

NTN[®]

Thrust Spherical Roller Bearing

ULTAGE



ULTAGE[®]

CAT. No.3034/E

ULTAGE®

Up to
Six times
longer
service life

Up to
70%
higher
load capacity

Up to
20%
higher
allowable speed

Thrust Spherical Roller Bearing

"ULTAGE series Thrust Spherical Roller Bearing" is a new series developed to satisfy customers' needs such as "longer service life", "higher rotational speed", "improved ease-of-use" required for all industrial applications.

Longer Service Life

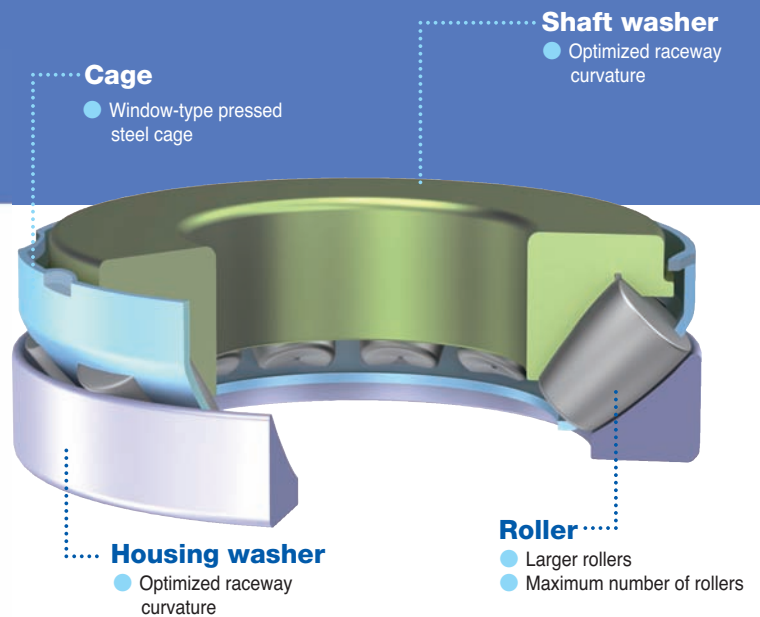
- Industry's highest load capacity
- Extended maintenance intervals
- Withstands operating temperature up to 200°C

Higher Rotational Speed

- Industry's highest allowable speed
- Simple widow-type pressed steel cage

Improved Ease-of-Use

- Unique structure readily accepts lubricant
- Both oil and grease are applicable



Advantages

1. Industry's highest load capacity

These bearings have a significantly increased roller diameter and incorporate the maximum number of rollers, thus achieving both a high load capacity and a longer service life.

- Basic dynamic load rating: **up to 70% greater** (vs. conventional design)
- Service life : **up to 6 times longer** (vs. conventional design)

2. Industry's highest allowable speed

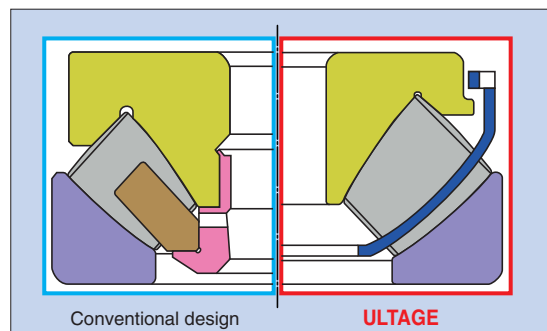
The new pressed steel cage results in allowable speed up to **20% greater**. (vs. NTN conventional type)

3. Window-type pressed steel cage

With the new window-type pressed steel cage, both oil and grease lubrication are applicable.

4. Withstands operating temperature up to 200°C

By adoption a special heat treatment, dimensional stability is achieved at high temperatures.



ULTAGE®

"ULTAGE®" (a name created from the combination of "ultimate," signifying refinement, and "stage," signifying NTN's intention that this series of products be employed in diverse applications) is the general name for NTN's new generation of bearings that are noted for their industry-leading performance.

