



SPHERICAL ROLLER BEARINGS

An unrivalled extensive product range!

NTN® **SNR**®

www.ntn-snr.com



With You



NTN-SNR THE STRENGTH OF A GROUP

NTN Corporation, a global leader in bearings, specializes in designing, developing and producing spherical roller bearings.

With NTN-SNR BEARINGS, benefit from this know-how near you with:

- An extensive range of spherical roller bearings
- The constant pursuit for excellence, culminating in high levels of performance and exceptional quality
- Extended service life and unfailing reliability, as recognised by thousands of users around the world

Globally, NTN Corporation is an expert in product life cycle management, and is typified by the accessibility and commitment of its teams.

[NTN-SNR ACCOMPANIES YOU ON THE ROAD TO RELIABILITY AND PERFORMANCE](#)

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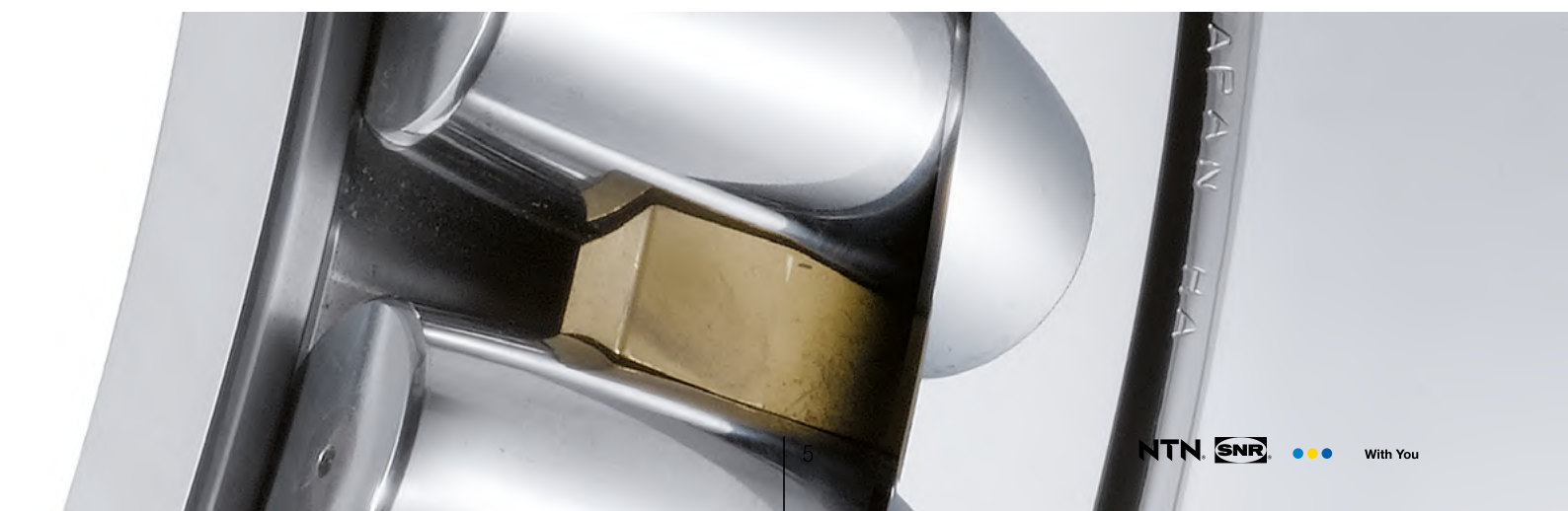


ULTAGI



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CHARACTERISTICS OF THE RANGE

PRINCIPLE OF SPHERICAL ROLLER BEARINGS

Spherical roller bearings are engineered to offer excellent resistance to high temperatures and loads, meaning that they are capable of withstanding the harshest applications. They are a popular choice for absorbing misalignments, impacts and vibrations, as well as operating in polluted environments.

Misalignment

The design of the spherical roller bearings allows for misalignment between the outer ring and the inner ring with no loss of bearing performance.

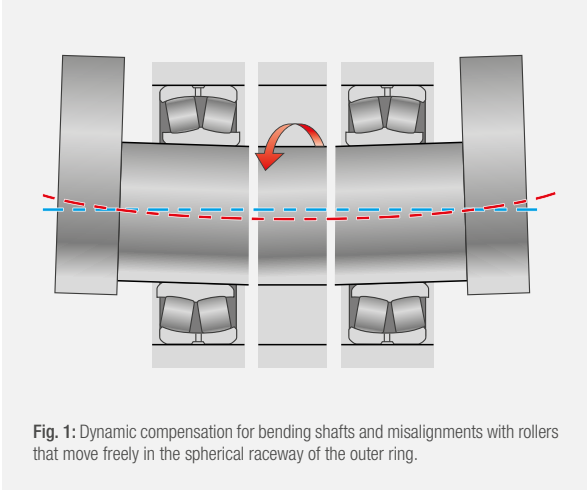
Under normal operating conditions, i.e. where the C/P ratio (dynamic bearing load vs. actual load applied) is greater than 10, the permissible angle of tilt is 0.5°.

This angle of tilt is permissible in cases where the misalignment of the inner ring is constant with respect to the outer ring and in the case of a rotating inner ring.

This value depends on the parts surrounding the bearing or on the type of external seal used. In the case of a rotating outer ring or variable misalignment, the permissible angle of tilt is reduced.

In the case of low loads, the angle of tilt may reach 2°.

For these particular cases, please contact your NTN-SNR representative.



ULTAGE QUALITY

Maintenance operations due to a fault in a component as simple as a bearing can run into hundreds of thousands of euros depending on the application (unavailability of the user's production tools, repair times and employee downtime due to the repairs).

To raise the reliability bar on your equipment, the NTN Group has developed the ULTAGE quality hallmark for its spherical roller bearings. It combines the use of superior quality materials with an enhanced design and precision manufacturing process.



ULTAGE®

ULTAGE, the generation of NTN high-performance bearings delivering:

- Unrivalled service life
- Higher speed limits
- Maximised load capacities

i Bearings designed according to **ULTAGE** rules can be identified with the **suffix E**.

