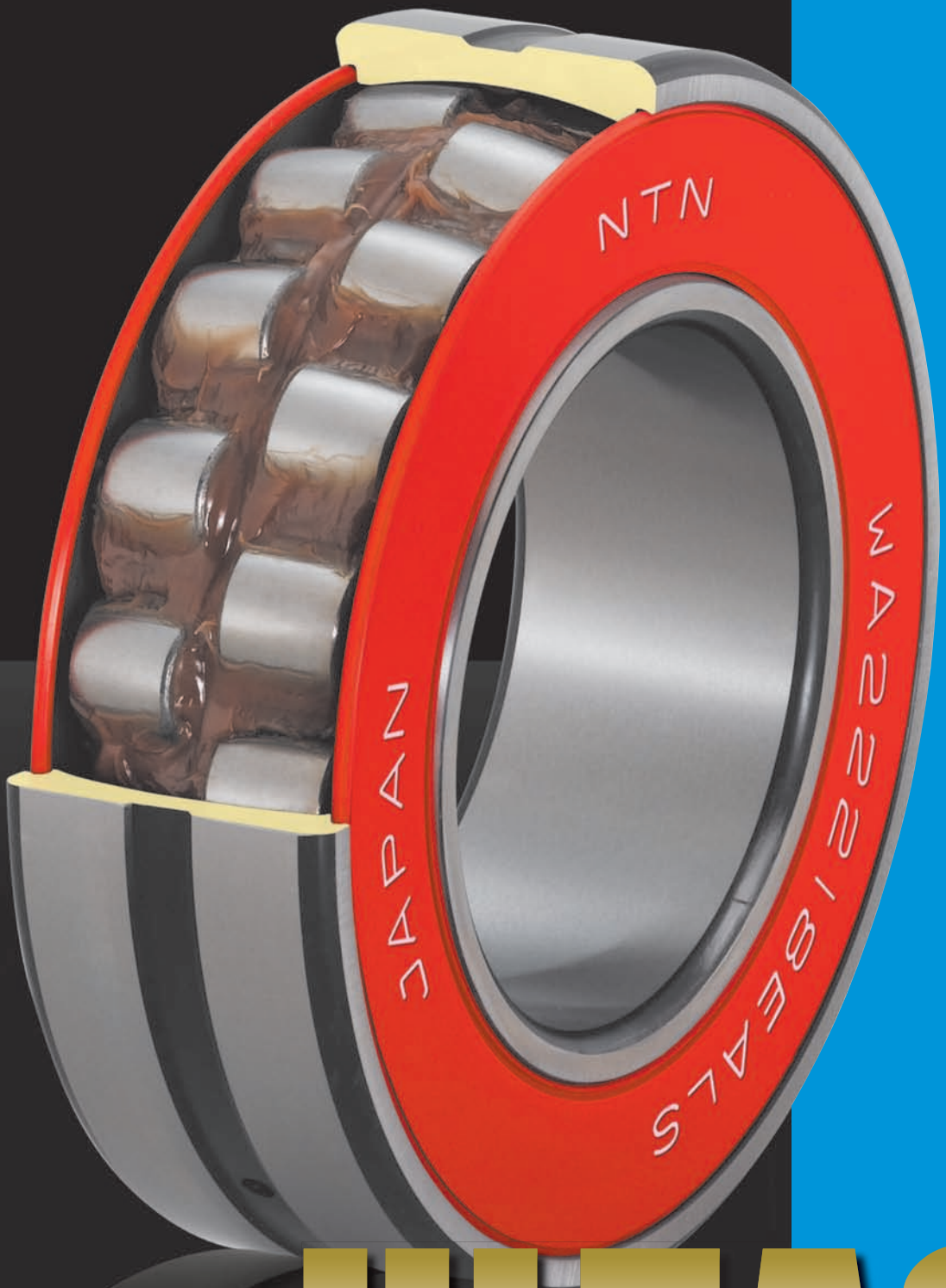
NTN®

Sealed Spherical Roller Bearings

[WA Type]

ULTAGE



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Note: Markings on the seal are not white in actual bearings.

