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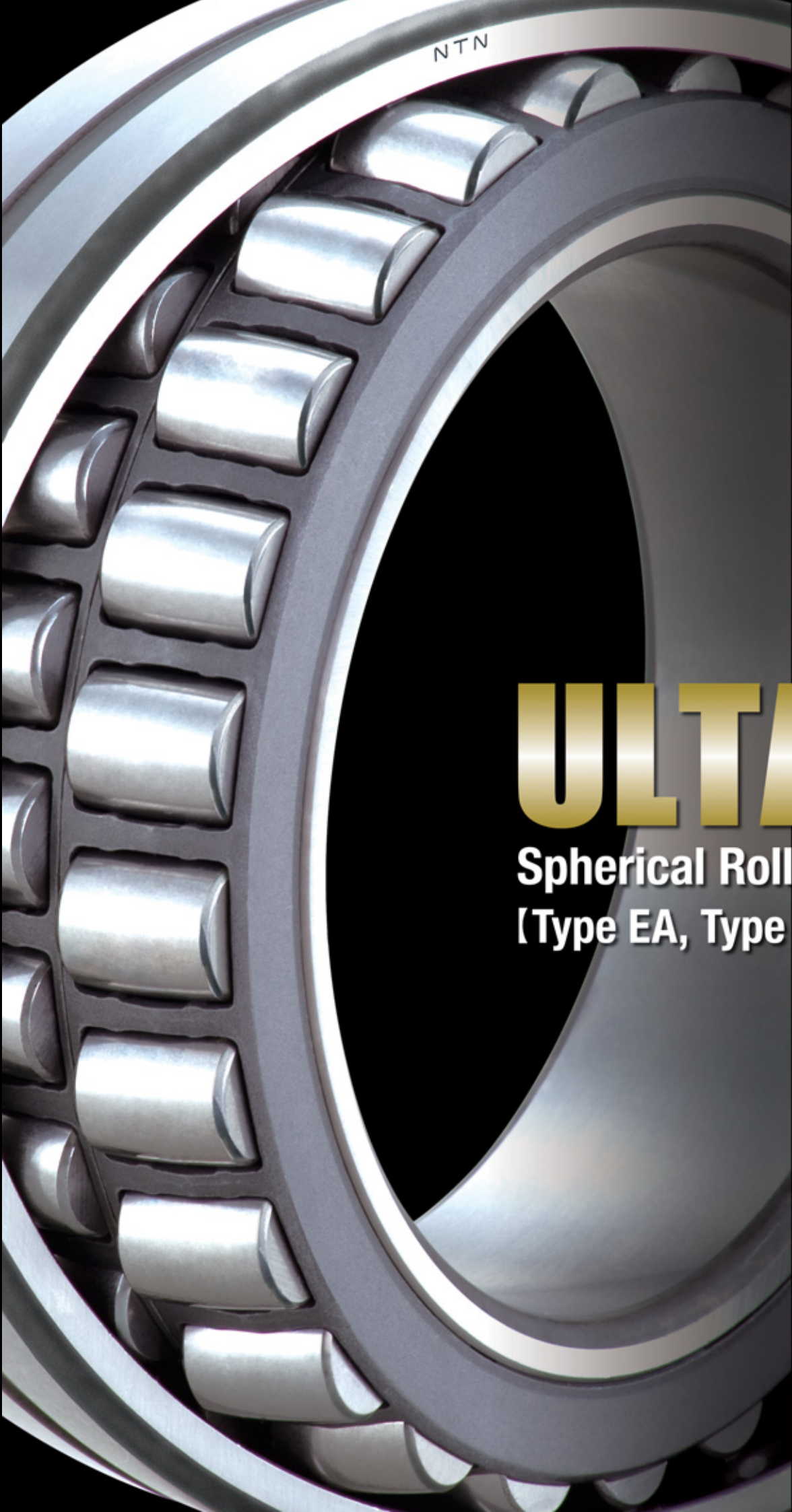
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NTN[®]

ULTAGE

ULTAGE[®]

Spherical Roller Bearings
[Type EA, Type EM]

【Type EA・

Up to
five times
longer
service life

ULT

Longer service life and higher rotational speed while contributing to more energy efficiency

Ultage Series Type EA and Type EM spherical rollers bearings to provide longer service life, higher rotational speed, and energy efficiency.

Longer Service Life

- Larger rollers provide the industry's highest load capacity.
- Extended maintenance intervals
- Lighter and more compact design
- Withstands operating temperatures up to 200°C.

Higher Rotational Speed

- The industry's highest allowable rotational speed
- Simple window-type configuration employs a pressed steel cage.
- The back face of the cage provides a guide function that eliminates the guide ring.

