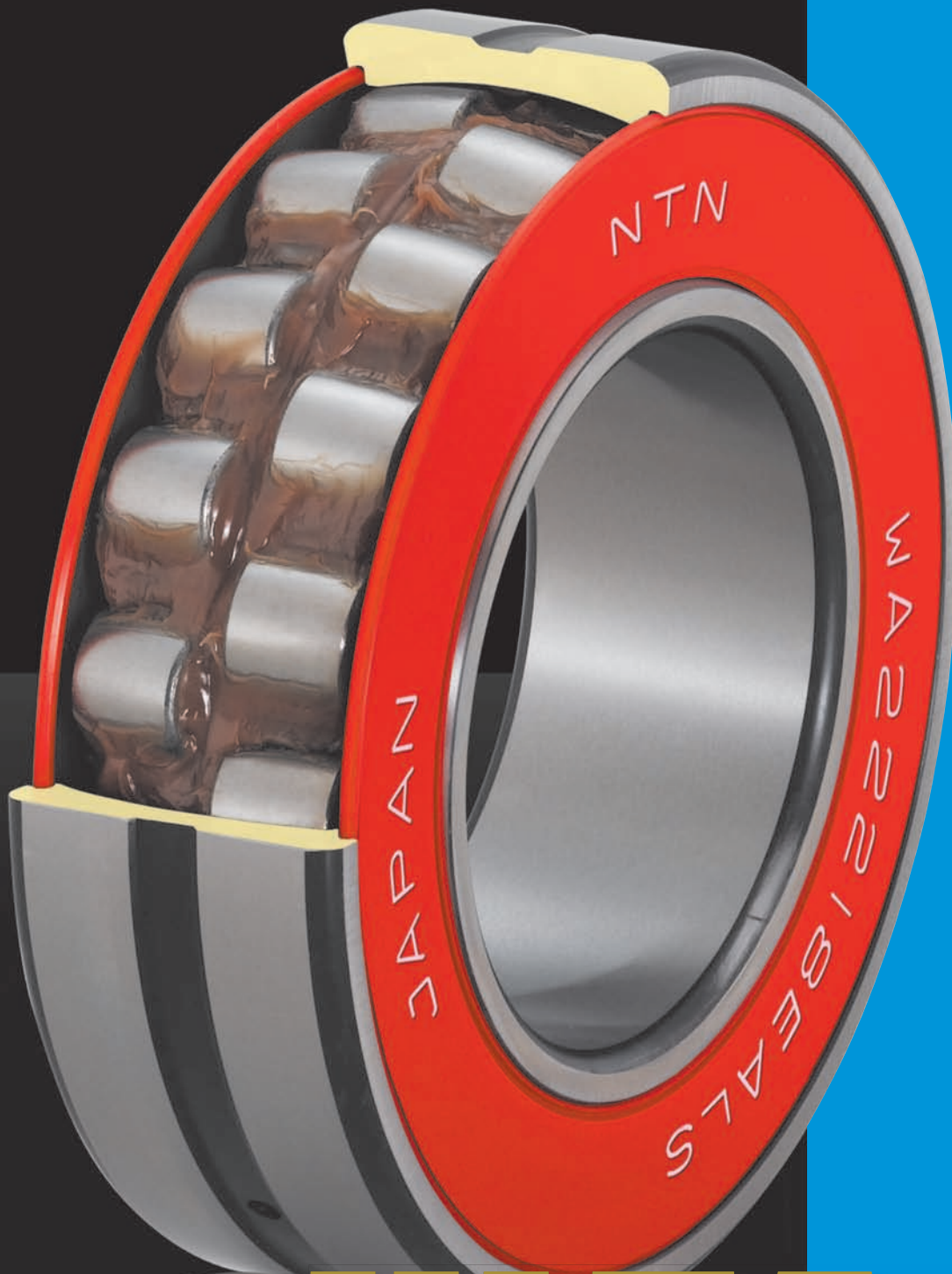


NTN®

Sealed Spherical Roller Bearings [WA Type]