CAT. No. 3703/E

ULTAGE®

Up to five times longer service life

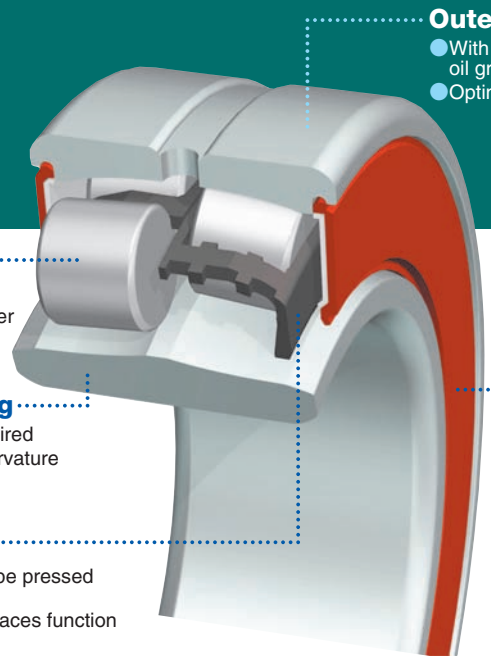
Sealed Spherical Roller Bearings【WA Type】

ULTAGE Series Sealed Spherical Roller Bearings (WA Type) are new innovative standard products specifically developed to provide "longer service life", "higher reliability" and "improved ease of use" required for all industrial machineries.

Longer Service Life
- Larger rollers provide the industry's highest load capacity.
- Extended maintenance intervals
- Lighter and more compact design

Higher reliability
- Prevent from intrusion of foreign matters
- Prolonged relubrication interval

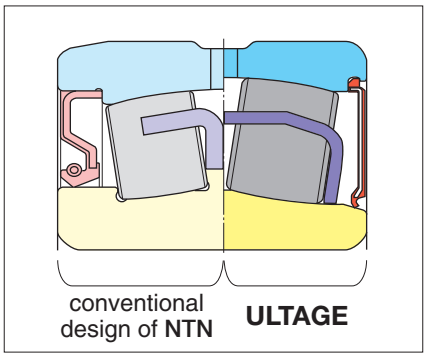
Improved Ease-of-Use
- Unique structure readily accepts lubricant
- Pre-lubricated as standard with long life grease



Features

1. The industry's highest load capacity

Both a high load capacity and a longer service life are achieved by adopting the internal design of EA type spherical roller bearing which has a significantly increased roller diameter and the maximum number of rollers guided with the window-type pressed steel cage.

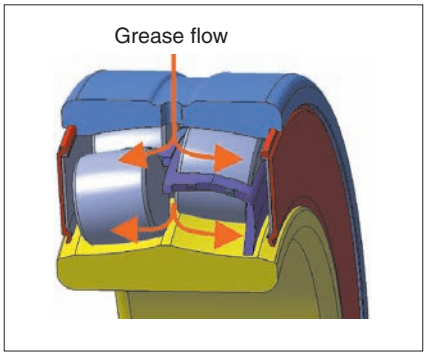


2. Compact design with minimized volume of seals

Adopt the contact type dust-proof seal with minimized volume.
① Prevent from intrusion of foreign matters with uniquely designed contact type rubber seals.
② Secure the dust-proof capability by maintaining the constant contact pressure of seals even under aligned conditions.

3. Prelubricated with a long life grease as standard

Barings are prelubricated with a long life grease.
No cleaning nor greasing are required when being mounted.



4. Oil groove and holes are adopted as standard

Adequate greasing into the inside of the bearing is secured with a lubrication groove and holes on the outside diameter of the outer ring.