Improved Ease-of-Use

- Unique structure readily accepts lubricant.
- Easy application of grease

ULTAGE

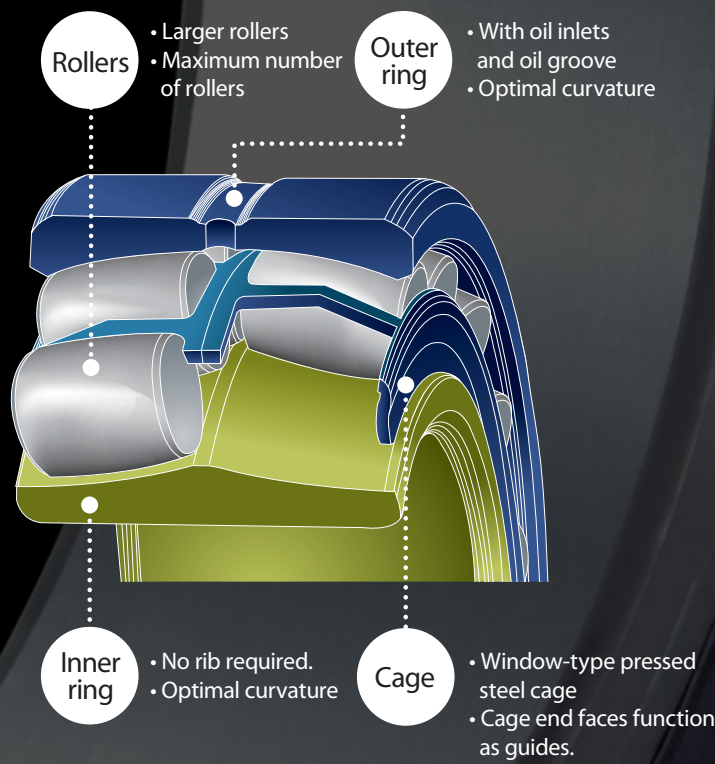
"ULTAGE" (a name created from the combination of "ultimate," signifying refinement, and "stage," signifying NTN's intention that this series of products be employed in diverse applications) is the general name for NTN's new generation of bearings that are noted for their industry-leading performance.

Type EM】
AGE®

Up to
20% higher
 allowable
 speed

ational speed improve ease-of-use re eco-friendly operation.

are innovative new standard products specifically developed
 improved ease-of-use required for industrial machinery.



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ULTAGE® The ULTAGE® Advantage

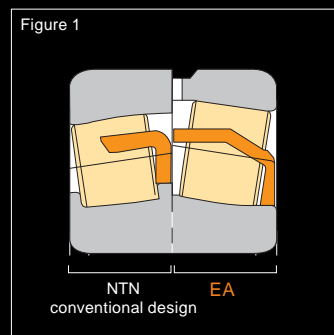
1 The industry's highest load capacity

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. Maintenance intervals can also be extended.

Basic dynamic load rating: up to 65% greater than the NTN conventional design

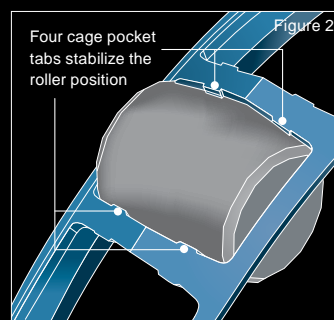
Basic static load rating: up to 35% greater than the NTN conventional design

Service life: up to five times longer than the NTN conventional design



2 The industry's highest allowable speed

The new pressed steel cage results in allowable bearing speeds up to 20% greater than NTN's conventional design.



3 Pressed steel cage provided as standard.

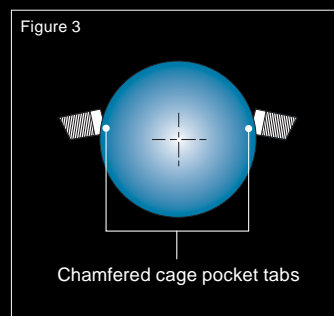
The window-type pressed steel cage provides higher rigidity. Each roller pocket is provided with four tabs.

The guide system employs a back-to-back cage system.

Four tabs in each cage pocket stabilize the roller position.

The innovative cage pocket shape ensures a stable supply of lubricating oil or grease into the bearing.

A special surface treatment enhances wear resistance.



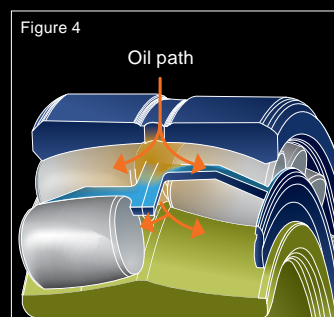
4 Compact, lightweight design

The increased load capacity contributes to a lighter and more compact design.

Benchmarks

Model No.	Load rating (kN)		Boundary dimensions (mm)	Bearing volume (cm ³)	Mass (kg)
	Cr	Cor			
22220B	315	415	100 × 180 × 46	810	4.95
22218EA	385	398	90 × 160 × 40	550	3.28

Results in approximately a 30% reduction in volume ratio and mass ratio



5 Improved ease-of-use

Adoption of a simple window-type pressed steel cage improves ease of assembly/disassembly and grease application.