ULTAGE FEATURES

- Superior grade steel
- Improved roller size
- Enhanced surface finishes
- Cage made from high-performance solid brass or drawn steel without a central guide ring
- Specific heat treatment processes

BENEFITS

- Service life doubled with increased load capacities
- Greater rigidity and stability
- Reduced in-service temperatures with improved lubricant circulation within the bearing
- Dimensional stability up to 200°C without impairing the bearing's mechanical properties
- Speed limits 20% higher than conventional designs due to the excellent surface properties



"ULTAGE: less downtime, more profit"

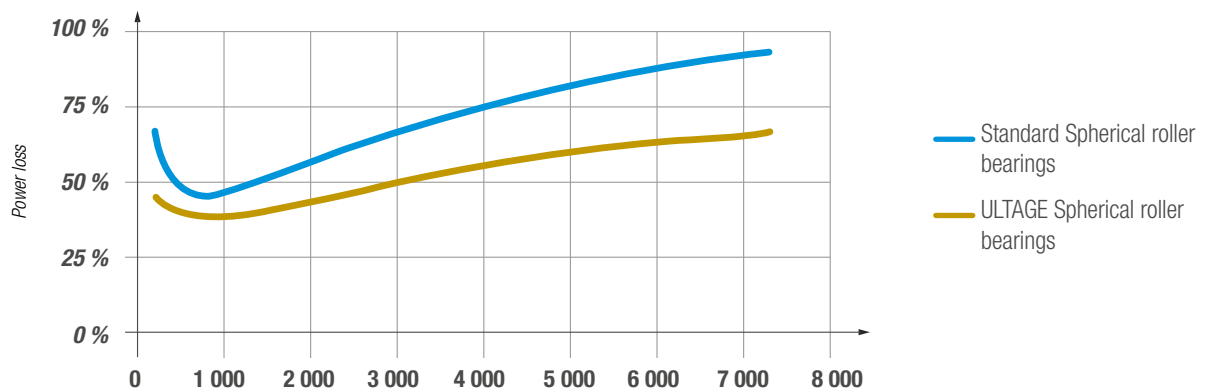


Fig. 2: Reduced power dissipation vs speed.

CONTROLLED MANUFACTURING

AN ALL-INTERNAL IRONCLAD PROCESS

Our entire range of spherical roller bearings is developed and manufactured internally in our Japanese and Italian factories.

The NTN Group is strongly committed to keeping its production processes in-house as a sign of its superlative quality and expertise, especially since its bearings are widely used in critical and costly applications. This strategy ensures that the Group exercises complete control over its range of spherical roller bearings, from product design through to marketing.

The NTN Group has spearheaded a high-performance quality assurance system for its production processes, supported by self-inspections and continuous oversight. This system assures the highest product quality over time by controlling every component of the process (means, methods, manpower, environment and materials).

Thanks to the continuous improvement approach applied to its production facilities, and its quality assurance system, the NTN Group is able to guarantee bearings with ever more precise surfaces for enhanced performance, reduced friction during operation and, consequently, improved lubrication efficiency.

For several years, NTN-SNR has integrated an environmental approach into its manufacturing processes. Accordingly, numerous initiatives have been undertaken on our production sites:

- Controlled use of the water used for cooling the production units
- Recycling of cutting oils
- Continuous monitoring of CO₂ emissions from the boilers in the thermal power plants

QUALITY: A SHARED VISION

NTN-SNR is committed to the quality of its products. All our bearings comply strictly with the most rigorous of technical requirements. The quality process is closely controlled at each stage:

- Quality of design
- Quality of product development
- Quality of production
- Quality of marketing
- Quality of services

So that you can be sure of the authenticity of our products, we have developed a label featuring a hologram that is easily identifiable and difficult to fake.

"A fully guaranteed NTN-SNR product meeting the Group's quality requirements"





SPHERICAL ROLLER BEARING

An unrivalled extensive product range!



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With You



SECTORS OF ACTIVITY AND APPLICATIONS

NTN-SNR possesses one of the widest ranges of spherical roller bearings offering high-end load capacity and speed performance. Expertise in product design and complete control over the production process guarantee the best results for the most demanding applications.



DESIGNATIONS

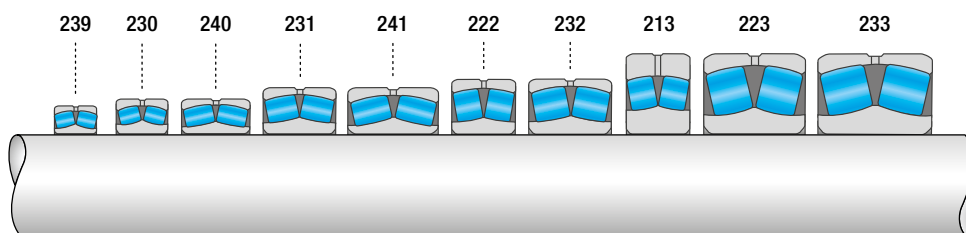
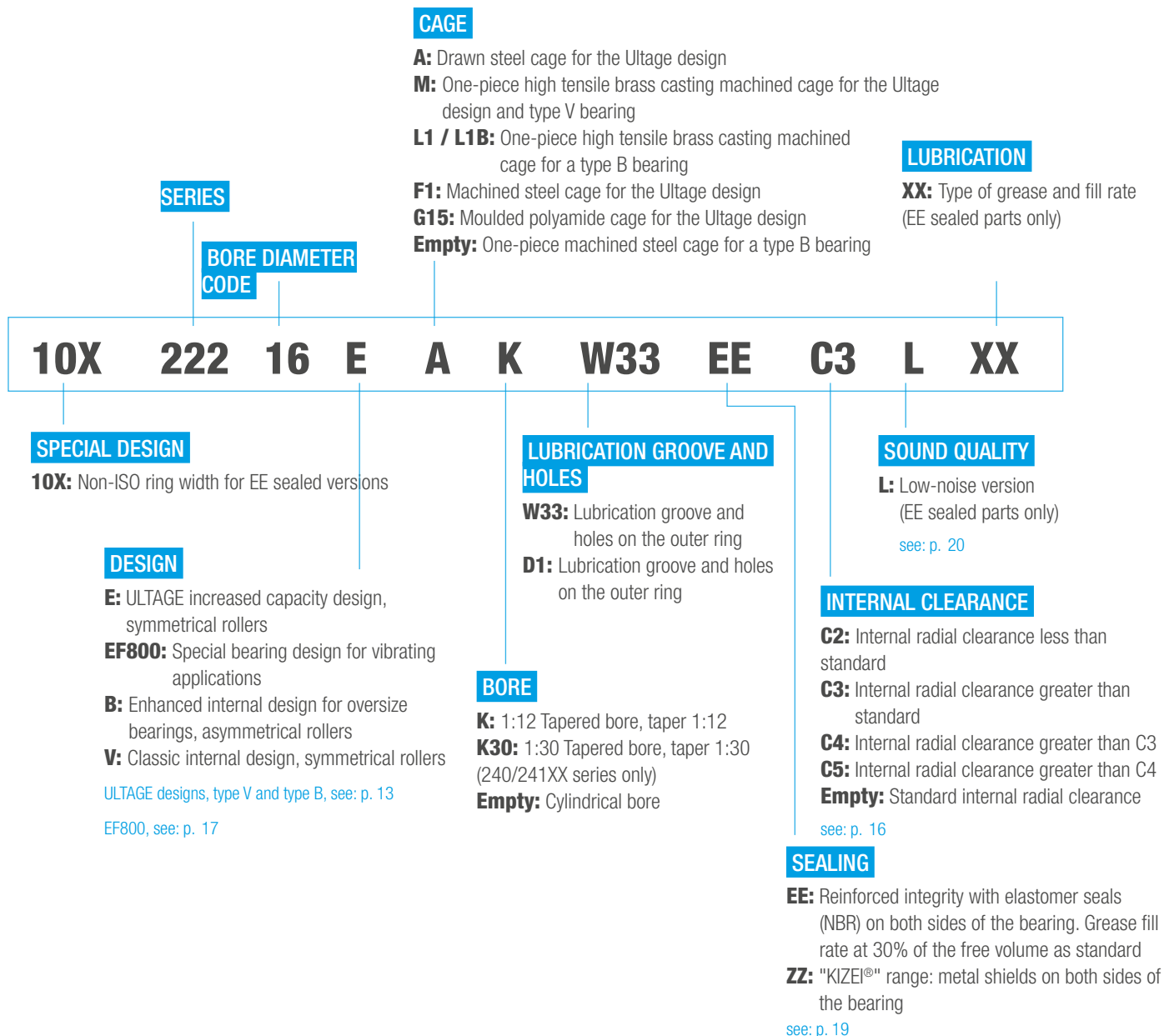


Fig. 3: Series of spherical roller bearings available from NTN-SNR

NTN-SNR proposes a full range of spherical roller bearings with cylindrical and tapered bores from 25 to 1800 mm. These bearings are available in several series designed to cater to the broadest spectrum of usages depending on your requirements in terms of loads, speeds and dimensions.