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"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 Internal Clearance

1) Cylindrical bore

Unit : μm

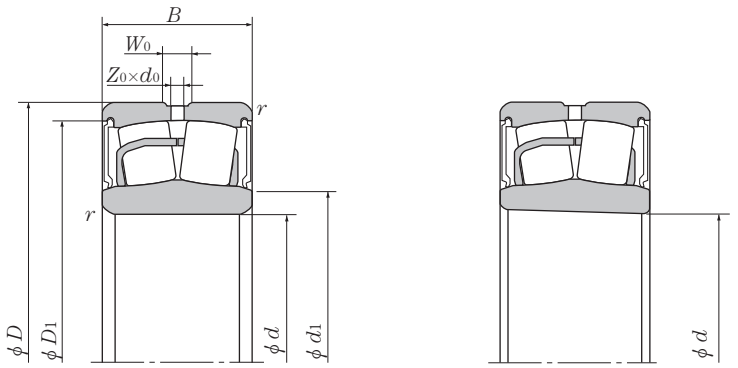
Nominal bore diameter d mm		C2		CN		C3		C4	
over	incl.	min	max	min	max	min	max	min	max
—	30	15	25	25	40	40	55	55	75
30	40	15	30	30	45	45	60	60	80
40	50	20	35	35	55	55	75	75	100
50	65	20	40	40	65	65	90	90	120
65	80	30	50	50	80	80	110	110	145
80	100	35	60	60	100	100	135	135	180
100	120	40	75	75	120	120	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

Unit : μm

Nominal bore diameter d mm		C2		CN		C3		C4	
over	incl.	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

Dimension Table



Oil inlet number

Z_0	
D1	W33
4	3

Bearing numbers		Boundary dimensions mm						Basic load ratings dynamic kN	static kN	dynamic kgf	static kgf
Cylindrical bore	Tapered bore ❶	d	D	B	$r_{s\,min}$ ❷	W_0	d_0	C_r	C_{0r}	C_r	C_{0r}
WA22205EALLSW33	—	25	52	23	1	3	1.5	57.3	46.1	5,840	4,700
WA22206EALLSW33	—	30	62	25	1	4	2	75.7	64.5	7,720	6,580
WA22207EALLSW33	WA22207EALLSKW33	35	72	28	1.1	5	2	100	92	10,200	9,380
WA22208EALLSD1	WA22208EALLSKD1	40	80	28	1.1	5	2.5	116	105	11,800	10,700
WA22209EALLSD1	WA22209EALLSKD1	45	85	28	1.1	6	2.5	121	113	12,300	11,500
WA22210EALLSD1	WA22210EALLSKD1	50	90	28	1.1	6	2.5	130	124	13,300	12,600
WA22211EALLSD1	WA22211EALLSKD1	55	100	31	1.5	6	3	155	148	15,800	15,100
WA22212EALLSD1	WA22212EALLSKD1	60	110	34	1.5	7	3	187	181	19,100	18,400
WA22213EALLSD1	WA22213EALLSKD1	65	120	38	1.5	8	3.5	226	224	23,100	22,900
WA22214EALLSD1	WA22214EALLSKD1	70	125	38	1.5	7	3.5	235	240	24,000	24,400
WA22215EALLSD1	WA22215EALLSKD1	75	130	38	1.5	7	3.5	244	249	24,800	25,400
WA22216EALLSD1	WA22216EALLSKD1	80	140	40	2	8	3.5	278	287	28,400	29,300
WA22217EALLSD1	WA22217EALLSKD1	85	150	44	2	8	3.5	324	330	33,000	33,600
WA22218EALLSD1	WA22218EALLSKD1	90	160	48	2	10	4.5	384	398	39,200	40,600
WA22220EALLSD1	WA22220EALLSKD1	100	180	55	2.1	11	5	472	495	48,100	50,500
WA22222EALLSD1	WA22222EALLSKD1	110	200	63	2.1	12	6	602	643	61,400	65,600
WA22224EALLSD1	WA22224EALLSKD1	120	215	69	2.1	12	6	688	753	70,100	76,800
WA22226EALLSD1	WA22226EALLSKD1	130	230	75	3	13	6	808	898	82,400	91,600

❶ Tapered bore ratio of 1:12. ❷ Smallest allowable dimension for chamfer dimension r.

NTN Standard Grease

- Brand name: Shell Alvania EP grease No.2
  High performance grease for heavy duty containing extreme pressure additives.
- Amount of grease: 15～25% of inside free space of the bearing.