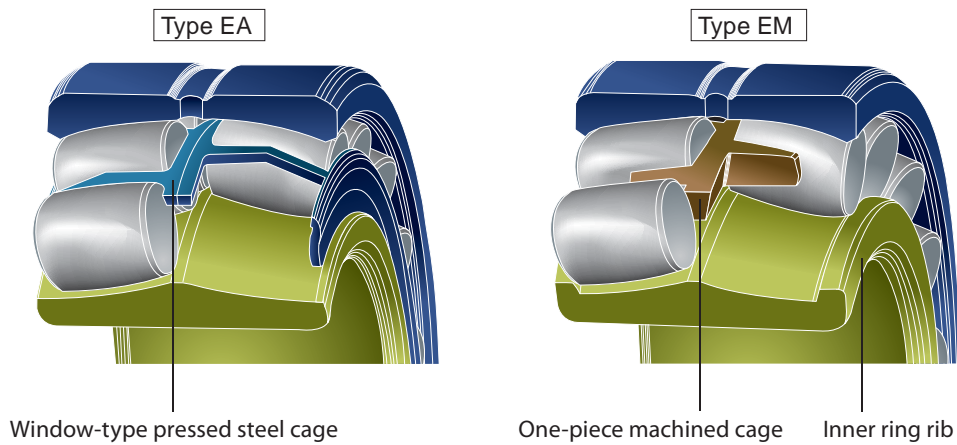
Easier application of grease to the roller surface

Improved roller retention contributes to easier assembly/disassembly

【Bearing Number】

222	20	EA	K	D1	C3
Dimension series code	Bore diameter code	Type code	Raceway configuration code	Oil inlet/oil groove code	Internal clearance code
		EA: Window-type pressed steel cage EM: One-piece machined high-tension brass cage	No code: Cylindrical bore K: Tapered bore	D1: With oil inlet/oil groove (D1 specification only) W33: With oil inlet/oil groove (European market specification)	No code: Normal clearance C3: C3 clearance

For applications that expose bearings to severe vibration and impact, we recommend Type EM bearings, which incorporate a high-tension brass cage machined from a single piece.
(Type EM differs from Type EA in the shape of the inner ring.)



【Allowable Misalignment】

- **Normal or heavy load** ····· 0.009rad(0.5 °)
- **Light load** ··········· 0.035rad(2 °)

1 Bearing Tolerances

4.1. Dimensional accuracy and running accuracy

(1) Inner ring (μm)

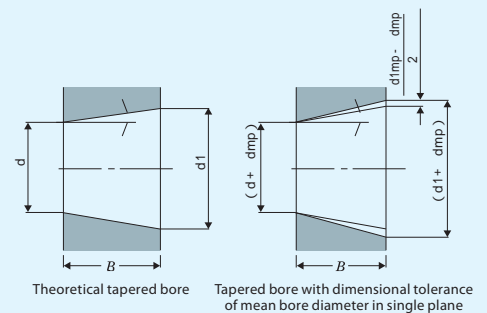
Nominal bore diameter d mm		Dimensional tolerance of mean bore diameter in single plane d_{mp} Class 0		Radial runout K_{ia} Class 0	Width deviation $_{BS}$ Class 0		Width variation V_{BS} Class 0
Over	Including	High	Low	Max	High	Low	Max
-	30	0	-10	13	0	-120	20
30	50	0	-12	15	0	-120	20
50	80	0	-15	20	0	-150	25
80	120	0	-20	25	0	-200	25
120	150	0	-25	30	0	-250	30
150	180	0	-25	30	0	-250	30
180	250	0	-30	40	0	-300	30

(2) Outer ring (μm)

Nominal outside diameter D mm		Dimensional tolerance of mean outside diameter in single plane D_{mp} Class 0		Radial runout K_{ea} Class 0	Width deviation $_{CS}$ Class 0		Width variation V_{CS} Class 0
Over	Including	High	Low	Max	High	Low	Max
50	80	0	-13	25	Same as $_{BS}$ and V_{BS} of bearings of same nominal bore diameter d.		
80	120	0	-15	35			
120	150	0	-18	40			
150	180	0	-25	45			
180	250	0	-30	50			
250	315	0	-35	60			

4.2. Tolerance of tapered bore (μm)

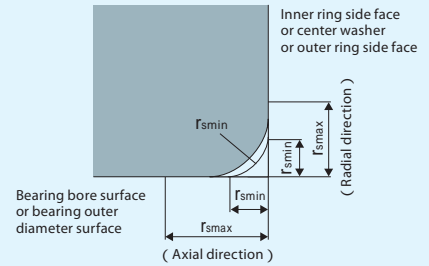
Nominal bore diameter d mm		Dimensional tolerance of mean bore diameter in single plane d_{mp}		$d_{1mp} - d_{mp}$		Bore diameter variation V_{dp}
Over	Including	High	Low	High	Low	Max
-	30	+33	0	+21	0	13
30	50	+39	0	+25	0	16
50	80	+46	0	+30	0	19
80	120	+54	0	+35	0	22
120	180	+63	0	+40	0	40
180	250	+72	0	+46	0	46



2 Chamfer Dimensions

(mm)

r_{smin}	Nominal bore diameter d		r_{smax}	
	Over	Including	Radial direction	Axial direction
1	-	50	1.5	3
	50	-	1.9	3
1.1	-	120	2	3.5
	120	-	2.5	4
1.5	-	120	2.3	4
	120	-	3	5
2	-	80	3	4.5
	80	220	3.5	5
	220	-	3.8	6
2.1	-	280	4	6.5
	280	-	4.5	7
2.5	-	100	3.8	6
	100	280	4.5	6
	280	-	5	7
3	-	280	5	8
	280	-	5.5	8
4	-	-	6.5	9

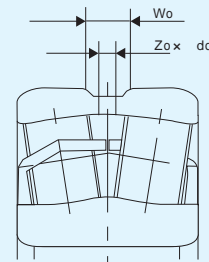


3 Dimensions of Oil Inlets and Outer Diameter Groove

Number of oil inlets

Nominal outside diameter mm		Number of oil inlets	
		D1	W33 (European market specification)
Min	Less than	Zo	Zo
-	320	4	3
320	420	8	3

Note : See the dimension table for information on the oil groove width W_o and oil inlet diameter d_o .