Most spherical roller bearings are proposed with the Ultage design (type E). Some products are available with a conventional design (type V) or asymmetric design specific to oversize versions (type B).

CODE SYSTEM



TYPES OF DESIGN

ULTAGE DESIGN: TYPE E

- Symmetrical rollers
- No central rib for optimal load capacity and optimum lubricant flow in the bearing
- Stabilisation of the steel for use at temperatures of up to +200°C
- Optimised internal geometry to minimise friction and heat build-up
- Cage made from drawn steel (EA), fibre glass reinforced polyamide (EG15) or machined solid brass (EM) for the harshest applications
- Lubrication groove and holes on the outer ring (W33 or D1)



Do not use a product with a fibre glass reinforced polyamide cage over 150°C

AN IMPROVED DESIGN FOR BETTER LUBRICATION

55% of bearing faults are due to lubrication defects, meaning that lubrication plays a major role in ensuring peak performance.

Just like the design, geometry and surface finish of the different bearing components, the viscosity of the lubricant is vitally important for increasing the bearing's operation and service life. The Ultage design represents the enhanced combination of all these factors.

- **No central shoulder section:** the available volume is higher so that the lubricant can flow more freely, meaning that the different parts of the bearing are constantly lubricated. This design drastically reduces the risk of overheating.
- **Wider lubrication holes and grooves:** this design feature simplifies bearing maintenance and relubrication. The number of lubrication holes on the outer ring may be 3, 4 or 8 depending on the bearing brand and size (information specified in the product tables on page 54).
- **Improved cage materials and design:** the cage is a risk-prone part of the bearing and is often the cause of faults. Special attention has been taken over the cage design (see p.14).

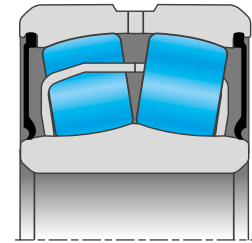


Fig. 4: Cross-sectional diagram of the Ultage design with a drawn steel cage (EA)

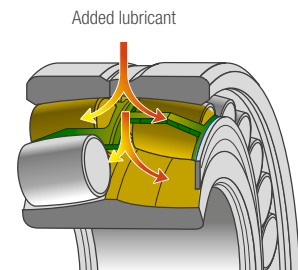


Fig. 5: The lubricant flows more freely inside the bearing

Number of lubrication holes

Outer diameter of the bearing Ø D mm		Number of lubrication holes		
		D1	W33	B
≥	≤	k	k	k
-	320	4	3-4*	
320	420	8	3-8*	
420	1000	8	8	8
1000	-	12		12

Note: For the width of the fill groove "**b**" and the diameter of the fill hole "**k**", refer to the table entitled "**spherical roller bearing references**" on pages 56 to 73 of the catalogue.

*3 or 4 / 3 or 8 lubrication holes depending on the model

Specific ULTAGE design for oversize bearings

For bearings with a bore diameter of 420 mm and above, a guide ring is added between the cage and the inner ring of the bearing. This specific design guarantees improved long-term strength for oversize bearings.

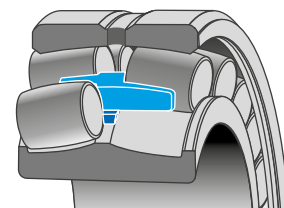


Fig. 6: Ultage design for oversize bearings

TYPE B DESIGN

- Design used for oversize bearings
- Asymmetrical rollers
- Shoulder section fixed to the centre of the inner ring
- Stabilisation of the steel for use at temperatures of up to +200°C
- Machined steel or brass cage
- Lubrication groove and holes on the outer ring (not indicated by a suffix)

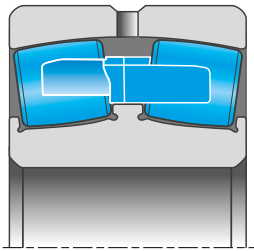


Fig. 7: Cross-sectional diagram of a type B bearing

TYPE V DESIGN

- Earlier generation to the Ultage design, type E
- Symmetrical rollers
- No central rib for optimal load capacity and optimum lubricant flow in the bearing
- Stabilisation of the steel for use at temperatures of up to +200°C
- Cage made from drawn steel or solid brass (M)
- Lateral retaining shoulder sections for the rollers
- No lubrication grooves or holes on the outer ring as standard

CAGES

ULTAGE EA DESIGN - DRAWN STEEL CAGE

"Minimal friction and heat build-up, increased service life and reduced maintenance costs"

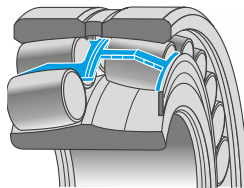


Fig. 8: Ultage design bearing with EA cage

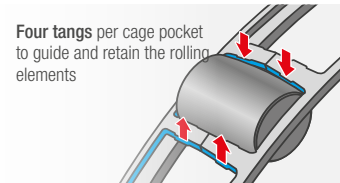


Fig. 9: Unique guidance system for perfect control

- Two steel plate window cages centred on the ground surface of the inner ring
- Precise guidance of the rollers with a unique four-tang system for perfect control of the position of the rolling elements

The steel plate cages are reinforced with a specific surface treatment process, which may either be nitriding or phosphating depending on the bearing dimensions.