ULTAGE



ULTAGE®

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

Rollers

- Larger rollers
- Maximum number of rollers

Inner ring

- No rib required
- Optimal curvature

Cage

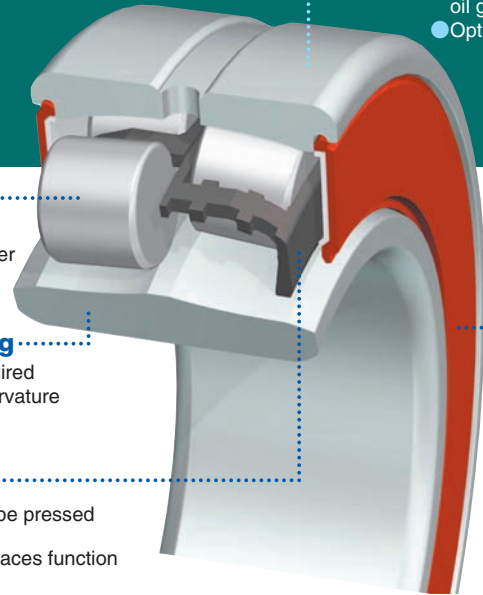
- Window-type pressed steel cage
- Cage end faces function as guides

Outer ring

- With oil inlets and oil groove
- Optimal curvature

Seal

- Contact seals on both sides
- Unique lip structure to maintain the contact pressure even under being aligned



Features

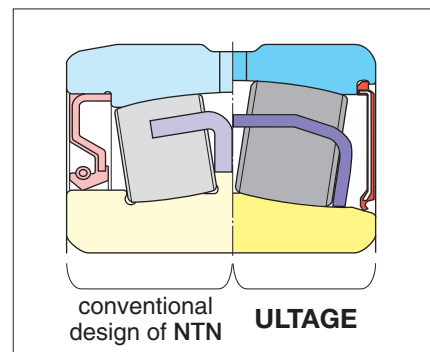
1. The industry's highest load capacity

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.

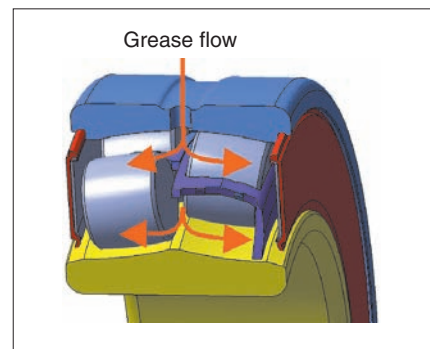


3. Prelubricated with a long life grease as standard

Bearings 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.



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 Internal Clearance

1) Cylindrical bore

Unit : μm

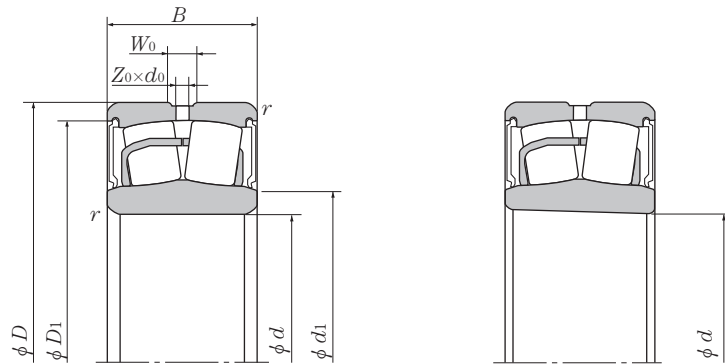
Nominal bore diameter d mm	C2		CN		C3		C4			
	over	incl.	min	max	min	max	min	max		
—	30		15	25	25	40	40	55	55	75
30	40		15	30	30	45	45	60	60	80
40	50		20	35	35	55	55	75	75	100
50	65		20	40	40	65	65	90	90	120
65	80		30	50	50	80	80	110	110	145
80	100		35	60	60	100	100	135	135	180
100	120		40	75	75	120	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		
—	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			
Cylindrical bore	Tapered bore ^①	d	D	B	$r_s \text{ min}$ ^②	W_0	d_0	dynamic kN	static C_{0r}	dynamic kgf	static 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

① Tapered bore ratio of 1:12.

② 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.