4 Internal Clearance

(1) Cylindrical bore

(μm)

Nominal bore diameter d mm		C2		CN		C3		C4	
Over	Including	Min	Max	Min	Max	Min	Max	Min	Max
-	30	15	25	25	40	40	55	55	75
30	40	15	30	30	45	45	60	60	80
40	50	20	35	35	55	55	75	75	100
50	65	20	40	40	65	65	90	90	120
65	80	30	50	50	80	80	110	110	145
80	100	35	60	60	100	100	135	135	180
100	120	40	75	75	120	120	160	160	210
120	140	50	95	95	145	145	190	190	240
140	160	60	110	110	170	170	220	220	280
160	180	65	120	120	180	180	240	240	310
180	200	70	130	130	200	200	260	260	340
200	225	80	140	140	220	220	290	290	380
225	250	90	150	150	240	240	320	320	420

(2) Tapered bore

(μm)

Nominal bore diameter d mm		C2		CN		C3		C4	
Over	Including	Min	Max	Min	Max	Min	Max	Min	Max
-	30	20	30	30	40	40	55	55	75
30	40	25	35	35	50	50	65	65	85
40	50	30	45	45	60	60	80	80	100
50	65	40	55	55	75	75	95	95	120
65	80	50	70	70	95	95	120	120	150
80	100	55	80	80	110	110	140	140	180
100	120	65	100	100	135	135	170	170	220
120	140	80	120	120	160	160	200	200	260
140	160	90	130	130	180	180	230	230	300
160	180	100	140	140	200	200	260	260	340
180	200	110	160	160	220	220	290	290	370
200	225	120	180	180	250	250	320	320	410
225	250	140	200	200	270	270	350	350	450

5 Installing Tapered Bore Bearings

(mm)

Nominal bore diameter d mm		Reduction in radial internal clearance		Axial displacement drive-up		Minimum residual internal clearance		
Over	Including	Min	Max	Min	Max	CN	C3	C4
24	30	0.01	0.015	0.15	0.2	0.015	0.025	0.04
30	40	0.01	0.015	0.2	0.25	0.02	0.035	0.05
40	50	0.015	0.02	0.3	0.35	0.025	0.04	0.06
50	65	0.025	0.03	0.35	0.4	0.025	0.045	0.065
65	80	0.035	0.04	0.45	0.55	0.03	0.055	0.08
80	100	0.035	0.045	0.6	0.7	0.035	0.065	0.095
100	120	0.05	0.06	0.75	0.85	0.04	0.075	0.11
120	140	0.06	0.07	0.85	0.95	0.05	0.09	0.13
140	160	0.07	0.085	0.9	1.1	0.045	0.095	0.145
160	180	0.075	0.095	1	1.3	0.045	0.105	0.165
180	200	0.09	0.11	1.2	1.5	0.05	0.11	0.18

6 Bearing Fits

(1) Tolerance class of normally used shaft

Conditions	Spherical Roller Bearings		Tolerance zone of shaft	Remarks	
	Shaft diameter d mm				
	Over	Including			
Cylindrical bore bearing (class 0)					
Rotating inner ring load or indefinite-direction load	Light load Varying load Normal load	-	40	k5	
		40	65	m5	
		65	100	m6	
		100	140	n6	
		140	280	p6	
	280	500	r6		
Heavy load or impact load	50	100	n6	Use a bearing with an internal clearance greater than the CN clearance.	
	100	140	p6		
	140	200	r6		
Static inner ring load	Inner ring should slide smoothly on shaft.	All shaft diameters		g6	For larger bearings, tolerance zone f6 may be applied to ensure the bearing slides smoothly on the shaft.
	Inner ring need not slide smoothly on shaft.	All shaft diameters		h6	
Tapered bore bearing (Class 0; complete with adaptor or removable sleeve.)					
All load types	All shaft diameters		h9/IT5		

Criteria for light load, normal load, and heavy load

$$\begin{cases} \text{Light load} \cdots & \text{Dynamic equivalent radial load} & 0.06C_r \\ \text{Normal load} \cdots & 0.06C_r < \text{Dynamic equivalent radial load} & 0.12C_r \\ \text{Heavy load} \cdots & 0.12C_r < \text{Dynamic equivalent radial load} & \end{cases}$$

The above table applies to solid steel shafts.