Combination layer
~ 10 μm / ~ 400 HV Diffusion layer
~ 100 μm / ~ 250 HV

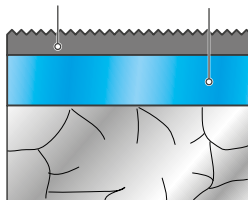


Fig. 10: Cross-sectional view of the nitriding surface treatment for a steel plate cage

CAGES WITH NITRIDING SURFACE TREATMENT

- Increased surface hardness of the cage for superior wear resistance
- Maintained resistance in the cage core to improve impact resistance
- Lower friction coefficient for greater in-service performance at high speeds
- Good corrosion resistance

Phosphate layer
~ 20 μm

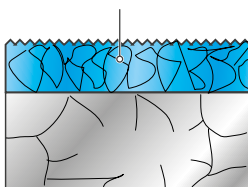


Fig. 11: Cross-sectional view of the phosphating surface treatment for a steel plate cage

CAGES WITH PHOSPHATING SURFACE TREATMENT

- Lower friction coefficient for greater in-service performance at high speeds
- Good corrosion resistance

ULTAGE DESIGN EM - HIGH TENSILE BRASS CASTING MACHINED CAGE

"Especially suited to the most demanding applications"

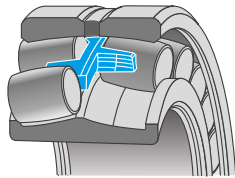


Fig. 12: Ultage design bearing with EM cage

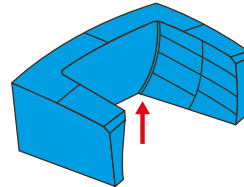


Fig. 13: Contoured pocket to guide the rolling elements

- Machined brass alloy one-piece cage centred on the rolling elements
- Simple design without a guide ring or fixed central shoulder section to avoid a cage/ring seizure in the event of thermal expansion
- Contoured profile of the cage pockets to guarantee perfect stability of the rolling elements under the harshest operating conditions
- Self-lubricating properties of the brass to reduce overheating at high speed

ULTAGE DESIGN EG15 – MOULDED POLYAMIDE CAGE (on request; contact us)

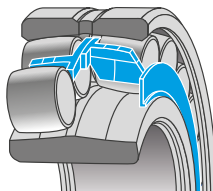


Fig. 14: Ultage design bearing with EG15 cage

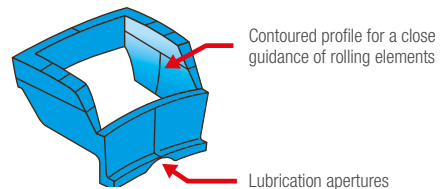


Fig. 15: Perfect guidance of the rollers with a soft material offering a low friction coefficient



Unsuitable for applications over 150°C

- 6.6 moulded polyamide cage reinforced with 25% glass fibre
- Perfect guidance of the rollers with a soft and elastic material offering a low friction coefficient
- Enhanced cage design to ensure perfect distribution of the lubricant

INTERNAL RADIAL CLEARANCE AND TOLERANCES

NTN-SNR bearings are delivered with normal precision according to ISO 492.

The internal radial clearance is defined by ISO 5753.

Radial clearance of spherical roller bearings with a cylindrical bore

Bore diameter		Internal radial clearance									
>	≤	C2		Normal		C3		C4		C5	
		min	max	min	max	min	max	min	max	min	max
mm		μm									
14	18	10	20	20	35	35	45	45	60	60	75
18	24	10	20	20	35	35	45	45	60	60	75
24	30	15	25	25	40	40	55	55	75	75	95
30	40	15	30	30	45	45	60	60	80	80	100
40	50	20	35	35	55	55	75	75	100	100	125
50	65	20	40	40	65	65	90	90	120	120	150
65	80	30	50	50	80	80	110	110	145	145	180
80	100	35	60	60	100	100	135	135	180	180	225
100	120	40	75	75	120	120	160	160	210	210	260
120	140	50	95	95	145	145	190	190	240	240	300
140	160	60	110	110	170	170	220	220	280	280	350
160	180	65	120	120	180	180	240	240	310	310	390
180	200	70	130	130	200	200	260	260	340	340	430
200	225	80	140	140	220	220	290	290	380	380	470
225	250	90	150	150	240	240	320	320	420	420	520
250	280	100	170	170	260	260	350	350	460	460	570
280	315	110	190	190	280	280	370	370	500	500	630
315	355	120	200	200	310	310	410	410	550	550	690
355	400	130	220	220	340	340	450	450	600	600	750
400	450	140	240	240	370	370	500	500	660	660	820
450	500	140	260	260	410	410	550	550	720	720	900
500	560	150	280	280	440	440	600	600	780	780	1,000
560	630	170	310	310	480	480	650	650	850	850	1,100
630	710	190	350	350	530	530	700	700	920	920	1,190
710	800	210	390	390	580	580	770	770	1,010	1,010	1,300
800	900	230	430	430	650	650	860	860	1,120	1,120	1,440
900	1,000	260	450	450	710	710	930	930	1,220	1,220	1,570
1,000	1,120	290	530	530	780	780	1,020	1,020	1,330	1,330	1,720
1,120	1,250	320	580	580	860	860	1,120	1,120	1,450	1,450	1,870
1,250	1,400	350	640	640	950	950	1,240	1,240	1,620	1,620	2,050
1,400	1,600	400	720	720	1,060	1,060	1,380	1,380	1,800	1,800	2,300
1,600	1,800	450	810	810	1,180	1,180	1,550	1,550	2,000	2,000	2,550

Radial clearance for spherical roller bearings with a tapered bore

Bore diameter		Internal radial clearance									
>	≤	C2		Normal		C3		C4		C5	
		min	max	min	max	min	max	min	max	min	max
mm		μm									
18	24	15	25	25	35	35	45	45	60	60	75
24	30	20	30	30	40	40	55	55	75	75	95
30	40	25	35	35	50	50	65	65	85	85	105
40	50	30	45	45	60	60	80	80	100	100	130
50	65	40	55	55	75	75	95	95	120	120	160
65	80	50	70	70	95	95	120	120	150	150	200
80	100	55	80	80	110	110	140	140	180	180	230
100	120	65	100	100	135	135	170	170	220	220	280
120	140	80	120	120	160	160	200	200	260	260	330
140	160	90	130	130	180	180	230	230	300	300	380
160	180	100	140	140	200	200	260	260	340	340	430
180	200	110	160	160	220	220	290	290	370	370	470
200	225	120	180	180	250	250	320	320	410	410	520
225	250	140	200	200	270	270	350	350	450	450	570
250	280	150	220	220	300	300	390	390	490	490	620
280	315	170	240	240	330	330	430	430	540	540	680
315	355	190	270	270	360	360	470	470	590	590	740
355	400	210	300	300	400	400	520	520	650	650	820
400	450	230	330	330	440	440	570	570	720	720	910
450	500	260	370	370	490	490	630	630	790	790	1,000
500	560	290	410	410	540	540	680	680	870	870	1,100
560	630	320	460	460	600	600	760	760	980	980	1,230
630	710	350	510	510	670	670	850	850	1,090	1,090	1,360
710	800	390	570	570	750	750	960	960	1,220	1,220	1,500
800	900	440	640	640	840	840	1,070	1,070	1,370	1,370	1,600
900	1,000	490	710	710	930	930	1,190	1,190	1,520	1,520	1,860
1,000	1,120	530	770	770	1,030	1,030	1,300	1,300	1,670	1,670	2,050
1,120	1,250	570	830	830	1,120	1,120	1,420	1,420	1,830	1,830	2,250
1,250	1,400	620	910	910	1,230	1,230	1,560	1,560	2,000	2,000	2,450
1,400	1,600	630	1,000	1,000	1,350	1,350	1,720	1,720	2,200	2,200	2,700
1,600	1,800	750	1,110	1,110	1,500	1,500	1,920	1,920	2,400	2,400	2,950

DEDICATED PRODUCTS

EF800 SERIES FOR HIGH-VIBRATION APPLICATIONS

For high-vibration applications (screens, crushers and grinders), the generally recommended internal clearance is C4. In order to avoid any risk of preload on the bearings, linked to adjustment defects or deformation of the shaft or housing seating surfaces, NTN-SNR proposes a special radial clearance range in the C4 group, reduced to 2/3 of the tolerance. This new range facilitates the achievement and control of the final radial clearance after assembly and takes account of the specific operating conditions for these vibrating materials.