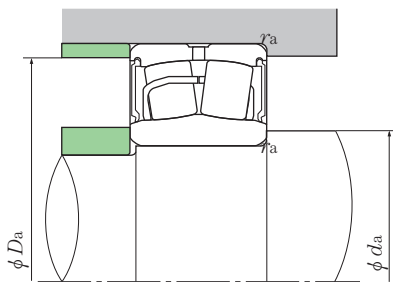
Allowable Misalignment

- 0.009 rad (0.5°)

Bearing Number

WA 222 20 EA LLS K D1 C3

Seal type code: WA
 Dimension series code: 222
 Bore diameter code: 20
 Internal clearance code: C3
 Lubrication hole / lubrication groove code: D1
 D1 : With oil inlet/oil groove (D1 specification only)
 W33: With oil inlet/oil groove (European market specification)
 Bore configuration code: K
 No code: Cylindrical bore K: Tapered bore
 Contact seal on both sides: EA
 Type code: EA: Window-type pressed steel cage



Allowable Speed

- With relubrication : $dn \leq 6 \times 10^4$
 - Without relubrication : $dn \leq 8 \times 10^4$
- (d = inner bore diameter dimension, mm) × (n = operating speed, min⁻¹)

Allowable Temperature Range

- Bearing temperature : -20~+110

Equivalent radial load dynamic

$$P_r = X F_r + Y F_a$$

$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.67	Y ₂

static

$$P_{or} = F_r + Y_0 F_a$$

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

Abutment and fillet dimensions					Constant e	Axial load factor			Mass (approx.)		Amount of grease (approx.) g
d_1	d_a min	D_a max	D_1	r 's max		Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore	
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

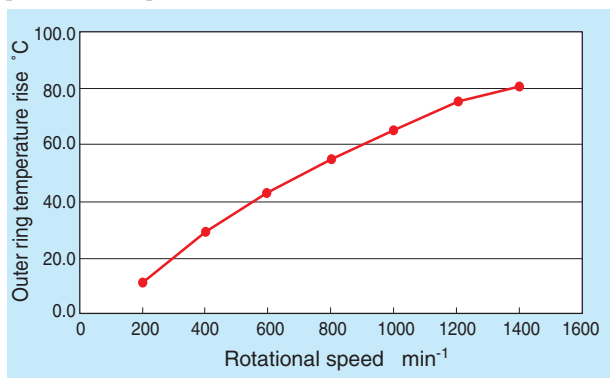
Performance Test Data

Heat Run Test

[Test conditions]

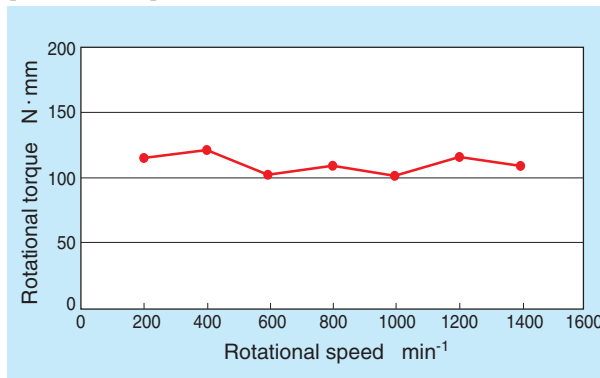
Bearing : WA22218EALLSD1
 Load : Radial load 294N {30kgf}
 Speed : 200~1400min⁻¹
 Lubrication : Shell Alvania EP grease No.2 (NTN code 8A)
 Amount of grease : 20% of free space
 Operating time : Until temperature rise stabilizes

[Test results]



Outer ring temperature rise

[Test results]



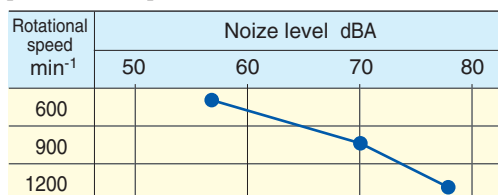
Rotational torque

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]



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

- 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**.
- During assembly, if misalignment exceeding the allowable misalignment angle of $\pm 0.5^\circ$ 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.
- Please use Lithium mineral grease. In case other types of grease are to be used, please consult NTN.
- 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