When calculating the necessary interference, use the following expressions. Determine the value to 1/1000 the shaft diameter at maximum:

$$\begin{cases} \text{When } Fr \leq 0.3C_{0r} & \text{Necessary interference } d_F (\mu\text{m}) \text{ is } d_F = 0.08(d \cdot Fr/B)^{1/2} \\ \text{When } Fr > 0.3C_{0r} & d_F = 0.02(Fr/B) \end{cases}$$

(where, d: bearing bore diameter mm, B: inner ring width, Fr: radial load N, C_{0r}: basic static load rating N)

When taking into account the difference between the ambient temperature and the temperature of a running bearing, consider adopting the necessary temperature-difference-dependent effective interference $d_T (\mu\text{m})$.

$$d_T = 0.0015 \cdot d \cdot T$$

(where, T: difference between bearing temperature and ambient temperature in °C)

(2) Tolerance class of normally used housing bore

Housing	Conditions		Tolerance class of housing bore	Remarks	
	Load type, etc.	Axial movement of outer ring			
One-piece housing or two-piece housing	Static outer ring load	All load type	Movable	H7	When a large bearing is used or a large temperature difference exists across the outer ring and housing, tolerance zone G7 may be applied.
		Light or normal load	Movable	H8	—
		Shaft and inner ring become very hot.	Easily movable	G7	When a large bearing is used or a large temperature difference exists across the outer ring and housing, tolerance zone F7 may be applied.
One-piece housing	Indefinite-direction load	Precision rotation must be possible under light or normal load.	Generally immovable	K6	—
		Quiet running required.	Movable	JS6	—
			Movable	H6	—
	Rotating outer ring load	Light or normal load	Movable	JS7	—
		Normal or heavy load	Generally immovable	K7	—
		High-impact load	Immovable	M7	—
		Light or varying load	Immovable	M7	—
Normal or heavy load	Immovable		N7	—	
Heavy or high-impact loads on thin-walled housings	Immovable	P7	—		

Criteria for light load, normal load, and heavy load

$$\begin{cases} \text{Light load} \cdots & \text{Dynamic equivalent radial load} & 0.06C_r \\ \text{Normal load} \cdots & 0.06C_r < \text{Dynamic equivalent radial load} & 0.12C_r \\ \text{Heavy load} \cdots & 0.12C_r < \text{Dynamic equivalent radial load} & \end{cases}$$

The above table applies to steel or cast iron housings.

7 Allowable Axial Load

Spherical roller bearings carry a radial load, a bidirectional axial load, or a combination of both. They are suitable for applications involving vibration and impact loads. However, if a spherical roller bearing is used under an excessive axial load, the load on the rollers of the row not receiving the axial load will be reduced and the rollers in this row move with a sliding motion, possibly leading to lubrication failure and other problems. To prevent such problems, use spherical roller bearings under conditions that satisfy $F_a/F_r \leq e$.

Allowable Axial Load

$F_a/F_r \leq e$... F_a : Axial load, F_r : Radial load, e : Constant (See dimension table.)

8 Allowable Speeds

Higher bearing speeds result in higher bearing temperatures caused by friction. When the bearing temperature exceeds a specific limit, lubricant performance deteriorates significantly, leading to abnormally high temperatures and bearing seizure.

The limiting factors that affect allowable bearing speed include the following:

- (1) Bearing type
- (2) Bearing size
- (3) Lubrication system (grease, circulating lubrication, oil bath, etc.)
- (4) Bearing internal clearance (internal clearance of running bearing)
- (5) Bearing load
- (6) Dimensional accuracy with shaft, housing, etc.

The allowable speeds indicated in the bearing dimension table are for reference only and apply 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 speed at which the outer ring temperature reaches 80 °C when the bearing is allowed to run at 5% basic static load rating C_{0r} while lubricated with oil (viscosity VG32) which is assimilated to room temperature and fed at a rate of 1 liter/min (circulating lubrication)

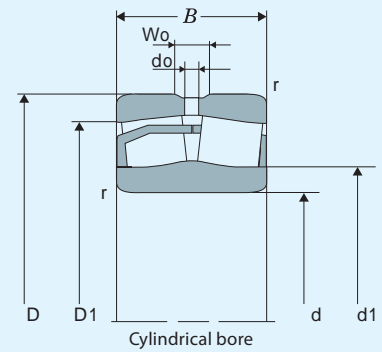
Grease-lubricated bearings

The bearing speed at which the outer ring temperature reaches 80 °C when the bearing, which has undergone running-in operation, is allowed to run at 5% basic static load rating C_{0r} with the bearing's internal free volume 20 to 30% pre-filled with lithium grease (consistency: NLGI3)

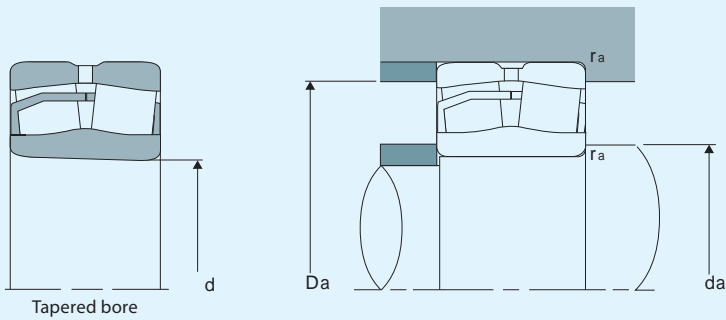
With either lubrication system, the bearing temperature rise profile varies with the operating conditions (operating load, running speed pattern, lubricating conditions, etc.) in which the bearing is used. Therefore, select the optimal bearing by allowing sufficient margin for the allowable speed for that particular bearing as indicated in the catalog.

Contact NTN Engineering for technical assistance if the bearing speed in the intended application exceeds 80% of the allowable speed indicated in the bearing dimension table, or if the intended bearing is to be used under severe operating conditions involving vibration and impact.