ULTAGE



Products corresponding to the specification can be identified by the suffix **EF800**.

CHARACTERISTICS

- ULTAGE bearing with symmetrical rollers and machined brass alloy one-piece cage centred on the rolling elements
- Available in a range of bore diameters from 40 to 200 mm
- Cylindrical and tapered bores available
- No floating guide ring or fixed central shoulder section to avoid any risk of a cage/ring seizure in the event of thermal expansion
- Special tolerances for the outer diameter and bore
- Outer diameter: the tolerances of the EF800 specification guarantee the fixed adjusting of the outer ring in its housing for a type P6 fit
- Cylindrical bore: the reduced tolerances defined by the EF800 specification guarantee a sliding adjusting of the inner ring over the shaft produced with a type g6 or f6 tolerance
- Tapered bore: the reduced tolerances enabling limitation of the axial displacement of the inner ring when setting the clearance during assembly, thereby facilitating the assembly operations

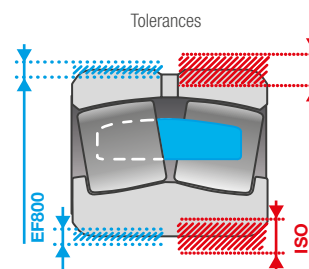


Fig. 16: Special tolerances for the outer diameter and bore

BENEFITS

- Increased service life
- Wider maintenance intervals
- Greater operational profitability

Note: In certain cases, applications may necessitate the use of a clearance other than group C4. Upon request, we can deliver bearings in groups C3, EF801 series or CN, EF802 series. For the EF801 and EF802 series, just like the EF800 series, the clearance range is reduced to 2/3 of the tolerance.

Clearance	22220		Clearance in microns											
	Minimum	Maximum	130	135	140	145	150	155	160	165	170	175	180	185
C4	135	180												
Clearance EF800	150	180												

EF800 series = C4 with reduced tolerance

E.g. EF800 clearance value compared to the clearance value of group C4

EF800, EF801, EF802 DIAMETER TOLERANCES

	Nominal bore "mm"		Differences in microns "µm"			
	>	≤	Cylindrical bore		Tapered bore	
	Inner ring	30	50	0	-7	25
	50	80	0	-9	30	0
	80	120	0	-12	35	0
	120	180	0	-15	40	0
	180	250	0	-18	46	0

	Nominal outer diameter "mm"		Differences in microns "µm"	
	>	≤	Cylindrical bore	
	Outer ring	80	120	-5
	120	150	-5	-13
	150	180	-5	-18
	180	250	-10	-23
	250	315	-10	-23
	315	400	-13	-28
	400	500	-13	-30
	500	630	-15	-35

EF800, EF801, EF802 INTERNAL RADIAL CLEARANCE

Cylindrical bores

Nominal bore "mm"		Clearances in microns "µm"					
>	≤	Group C4 = EF800		Group C3 = EF801		Group CN = EF802	
30	40	65	80	50	60	35	45
40	50	85	100	60	75	40	55
50	65	100	120	75	90	50	65
65	80	120	145	90	110	60	80
80	100	150	180	110	135	75	100
100	120	180	210	135	160	90	120
120	140	205	240	160	190	110	145
140	160	240	280	190	220	130	170
160	180	260	310	200	240	140	180
180	200	285	340	220	260	155	200
200	225	320	380	245	290	165	220
225	250	355	420	265	320	180	240
250	280	385	460	290	350	200	260

Tapered bores (1/12)

Nominal bore "mm"		Clearances in microns "µm"					
>	≤	Group C4 = EF800		Group C3 = EF801		Group CN = EF802	
30	40	70	85	55	65	40	50
40	50	85	100	65	80	50	60
50	65	105	120	80	95	60	75
65	80	130	150	100	120	80	95
80	100	155	180	120	140	90	110
100	120	185	220	145	170	110	135
120	140	220	260	175	200	135	160
140	160	255	300	195	230	145	180
160	180	285	340	220	260	160	200
180	200	315	370	245	290	180	220
200	225	350	410	275	320	205	250
225	250	385	450	295	350	225	270
250	280	425	490	330	390	245	300

SEALED BEARINGS WITH ELASTOMER SEALS

To prevent ingress and contamination if bearings are used in hostile environments, such as outdoors or in dusty conditions, you are advised to use sealed bearings.

These compact solutions offer a constant hermetic seal even when there is bending of the shaft (up to 0.5° maximum).

CHARACTERISTICS

- Identical internal design to the open bearings with the ULTAGE EA design
- Non-ISO width with a minimal increase in order to integrate seals (10X prefix)
- Specially designed NBR seal to guarantee impermeability by means of constant contact pressure of the lip, even in the event of misalignment
- Pre-filled bearing with a quantity and quality of lubricant suited to high loads; no relubrication is required for applications below 70°C
- Operation up to +110°C; for higher temperatures, the materials of the seals and the quality of the lubricant need to be adapted accordingly



"Our seals with their superior geometric design are tested in our laboratories under the most extreme conditions to guarantee their reliability and their performance for your applications"

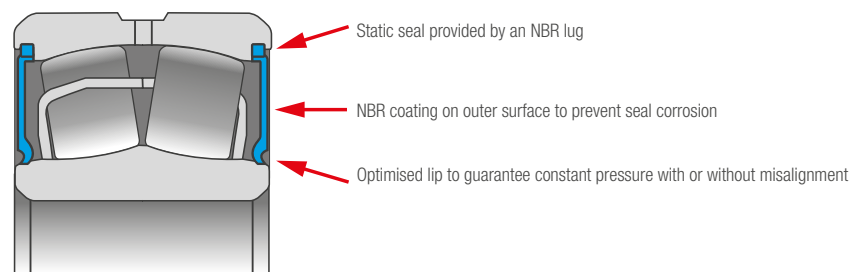


Fig. 17: Ultage design sealed bearing

BENEFITS

- Increased service life
- Wider maintenance intervals
- Greater operational profitability
- Protection of the environment

EE sealed spherical roller bearings are frequently used in such applications as steel industry conveyors, mines, power transmission systems for elevators and printing machinery.

Note: During mounting, feeler gauges cannot be used to check the internal clearance of sealed bearings due to the seals. All the specific mounting recommendations and advice for checking the clearance for this type of bearing are explained on pages 45-46.

SPECIAL CASE OF LOW-NOISE APPLICATIONS

Some applications, such as the power transmission system for elevators, are particularly demanding in terms of the noise made by the bearings. Therefore, NTN-SNR offers sealed spherical roller bearings with low vibration levels, which are identified by the suffix L and which are available on request. Their improved geometric and functional characteristics significantly reduce the amount of noise generated.