Allowable Speed

- With relubrication : $dn \leqq 6\times10^4$
- Without relubrication : $dn \leqq 8\times10^4$

(d= inner bore diameter dimension, mm) × (n= operating speed, min^{-1})

Allowable Misalignment

- 0.009 rad (0.5˚)

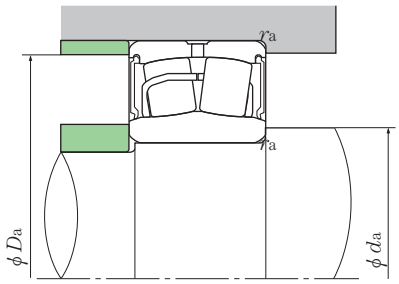
Allowable Temperature Range

- Bearing temperature : -20～+110

Bearing Number

WA 222 20 EA LLS K D1 C3

- **Seal type code**
- **Dimension series code**
- **Bore diameter code**
- **Internal clearance code**
- **Lubrication hole / lubrication groove code**
  - **D1 :** With oil inlet/oil groove (D1 specication only)
  - **W33:** With oil inlet/oil groove (European market specication)
- **Bore configuration code** No code: Cylindrical bore K: Tapered bore
- **Contact seal on both sides**
- **Type code** **EA:** Window-type presed steel cage



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

$P_{or} = F_r + Y_o F_a$

For values of e, Y_1, Y_2 and Y_o see the table below.

Abutment and fillet dimensions					Constant	Axial load factor			Mass (approx.)		Amount of grease (approx.)
d_1	$d_{a\ min}$	$D_{a\ max}$	D_1	$r_{s\ max}$	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore	g
29	29	47	47	1	0.34	2.00	2.98	1.96	0.19	—	1.4～2.4
36	36	56	56	1	0.31	2.15	3.20	2.10	0.30	—	2.0～3.3
43	42	65	65	1.1	0.31	2.21	3.29	2.16	0.50	0.49	2.3～3.9
48	47	73	73	1.1	0.27	2.47	3.67	2.41	0.58	0.57	3.1～5.2
53	52	78	78	1.1	0.26	2.64	3.93	2.58	0.63	0.61	3.4～5.7
58	57	83	83	1.1	0.24	2.84	4.23	2.78	0.70	0.68	3.4～5.6
64	64	93	93	1.5	0.23	2.95	4.40	2.89	0.94	0.91	5.2～7.9
70	69	102	102	1.5	0.24	2.84	4.23	2.78	1.25	1.22	6.6～11.0
76	74	111	110	1.5	0.24	2.79	4.15	2.73	1.72	1.67	8.5～14.2
82	79	116	116	1.5	0.22	3.01	4.48	2.94	1.78	1.73	9.6～16.0
86	84	121	121	1.5	0.22	3.14	4.67	3.07	1.88	1.83	9.9～16.4
93	91	131	131	2	0.22	3.14	4.67	3.07	2.32	2.27	12.2～20.3
98	96	140	140	2	0.22	3.07	4.57	3.00	2.90	2.83	16.9～28.1
103	101	149	147	2	0.23	2.90	4.31	2.83	3.68	3.59	20.4～34.1
115	112	168	165	2.1	0.24	2.84	4.23	2.78	5.40	5.25	28.8～48.0
127	122	188	183	2.1	0.25	2.69	4.00	2.63	7.79	7.58	41.6～69.3
138	132	203	197	2.1	0.25	2.74	4.08	2.68	9.76	9.48	52.8～88.0
148	144	216	211	3	0.25	2.69	4.00	2.63	11.9	11.6	62.6～104.4

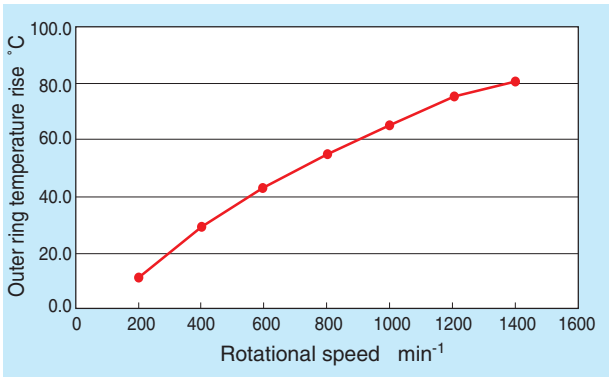
Performance Test Data

Heat Run Test

[Test conditions]