9 Dimensional Table



Boundary dimensions						Basic dynamic load rating	Basic static load rating	Basic dynamic load rating	Basic static load rating	Allowable speed	
mm						kN		kgf		min ⁻¹	
d	D	B	r _{min}	W ₀	d ₀	Cr	Cor	Cr	Cor	Grease	Oil
25	52	18	1	3	1.5	57.2	46.1	5830	4670	10400	13000
30	62	20	1	4	2	75.7	64.5	7720	6580	8800	11000
35	72	23	1.1	5	2	100	92	10200	9380	7500	9400
40	80	23	1.1	5	2.5	116	105	11800	10700	6800	8500
	90	33	1.5	6	3	169	152	17200	15500	5400	6600
45	85	23	1.1	6	2.5	121	113	12300	11500	6100	7700
	100	36	1.5	6	3	206	187	21000	19100	4600	5700
50	90	23	1.1	6	2.5	130	124	13300	12600	5700	7200
	110	40	2	7	3.5	250	232	25400	23700	4300	5300
55	100	25	1.5	6	3	155	148	15800	15100	5300	6700
	120	43	2	8	3.5	296	274	30200	28000	3900	4800
60	110	28	1.5	7	3	187	181	19100	15300	4800	6000
	130	46	2.1	9	4	340	319	34700	32600	3600	4600
65	120	31	1.5	8	3.5	227	224	23100	22900	4400	5500
	140	48	2.1	9	4	369	343	37600	35000	3300	4100
70	125	31	1.5	7	3.5	235	240	24000	24400	4100	5200
	150	51	2.1	10	5	420	396	42800	40400	3000	3800
75	130	31	1.5	7	3.5	244	249	24800	25400	4000	5000
	160	55	2.1	10	5	491	467	50100	47600	2900	3600
80	140	33	2	8	3.5	278	287	28400	29300	3700	4600
	170	58	2.1	10	5	541	522	55200	53200	2700	3400
85	150	36	2	8	3.5	324	330	33000	33600	3400	4300
	180	60	3	11	5	599	604	61100	61600	2600	3200
90	160	40	2	10	4.5	385	398	39200	40600	3200	4000
	190	64	3	12	5	668	652	68100	66400	2500	3000
95	170	43	2.1	10	4.5	416	417	42400	42600	3000	3800
	200	67	3	12	6	732	751	74600	76500	2300	2800
100	165	52	2	8	4	464	575	47300	57400	2400	3000
	180	46	2.1	11	5	472	495	48100	50500	2800	3600
	215	73	3	13	6	827	844	84300	86100	2100	2600
110	170	45	2	8	3.5	417	517	42500	52700	2600	3300
	180	56	2	9	4	547	669	55800	68200	2200	2800
	200	53	2.1	12	6	602	643	61400	65600	2600	3300
	240	80	3	16	7	975	972	99500	99100	2000	2400
120	180	46	2	8	3.5	446	577	45500	58900	2400	3100
	200	62	2	10	4.5	663	820	67600	83600	2000	2500
	215	58	2.1	12	6	688	753	70100	76800	2400	3000
	260	86	3	18	8	1170	1280	119000	131000	1800	2200



Dynamic equivalent radial load

$$P_r = XFr + YFa$$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

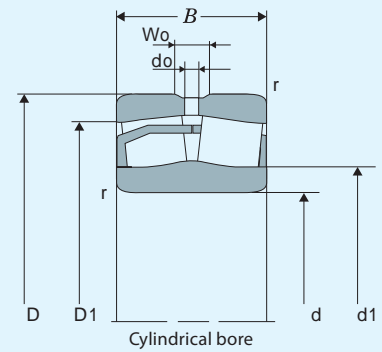
Static equivalent radial load

$$P_{or} = Fr + Y_0Fa$$

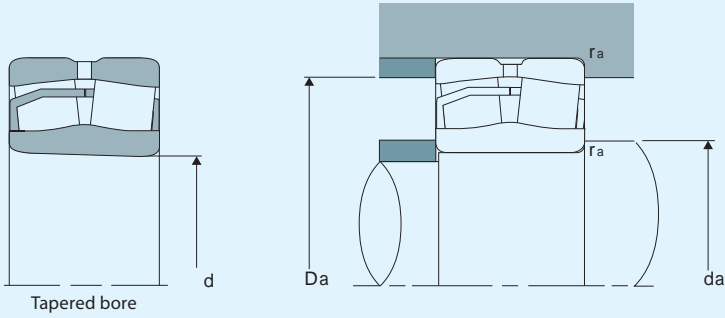
For values e, Y_1 , Y_2 , and Y_0 see the following table.