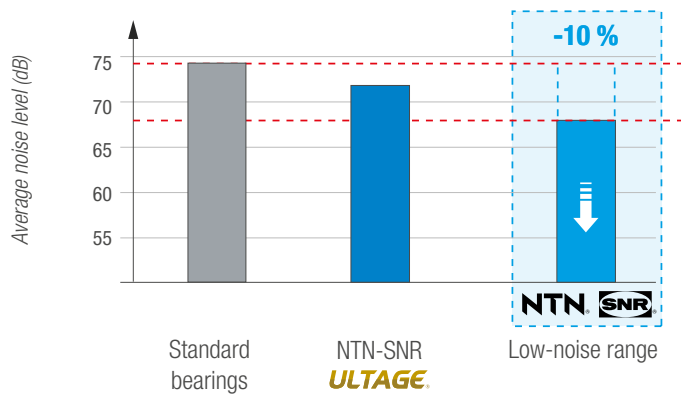


Fig. 18: The Low Noise grade from NTN-SNR significantly reduces the bearing's acoustic impact

ALL-IN-ONE BEARING KITS: AN INNOVATIVE SOLUTION TO ASSIST YOU

To bring greater simplicity to your partial and full maintenance operations, NTN-SNR offers a wide array of ready-to-use kits containing spherical roller bearings and the associated products required for their operation, all of which in a single container. Several options are available to accurately satisfy your specific needs.

CHARACTERISTICS

NTN-SNR offers three types of kit:

- **One kit for partial maintenance**, comprising an ULTAGE sealed spherical roller bearing, a special sealed mounting sleeve and two special sealed locating rings
- **One kit for full maintenance**, comprising an ULTAGE sealed spherical roller bearing, an SNC split plummer block, a special sealed mounting sleeve, two special sealed locating rings, two sets of NBR seals and a plug
- **One kit for full maintenance**, comprising an ULTAGE open spherical roller bearing, an SNC split plummer block, a mounting sleeve, two locating rings, two sets of NBR seals, a plug and a DRIVE BOOSTER automatic lubrication system
- All kits contain technical instructions with advice on how to adjust the internal clearance through axial displacement and relubrication instructions
- Kits are available for shaft diameters between 35 and 90 mm
- Each kit reference is available with a standard clearance (CN) or increased clearance (C3)

"The premium grade of our spherical roller bearing solutions with split plummer blocks can bring ultimate reliability to your facilities."



BENEFITS

- Streamlined inventory: only one reference to order and store
- Limited risk of errors and omissions: all specific components for each bearing are included in the kit
- Flexible use: each kit can be used for fixed or floating bearing units

KIZEI®: THE FIRST SPHERICAL ROLLER BEARING WITH METAL SHIELDS

NTN-SNR's R&D department has pioneered an unprecedented solution to increase the service life of your spherical roller bearings.

CHARACTERISTICS

- ULTAGE load capacities and speed
- **ISO dimensions:** 100% interchangeable with an open spherical roller bearing

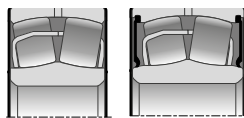
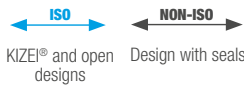


Fig. 19: The KIZEI® bearing is available in ISO widths, just like an open spherical roller bearing



- Premium quality nitrided steel plate cage and shields for maximum impact strength and superior corrosion resistance
- Extensive range of operating temperatures from -40°C to +200°C
- **Kizei® is supplied ungreased:** the initial lubrication process is similar to an open spherical roller bearing; 30% of the free volume must be filled with the appropriate grease
- The bearing can be lubricated while in service via the dedicated holes and grooves on the outer ring
- **Internal inspection possible** for easier maintenance
- **Easy mounting process:** no special tools are required, and the clearance can be checked after mounting

BENEFITS

- Improved production performance with the longer service life
- Reduced maintenance costs
- Easy to use



"KIZEI®: the ideal alternative for dusty environments and reducing maintenance costs"

INITIAL BEARING	[KIZEI]®												
1,100 hours in service	2,200 hours in service												
<p>Less deterioration to the bearing after a service life lasting twice as long</p>													
	<table border="1"> <thead> <tr> <th></th> <th>Open spherical roller bearing</th> <th>[KIZEI]</th> </tr> </thead> <tbody> <tr> <td>Life duration</td> <td>1 month</td> <td>3 month</td> </tr> <tr> <td>Production downtime</td> <td>12 times/year</td> <td>4 times/year</td> </tr> <tr> <td>Maintenance costs</td> <td>100</td> <td>30</td> </tr> </tbody> </table>		Open spherical roller bearing	[KIZEI]	Life duration	1 month	3 month	Production downtime	12 times/year	4 times/year	Maintenance costs	100	30
	Open spherical roller bearing	[KIZEI]											
Life duration	1 month	3 month											
Production downtime	12 times/year	4 times/year											
Maintenance costs	100	30											
<p>Maintenance costs can be reduced by a factor of 3</p>													

NTN-SNR SPHERICAL ROLLER BEARINGS: THE WIDEST RANGE ON THE MARKET

	OPEN	[KIZEI]	SEALED
Dimensions	ISO	ISO	Special
Protection	0	+*	++
Grease retention	0	+	++
Temperature range	-40°C to +200°C	-40°C to +200°C	-10°C to +120°C
Limiting speed	++	++	+
Load capacity	Ultage	Ultage	Ultage
Clearance inspection	Yes	Yes	No
Internal control	Yes	Yes	No
Sleeve and nut	Standard	Standard	Special
Supplied already greased	No	No	Yes

*Valid against solid contamination - Not suitable for liquids

PRODUCTS WITH SOLID LUBRICATION

For highly specific operating constraints where traditional brands of grease quickly show their limitations (low-amplitude oscillations, high centrifugal forces, washing out, pollution, difficult access, etc.), NTN-SNR has developed a solid lubrication concept suited to spherical roller bearings.



CHARACTERISTICS

- Porous polymer matrix that fills the free volume of the bearing and can contain three to four times more oil than conventional grease for improved lubrication
- Suitable for speeds less than 100,000 N.Dm

In applications where the bearing is subject to centrifugal phenomena, a traditional lubricant can be ejected instantaneously from the bearing, whereas a solid lubricant allows the oil to be kept within the bearing and to operate for thousands of hours.

BENEFITS

- Longer service life since oil is constantly supplied to the bearing core
- No re-lubrication required
- Excellent resistance to centrifugal forces
- Environmental protection by reducing lubricant leaks
- Sealing effect: the solid lubricant acts as a shield against external particles

NTN-SNR is at your disposal to determine the suitability of this concept in your applications.