Bearing Tolerances

1) Shaft washer

Unit μm

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δd_{mp}		Single radial plane bore diameter variation V_{dp} max	Face runout with bore S_d max	Height deviation of single direction thrust bearing ΔT_s	
over	incl.	high	low			high	low
60	80	0	-15	11	25	+150	-150
80	120	0	-20	15	25	+200	-200
120	160	0	-25	19	30	+250	-250

2) Housing washer

Unit μm

Nominal outside diameter D mm		Single plane mean outside diameter deviation ΔD_{mp}	
over	incl.	high	low
130	180	0	-25
180	250	0	-30
250	315	0	-35
315	320	0	-40

Bearing Fits (standard fits for ISO 199 normal class thrust bearings)

1) Shaft fits

Load conditions		Fit	Shaft diameter mm over incl.	Tolerance class
Combined load	Inner ring static load	Transition fit	All sizes	js6
	Inner ring rotating load or direction indeterminate load	Transition fit	— 200	k6 or js6

2) Housing fits

Load conditions		Fit	Tolerance class	Remarks
Combined load	Outer ring static load	Loose fit	H7	
	Direction Indeterminate load or outer ring rotating load	Transition fit	K7 M7	Normal operating conditions For relatively large radial loads

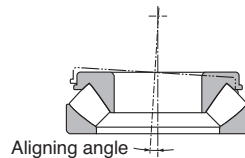
Note) Above tables shall be applied to steel or cast iron housing.

Bearing Number

294	20	E	Type code
			Bore diameter code
			Dimension series code

Allowable Misalignment

● $1 \sim 2^\circ$



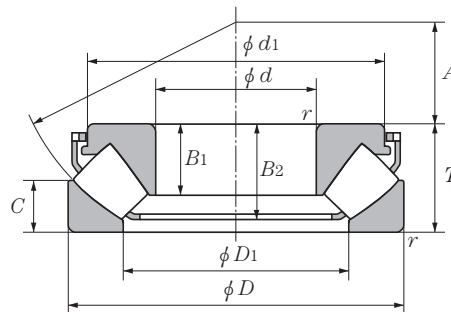
Allowable Radial Load

● $F_r / F_a \leq 0.55$

F_r : Radial load
 F_a : Axial load

Dimensional Table

● Bore diameter $\phi 60 \sim 160\text{mm}$



Bearing numbers	Boundary dimensions mm				Basic load ratings				Allowable speed min^{-1}	
	d	D	T	r_s min	dynamic C_a kN	static C_{0a}	dynamic C_a kgf	static C_{0a}	Oil lubrication	Grease lubrication
29412E	60	130	42	0.5	451	928	45 900	94 700	3 050	1 650
29413E	65	140	45	2	531	1 120	54 200	114 000	2 850	1 530
29414E	70	150	48	2	608	1 290	62 000	132 000	2 650	1 420
29415E	75	160	51	2	675	1 470	68 800	150 000	2 500	1 330
29416E	80	170	54	2.1	788	1 690	80 400	173 000	2 350	1 250
29417E	85	180	58	2.1	820	1 860	83 600	190 000	2 200	1 170
29418E	90	190	60	2.1	934	2 050	95 200	209 000	2 100	1 110
29420E	100	210	67	3	1 170	2 570	119 000	262 000	1 850	1 000
29422E	110	230	73	3	1 380	3 100	141 000	316 000	1 700	900
29424E	120	250	78	4	1 520	3 550	155 000	362 000	1 550	830
29426E	130	270	85	4	1 770	4 270	181 000	435 000	1 450	760
29428E	140	280	85	4	1 850	4 350	188 000	443 000	1 400	710
29430E	150	300	90	4	2 200	5 270	225 000	537 000	1 300	660
29432E	160	320	95	5	2 410	5 790	246 000	590 000	1 200	620

① Smallest allowable dimension for chamfer dimension r .