Bearing number		Abutment and fillet dimensions					Constant	Axial load factors				Mass (approx.) kg
Cylindrical bore	Tapered bore	d1	da min	Da max	D1	$r_{as \max}$	e	Y_1	Y_2	Y_0	Cylindrical bore	
22205EAD1	22205EAKD1	30	30	46	46	1	0.34	2.00	2.98	1.96	0.170	
22206EAD1	22206EAKD1	37	36	56	55	1	0.31	2.15	3.20	2.10	0.270	
22207EAD1	22207EAKD1	45	42	65	63	1.1	0.31	2.21	3.29	2.16	0.430	
22208EAD1	22208EAKD1	50	47	73	71	1.1	0.27	2.47	3.67	2.41	0.520	
22308EAD1	22308EAKD1	52	49	81	78	1.5	0.36	1.87	2.79	1.83	1.00	
22209EAD1	22209EAKD1	54	52	78	76	1.1	0.26	2.64	3.93	2.58	0.570	
22309EAD1	22309EAKD1	58	54	91	87	1.5	0.36	1.90	2.83	1.86	1.37	
22210EAD1	22210EAKD1	59	57	83	81	1.1	0.24	2.84	4.23	2.78	0.600	
22310EAD1	22310EAKD1	63	61	99	95	2	0.36	1.87	2.79	1.83	1.81	
22211EAD1	22211EAKD1	66	64	91	90	1.5	0.23	2.95	4.40	2.89	0.820	
22311EAD1	22311EAKD1	68	66	109	104	2	0.36	1.87	2.79	1.83	2.29	
22212EAD1	22212EAKD1	71	69	101	99	1.5	0.24	2.84	4.23	2.78	1.13	
22312EAD1	22312EAKD1	75	72	118	113	2.1	0.35	1.95	2.90	1.91	2.80	
22213EAD1	22213EAKD1	78	74	111	107	1.5	0.24	2.79	4.15	2.73	1.51	
22313EAD1	22313EAKD1	81	77	128	122	2.1	0.33	2.06	3.06	2.01	3.41	
22214EAD1	22214EAKD1	84	79	116	113	1.5	0.22	3.01	4.48	2.94	1.59	
22314EAD1	22314EAKD1	85	82	138	131	2.1	0.34	2.00	2.98	1.96	4.18	
22215EAD1	22215EAKD1	88	84	121	118	1.5	0.22	3.14	4.67	3.07	1.64	
22315EAD1	22315EAKD1	91	87	148	139	2.1	0.34	2.00	2.98	1.96	5.08	
22216EAD1	22216EAKD1	94	91	129	127	2	0.22	3.14	4.67	3.07	2.07	
22316EAD1	22316EAKD1	98	92	158	148	2.1	0.34	2.00	2.98	1.96	6.03	
22217EAD1	22217EAKD1	100	96	139	137	2	0.22	3.07	4.57	3.00	2.56	
22317EAD1	22317EAKD1	107	99	166	157	3	0.32	2.09	3.11	2.04	7.06	
22218EAD1	22218EAKD1	105	101	149	144	2	0.23	2.90	4.31	2.83	3.28	
22318EAD1	22318EAKD1	110	104	176	166	3	0.33	2.06	3.06	2.01	8.29	
22219EAD1	22219EAKD1	110	107	158	153	2.1	0.23	2.95	4.40	2.89	3.93	
22319EAD1	22319EAKD1	120	109	186	174	3	0.32	2.09	3.11	2.04	9.75	
23120EAD1	23120EAKD1	114	111	154	147	2	0.28	2.39	3.56	2.34	4.26	
22220EAD1	22220EAKD1	118	112	168	161	2.1	0.24	2.84	4.23	2.78	4.82	
22320EAD1	22320EAKD1	127	114	201	187	3	0.34	1.98	2.94	1.93	12.4	
23022EAD1	23022EAKD1	123	119	161	155	2	0.23	2.95	4.40	2.89	3.59	
23122EAD1	23122EAKD1	125	121	169	161	2	0.28	2.43	3.61	2.37	5.48	
22222EAD1	22222EAKD1	130	122	188	179	2.1	0.25	2.69	4.00	2.63	6.93	
22322EAD1	22322EAKD1	139	124	226	209	3	0.32	2.09	3.11	2.04	16.8	
23024EAD1	23024EAKD1	134	129	171	165	2	0.22	3.14	4.67	3.07	3.96	
23124EAD1	23124EAKD1	138	131	189	179	2	0.28	2.43	3.61	2.37	7.62	
22224EAD1	22224EAKD1	141	132	203	193	2.1	0.25	2.74	4.08	2.68	8.69	
22324EAD1	22324EAKD1	156	134	246	225	3	0.32	2.09	3.11	2.04	22.4	

