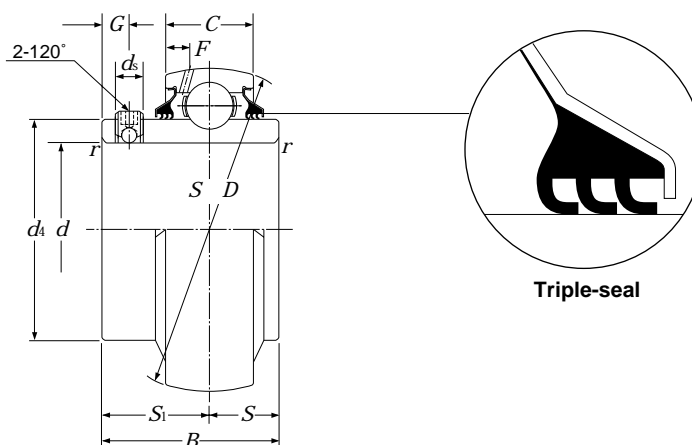
1) For shaft tolerances, see the Bearing Units catalog.

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

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

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

## Cylindrical bore with setscrew



Triple-seal

Shaft dia. mm inch.	Bearing <sup>①</sup> number	Nominal dimensions											basic load ratings		mass kg lb
		d	D	B	C	$r_s$ <sup>②</sup> min.	mm S	inch. S <sub>1</sub>	G	d <sub>s</sub>	d <sub>4</sub>	F	N dynamic C <sub>r</sub>	lbf static C <sub>0r</sub>	
55 2	UC211D1LLJ	55	100	55.6	25	2	22.2	33.4	9	M8 x 1	69	6.0	43 500	29 200	1.08
2 1/16	UC211-200D1LLJ	2.0000													2.71
2 1/8	UC211-201D1LLJ	2.0625	3.9370	2.1890	0.9843	0.079	0.874	1.315	0.354	3/16-24UNF	2.7165	0.236	9 750	6 550	2.60
2 1/4	UC211-202D1LLJ	2.1250													2.46
2 3/8	UC211-203D1LLJ	2.1875													2.34
60 2 1/4	UC212D1LLJ	60	110	65.1	27	2	25.4	39.7	10	M10 x 1.25	77	6.2	52 500	36 000	1.53
2 1/2	UC212-204D1LLJ	2.2500													3.66
2 5/8	UC212-205D1LLJ	2.3125	4.3307	2.5630	1.0630	0.079	1.000	1.563	0.394	3/8-24UNF	3.0315	0.244	11 800	8 150	3.50
2 3/4	UC212-206D1LLJ	2.3750													3.33
2 7/8	UC212-207D1LLJ	2.4375													3.17
65 2 1/2	UC213D1LLJ	65	120	65.1	32	2	25.4	39.7	10	M10 x 1.25	82.5	8.7	57 500	40 000	1.85
2 5/8	UC213-208D1LLJ	2.5000	4.7244	2.5630	1.2598	0.079	1.000	1.563	0.394	3/8-24UNF	3.2480	0.343	12 900	9 000	4.26
2 3/4	UC213-209D1LLJ	2.5625													4.09
70 2 5/8	UC214D1LLJ	70	125	74.6	33	2	30.2	44.4	12	M10 x 1.25	87	8.8	62 000	44 000	2.10
2 7/8	UC214-210D1LLJ	2.6250													5.09
2 3/4	UC214-211D1LLJ	2.6875	4.9213	2.9370	1.2992	0.079	1.189	1.748	0.472	3/8-24UNF	3.4252	0.346	14 000	9 900	4.87
2 3/4	UC214-212D1LLJ	2.7500													4.65
75 2 3/8	UC215D1LLJ	75	130	77.8	34	2	33.3	44.5	12	M10 x 1.25	93	9.0	66 000	49 500	2.35
2 7/8	UC215-213D1LLJ	2.8125													5.73
2 15/16	UC215-214D1LLJ	2.8750	5.1181	3.0630	1.3386	0.079	1.311	1.752	0.472	3/8-24UNF	3.6614	0.354	14 900	11 100	5.49
3	UC215-215D1LLJ	2.9375													5.25
3	UC215-300D1LLJ	3.0000													4.98
80 3 1/16	UC216D1LLJ	80	140	82.6	35	2.5	33.3	49.3	12	M10 x 1.25	98.1	9.5	72 500	53 000	2.80
3 1/8	UC216-301D1LLJ	3.0625													6.57
3 1/8	UC216-302D1LLJ	3.1250	5.5118	3.2520	1.3780	0.098	1.311	1.941	0.472	3/8-24UNF	3.8622	0.374	16 300	11 900	6.28
3 1/16	UC216-303D1LLJ	3.1875													6.00
85 3 1/4	UC217D1LLJ	85	150	85.7	36	2.5	34.1	51.6	12	M12 x 1.5	106.4	10.1	83 500	64 000	3.37
3 3/8	UC217-304D1LLJ	3.2500													7.92
3 1/2	UC217-305D1LLJ	3.3125	5.9055	3.3740	1.4173	0.098	1.343	2.031	0.472	1/2-20UNF	4.1890	0.398	18 700	14 300	7.60
3 1/2	UC217-307D1LLJ	3.4375													6.97
90 3 1/2	UC218D1LLJ	90	160	96	37	2.5	39.7	56.3	12	M12 x 1.5	111.6	9.8	96 000	71 500	4.36
3 1/2	UC218-308D1LLJ	3.5000	6.2992	3.7795	1.4570	0.098	1.563	2.217	0.472	1/2-20UNF	4.3937	0.386	21 600	16 100	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:

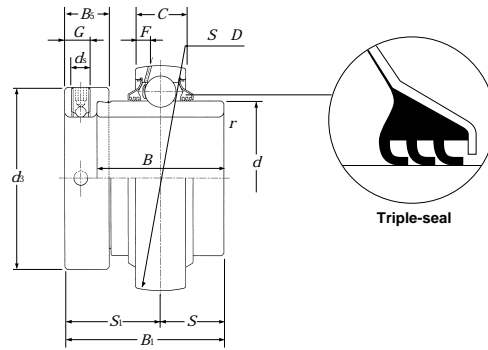
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# Triple-sealed ball bearings for bearing unit Type REL2...LLJ

## Cylindrical bore with eccentric locking collar



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

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

<sup>2</sup> Minimum allowable dimension for chamfer dimension *r*.

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

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