Allowable Speed

The allowable speeds indicated in the bearing dimension table are for reference only and applied only when bearings are lubricated and heat is efficiently drawn away from the bearing. The allowable speeds in this catalog are categorized as follows:

[Oil lubricated bearings]

The bearing rotational speed at which housing washer temperature reaches 80°C when the bearing is running under the load of 5% of basic static load rating C_{0a} while lubricated with oil (viscosity VG32) which is assimilated to room temperature and fed at a rate of 1 liter/min (circulating lubrication).

[Grease lubricated bearings]

The bearing rotational speed at which housing washer temperature reaches 80°C when the bearing is running under the load of 5% of basic static load rating C_{0a} after the running in with the Lithium grease of which amount is 100% of the bearing internal free value (consistency : NLGI3).

With either lubrication system, the bearing temperature rise profile varies with operating conditions (load, speed, lubrication, etc.). Therefore, select the bearing with sufficient margin from allowable speed in the catalog.

Please contact NTN Engineering for technical assistance if the bearing speed might exceeds 80% of the allowable speed indicated in the catalog.

Lubricating methods

Due to the nature of the design in thrust spherical roller bearings, lubrication may not be distributed thoroughly between the inner ring and the large end roller side face. So, it is imperative to supply sufficient lubricant to the bearing. For grease lubrication, fill the bearings' and housings' effective space with grease (ref. Fig.1 and Fig. 2).

[Vertical shaft]

Bearing : 100% of effective space (Fig.1 -①)
Housing : 100% of the volume (Fig.1 -②③)

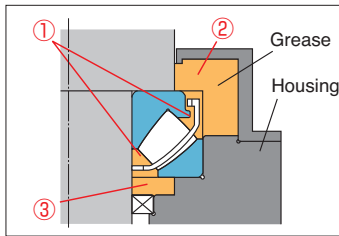


Fig.1 Grease lubrication for vertical shaft

[Horizontal shaft]

Bearing : 100% of effective space (Fig.2 -①)
Housing : 100% of the volume of shaft washer (Fig.2 -②)

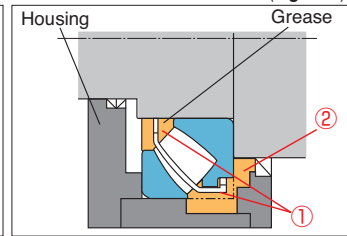
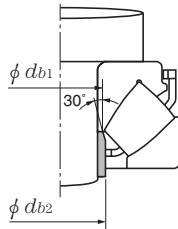
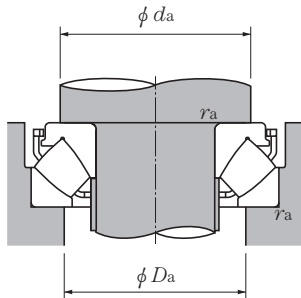


Fig.2 Grease lubrication for horizontal shaft



Dynamic equivalent axial load
 $P_a = F_a + 1.2 F_r$

Static equivalent axial load
 $P_{0a} = F_a + 2.7 F_r$
here $F_r / F_a \leq 0.55$

Dimensions mm				Abutment and fillet dimensions mm							Mass (approx.) kg	Effective space of the bearing (approx.) cm ³
B_1	B_2	C	A	d_1	d_a min.	db_1 max.	db_2 max.	D_1	D_a max.	r_{as} max.		
27	37	20.5	38	110	90	65	67	85	108	1.5	2.50	83.2
29.3	40	22.5	42	116	100	70	72	95	115	2	3.10	98.6
31.3	43	23.7	44	125	105	75	77	100	125	2	3.75	122
35.4	46	23.9	47	135	115	79	83	104	132	2	4.56	143
35.3	49	26.5	50	143	120	87	87	114	140	2	5.47	173
38.6	51	27.8	54	152	130	92	95	121	150	2	6.54	216
40.5	55	27	56	162	135	95	102	126	157	2	7.51	251
44	58.9	32	62	181	150	107	114	141	175	2.5	10.3	340
48.5	65	35	69	199	165	118	125	156	190	2.5	13.1	439
52.7	71	35.9	74	218	180	128	135	171	205	3	16.7	563
58.5	74	39.6	81	238	195	138	146	180	225	3	21.4	695
56	74.5	42	86	244	205	149	158	196	235	3	22.3	739
60.5	81	43.2	92	264	220	158	168	204	250	3	27.4	838
63	84.9	45.5	99	280	230	170	182	221	265	4	32.5	1050