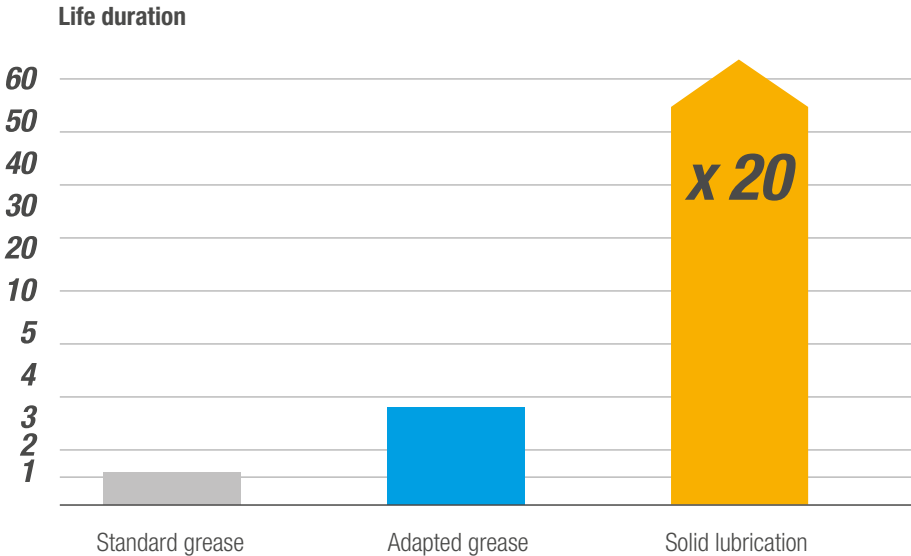


Fig. 20: Solid lubrication: a cutting-edge technology to drastically increase the service life of your bearings



ISO SPHERICAL
ROLLER BEARING
WITH SHIELDS [KIZEI][®]

KIZEI[®], armoured to face the dirt!*



www.ntn-snr.com



With You



TECHNICAL INFORMATION

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Adjusted nominal service life	27
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TECHNICAL INFORMATION

NOMINAL SERVICE LIFE

The nominal service life, L_{10} , recommended by ISO 281, is given by the equation $L_{10} = (C / P)^n$ where $n=10/3$ for the roller bearings. This equation is defined for a reliability level of 90% under normal operating conditions.

Nominal service life

$$L_{10} = (C/P)^n \text{ in millions of revs}$$

or

$$L_{10} = (C/P)^n \cdot 10^6 / 60N \text{ in hours}$$

C = Basic dynamic load (Newton)

P = Equivalent dynamic load (Newton)

N: Rotation speed (rpm)

Equivalent dynamic load P

$$P = F_r + Y_1 \cdot F_a \text{ where } F_a/F_r \leq e$$

$$P = 0.67F_r + Y_2 \cdot F_a \text{ where } F_a/F_r > e$$

P = Equivalent dynamic load (Newton)

F_r = dynamic radial load (Newton)

F_a = dynamic axial load (Newton)

e, Y_1 , Y_2 factors according to dimensions tables (see from page 54)

Equivalent static load P_0

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

P_0 = Equivalent static load (Newton)

F_{0r} = Static radial load (Newton)

F_{0a} = Static axial load (Newton)

Y_0 = Factor according to dimensions table

Safety factor

$$f_s = C_0 / P_0$$

C_0 basic static capacity defined in the dimensions tables (Newton)
(see from page 54)

Minimum basic values for the static safety coefficient f_s :

- 1.5 to 3 for severe conditions
- 1 to 1.5 for normal conditions
- 0.5 to 1 for operations with no particular noise or precision requirements

If you are looking for a bearing operating under harsh conditions, the safety coefficient f_s must be high.

Minimum radial load

In order to avoid slippage phenomena between the rolling elements and the raceways, particularly in the case of high speeds or accelerations, a minimum load must be applied to spherical roller bearings.

$$P_{rm} = 0.01C_0$$

P_{rm} = minimum radial load (Newton)

C_0 = basic static load (Newton)

Maximum axial load

Spherical roller bearings can support high axial loads.

Generally, $F_a/F_r \leq e$ can be used, however it is recommended that you do not exceed the following value $F_a/F_r = 0.3$.

In the event of high loads combined with high speeds, the rise in the bearing temperature must be taken into account.

ADJUSTED NOMINAL SERVICE LIFE

BASIC NOMINAL SERVICE LIFE

- **The basic nominal service life L₁₀** is often a satisfactory estimation of the bearing performance levels. This service life is understood to accommodate 90% reliability and conventional operating conditions. It may be necessary in certain applications to calculate the service life for a different level of reliability or for specific lubrication and contamination conditions.

With steels for high-quality bearings, it is possible, for low loads and under favourable operating conditions, to obtain extremely long service lives compared to L₁₀. A shorter service life than L₁₀ may apply under unfavourable operating conditions.

Below a certain load C_u (defined in the ISO 281 standard as "the fatigue load limit"), a modern high-quality bearing can achieve a practically infinite service life if the lubrication conditions, cleanliness and other operating conditions are favourable.

This load C_u can be determined precisely according to:

- The types of bearing
- Their internal geometry
- The fatigue limit of the raceway material

ADJUSTED NOMINAL SERVICE LIFE

The ISO 281 standard provides the necessary formula for obtaining a sufficient approximation based on the static capacity of the bearing.

- **The ISO 281** international standard introduces a correction factor of duration a_{ISO} which enables an adjusted nominal service life to be calculated according to the formula:

$$L_{nm} = a_1 a_{ISO} L_{10}$$

The coefficient a₁ is designed to calculate the duration for a reliability level different to 90% of the original formula.

The coefficient a_{ISO} is used to estimate the influence of the lubricant and of the contamination on the bearing service life. It takes account of the fatigue limit of the bearing steel.

Since the evaluation method for a_{ISO} defined by ISO 281 is fairly difficult to apply by a non-specialist user, NTN-SNR has looked for the best way to supply its customers with an easy way of determining a_{ISO} based on the hypotheses of the standard.

- > that the fatigue load C_u depends directly on the static capacity of the bearing
- > that the contamination factor is constant whatever the lubrication conditions and the average diameter of the bearing.

The method proposed by NTN-SNR enables rapid, graphic evaluation of the coefficient a_{ISO}. Our engineers are at your disposal to determine this coefficient more precisely if required.

METHOD FOR DETERMINING a_{ISO} (ISO 281)

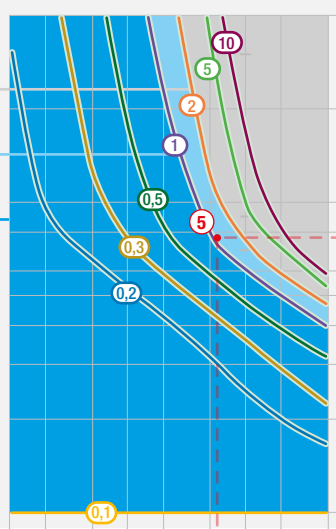
The following diagram can be used to determine a_{ISO} for double-row spherical roller bearings according to the following method:

1. Define the viscosity of the lubricant at the operating temperature based on the diagram on page 30.
Determine the viscosity of the base oil for greased bearings.
2. Define the pollution level:
 - **High cleanliness**
Oil filtered through an extremely fine filter; usual conditions for bearings that are greased for life and sealed.
 - **Normal cleanliness**
Oil filtered through a fine filter; usual conditions for bearings that are greased for life and equipped with a shield.
 - **Slight contamination**
Slight contamination in the lubricant
 - **Typical contamination**
Oil with coarse filtration; presence of wear and tear particles or particles from the surrounding environment.
Usual conditions for lubricated bearings with no integrated seal.
 - **For major contamination**, consider that a_{ISO} will be less than 0.1
3. Based on the loads applied to the bearing, calculate the equivalent load P and the static capacity / equivalent load ratio: C_0 / P .
4. In graph 1 on page 29, determine point 1 according to the pollution level and the value C_0 / P .
5. Determine point 2 based on the average diameter of the bearing: $D_m = (\text{bore} + \text{outer diameter}) / 2$
6. Determine point 3 according to the rotational speed of the bearing.
7. Determine point 4 according to the viscosity of the lubricant at the operating temperature.
8. Point 5 at the intersection between the straight lines deriving from points 2 and 4 defines the value zone for a_{ISO} .