9 Dimensional Table



d	Boundary dimensions					Basic dynamic load rating	Basic static load rating	Basic dynamic load rating	Basic static load rating	Allowable speed	
	mm					kN		kgf		min ⁻¹	
	D	B	r _{smin}	W ₀	d ₀	Cr	Cor	Cr	Cor	Grease	Oil
130	200	52	2	9	4	565	721	57600	73500	2200	2900
	210	64	2	10	4.5	710	906	72400	92400	1900	2400
	230	64	3	13	6	808	898	82400	91600	2200	2800
	280	93	4	19	9	1330	1400	135000	143000	1600	2000
140	210	53	2	9	4	597	783	60900	79800	2100	2700
	225	68	2.1	11	5	802	1030	81800	105000	1800	2200
	250	68	3	14	7	912	1010	93000	103000	2000	2500
	300	102	4	19	9	1540	1720	157000	175000	1500	1900
150	225	56	2.1	10	4.5	660	893	67300	91100	2000	2500
	250	80	2.1	13	6	1060	1350	108000	138000	1600	2000
	270	73	3	15	7	1080	1220	110000	124000	1800	2300
	320	108	4	20	9	1740	1890	178000	193000	1400	1700
160	240	60	2.1	11	5	748	1000	76300	102000	1800	2300
	270	86	2.1	14	6	1220	1580	124000	162000	1500	1900
	290	80	3	17	8	1220	1390	124000	142000	1700	2100
	340	114	4	20	10	1950	2210	199000	226000	1300	1600
170	260	67	2.1	12	5	914	1240	93200	127000	1700	2200
	280	88	2.1	14	6	1270	1700	129000	173000	1400	1800
	310	86	4	18	8	1400	1610	143000	164000	1600	2000
	360	120	4	20	10	2200	2630	225000	268000	1200	1500
180	280	74	2.1	13	6	1080	1450	110000	148000	1600	2000
	300	96	3	15	7	1490	1960	152000	200000	1300	1700
	320	86	4	18	8	1450	1660	148000	169000	1500	1900
190	290	75	2.1	13	6	1140	1570	116000	160000	1500	1900
	340	92	4	20	9	1620	1870	165000	191000	1400	1800
200	310	82	2.1	14	7	1310	1790	134000	182000	1400	1800
	360	98	4	20	10	1810	2100	184000	214000	1400	1700
220	340	90	3	15	7	1530	2110	156000	215000	1300	1600
	400	108	4	21	11	2210	2690	225000	274000	1200	1500



Dynamic equivalent radial load

$$Pr = XFr + YFa$$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Static equivalent radial load

$$P_0r = Fr + Y_0Fa$$

For values e, Y_1 , Y_2 , and Y_0 see the following table.

Bearing number		Abutment and fillet dimensions					Constant	Axial load factors				Mass (approx.) kg
Cylindrical bore	Tapered bore	d1	da min	Da max	D1	$r_{as\ max}$	e	Y_1	Y_2	Y_0	Cylindrical bore	
23026EAD1	23026EAKD1	145	139	191	183	2	0.22	3.01	4.48	2.94	5.79	
23126EAD1	23126EAKD1	148	141	199	189	2	0.27	2.51	3.74	2.45	8.33	
22226EAD1	22226EAKD1	151	144	216	206	3	0.25	2.69	4.00	2.63	10.8	
22326EAD1	22326EAKD1	164	147	263	243	4	0.33	2.06	3.06	2.01	26.8	
23028EAD1	23028EAKD1	155	149	201	193	2	0.22	3.14	4.67	3.07	6.21	
23128EAD1	23128EAKD1	159	152	213	203	2.1	0.26	2.55	3.80	2.50	10.1	
22228EAD1	22228EAKD1	163	154	236	224	3	0.25	2.74	4.08	2.68	13.6	
22328EAD1	22328EAKD1	181	157	283	261	4	0.33	2.03	3.02	1.98	34.0	
23030EAD1	23030EAKD1	167	161	214	207	2.1	0.21	3.20	4.77	3.13	7.56	
23130EAD1	23130EAKD1	171	162	238	223	2.1	0.29	2.35	3.50	2.30	15.5	
22230EAD1	22230EAKD1	177	164	256	242	3	0.25	2.74	4.08	2.68	17.4	
22330EMD1	22330EMKD1	188	167	303	279	4	0.34	2.00	2.98	1.96	42.0	
23032EAD1	23032EAKD1	177	172	229	221	2.1	0.21	3.20	4.77	3.13	9.15	
23132EAD1	23132EAKD1	185	172	258	240	2.1	0.29	2.35	3.50	2.30	19.8	
22232EAD1	22232EAKD1	190	174	276	260	3	0.25	2.69	4.00	2.63	22.1	
22332EMD1	22332EMKD1	205	177	323	296	4	0.33	2.03	3.02	1.98	50.7	
23034EAD1	23034EAKD1	190	181	249	238	2.1	0.22	3.07	4.57	3.00	12.7	
23134EAD1	23134EAKD1	195	182	268.0	250	2.1	0.28	2.39	3.56	2.34	21.3	
22234EMD1	22234EMKD1	201	187	293	277	4	0.26	2.60	3.87	2.54	28.2	
22334EMD1	22334EMKD1	223	187	343	313	4	0.32	2.09	3.11	2.04	60.2	
23036EAD1	23036EAKD1	201	191	269	255	2.1	0.23	2.95	4.40	2.89	16.6	
23136EAD1	23136EAKD1	205	194	286	267	3	0.29	2.32	3.45	2.26	26.9	
22236EMD1	22236EMKD1	209	197	303	287	4	0.25	2.74	4.08	2.68	28.9	
23038EAD1	23038EAKD1	213	201	279	266	2.1	0.22	3.01	4.48	2.94	17.6	
22238EMD1	22238EMKD1	222	207	323	305	4	0.25	2.74	4.08	2.68	35.3	
23040EMD1	23040EMKD1	223	211	299	283	2.1	0.23	2.95	4.40	2.89	22.6	
22240EMD1	22240EMKD1	234	217	343	323	4	0.25	2.74	4.08	2.68	42.5	
23044EMD1	23044EMKD1	246	233	327	310	3	0.23	2.95	4.40	2.89	29.5	
22244EMD1	22244EMKD1	264	237	383	358	4	0.25	2.74	4.08	2.68	59.5	