Performance Test Data

● Temperature rise

(1) Vertical shaft

[Test conditions]

- Bearing : 29418E
(ULTAGE Thrust Spherical Roller Bearing)
- Load : Axial 98kN (0.05C_a)
- Rotational speed : 1000~2200min⁻¹
- Lubrication : oil (circulating oil)
- Structure of the test rig : Fig.3

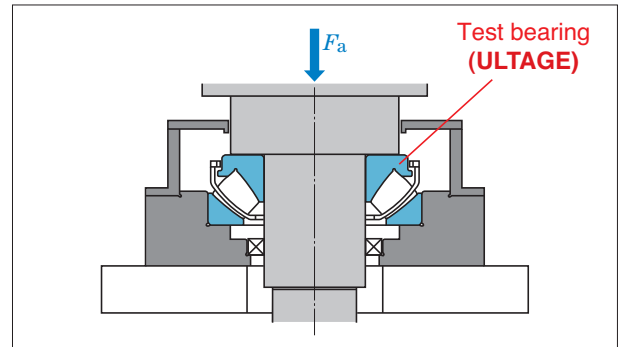
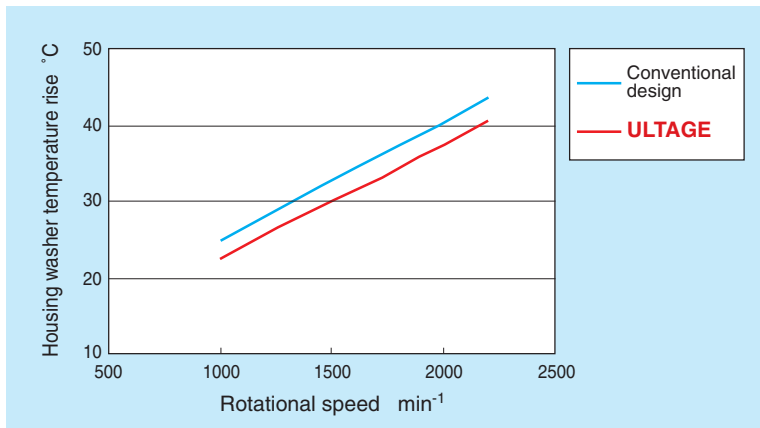


Fig.3 Structure of the test rig

[Test results]



(2) Horizontal shaft

[Test conditions]

- Bearing : 29418E
(ULTAGE Thrust Spherical Roller Bearing)
- Load : Axial 98kN (0.05C_a)
- Rotational speed : 1000~2200min⁻¹
- Lubrication : oil (circulating oil)
- Structure of the test rig : Fig.4

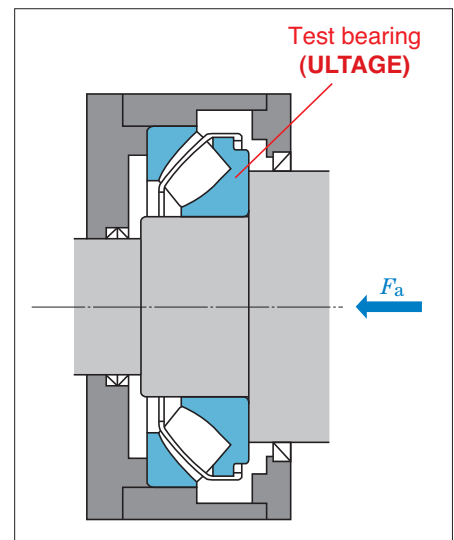


Fig.4 Structure of the test rig

[Test results]