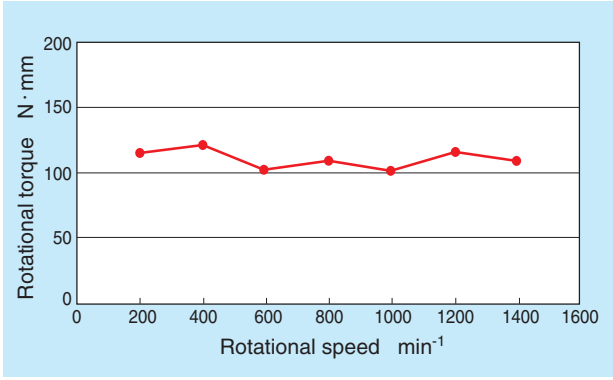
Bearing : WA22218EALLSD1
Load : Radial load 294N {30kgf}
Speed : 200～1400min^{-1}
Lubrication : Shell Alvania EP grease No.2 (**NTN** code 8A)
Amount of grease : 20% of free space
Operating time : Until temperature rise stabilizes

[Test results]



Outer ring temperature rise

[Test results]



Rotational torque

Noise Test

[Test conditions]

Bearing : WA22218EALLSD1
Load : Radial load 980N {100kgf}
Speed : 600, 900, 1200min^{-1}
Lubrication : Shell Alvania EP grease No.2 (**NTN** code 8A)
Amount of grease : 20% of free space

[Test results]

Rotational speed min^{-1}	Noize level dBA			
	50	60	70	80
600				
900				
1200				

Grease Leakage Test

[Test conditions]

Bearing : WA22218EALLSD1
Load : Radial load 1960N {200kgf}
Speed : 1000min^{-1}
Lubrication : Shell Alvania EP grease No.2 (**NTN** code 8A)
Amount of grease : 20% of free space
Operating time : 100 hours

[Test results]

Accumulated total amount of grease leakage		
25h	50h	100h
0.47g	0.58g	0.63g

Handling Precautions

1. Because the internal radial clearance of "ULTAGE Series Sealed Spherical Roller Bearings" with tapered bores cannot be measured with a thickness gauge, please monitor clearances by measuring the axial movement of the inner ring as shown in **Table 1**.
2. **During assembly, if misalignment exceeding the allowable misalignment angle of ±0.5˚ is applied to the bearing, rollers may come in direct contact with seals causing seal deformation. Furthermore, if additional force is applied under these conditions, seals may separate from the bearing entirely. Therefore, caution is advised.**
3. Please use Lithium mineral grease. In case other types of grease are to be used, please consult **NTN**.
4. **If a shrink fit is to be applied, please do not exceed a bearing temperature of 100˚C. However, these bearing cannot be shrink fit via immersion in a hot oil bath.**

Table 1 Installing sealed tapered bore bearings

Nominal bore diameter d mm		Reduction in radial internal clearance		Axial displacement drive-up		Minimum residual internal clearance		
over	incl.	min	max	min	max	CN	C3	C4
24	30	0.010	0.015	0.15	0.20	0.015	0.025	0.040
30	40	0.010	0.015	0.20	0.25	0.020	0.035	0.050
40	50	0.015	0.020	0.30	0.35	0.025	0.040	0.060
50	65	0.025	0.030	0.35	0.40	0.025	0.045	0.065
65	80	0.035	0.040	0.45	0.55	0.030	0.055	0.080
80	100	0.035	0.045	0.60	0.70	0.035	0.065	0.095
100	120	0.050	0.060	0.75	0.85	0.040	0.075	0.110
120	130	0.060	0.070	0.85	0.95	0.050	0.090	0.130