Roller bearings: estimation of coefficient a_{ISO}

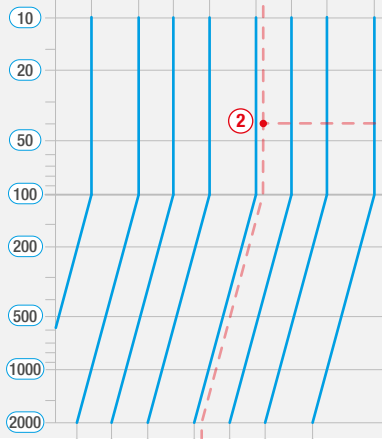
5 a_{ISO}

Favourable operating conditions
 Uncertain operating conditions
 Unfavourable operating conditions

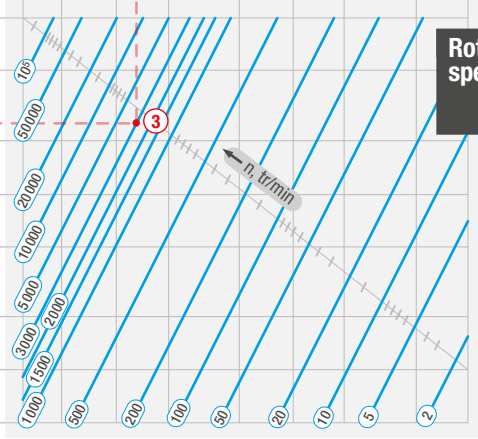


4 Real kinematic viscosity (cSt)

2 Dm (mm)



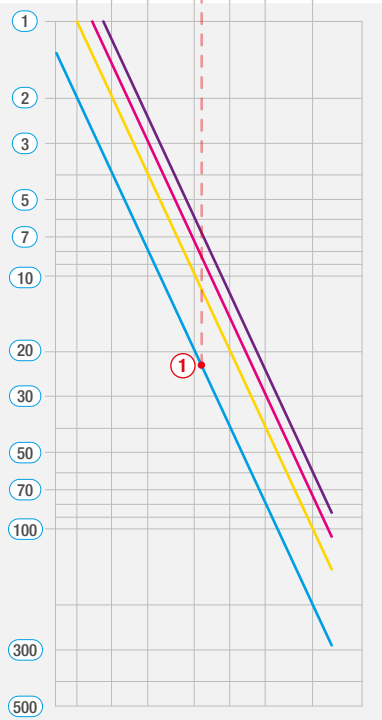
3 Rotation speed (rpm)



1 Load (C_0/P) and contamination*

- High cleanliness
- Normal cleanliness
- Light contamination
- High contamination

* Levels defined according to ISO 281



Example of determining the a_{ISO} for a roller bearing:

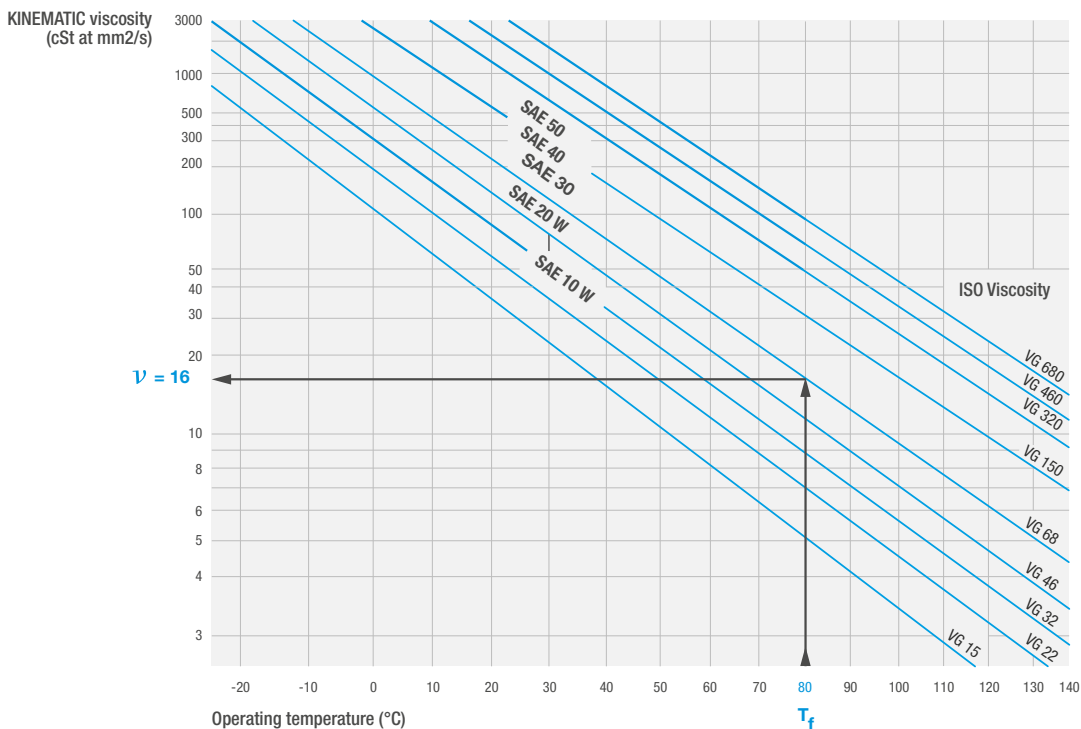
- Point 1: functioning with typical pollution, with a charge level $C_0/P = 22$
- Point 2: with an average diameter D_m of 40 mm
- Point 3: rotation speed of 3,000 rpm
- Point 4: and with a lubricant of viscosity 10 cSt
- Point 5: the coefficient a_{ISO} is: 1

DETERMINING THE MINIMUM VISCOSITY REQUIRED FOR THE OPERATING TEMPERATURE

VISCOSITY-TEMPERATURE DIAGRAM

The oils used for lubricating bearings are generally mineral oils with a viscosity in the vicinity of 90. The suppliers of these oils state the precise characteristics of their products and, in particular, the viscosity-temperature diagram. Failing this, the following general diagram will be used.

Since the oil is defined by its nominal viscosity (in centistokes) at the nominal temperature of 40°C, the viscosity at the operating temperature may be deduced.



SPEEDS

THERMAL REFERENCE SPEED N_{OR}

The thermal reference speed is the rotational speed of the inner ring at which a thermal equilibrium is attained between the heat produced by the friction in the bearing and the heat flow emitted via the contact surface (shaft and housing) of the bearing under reference conditions.

The reference speed values indicated in the tables are in compliance with standard ISO 15312. The reference conditions for this standard have been chosen to apply both for oil lubrication and for grease lubrication. This standard applies to bearings up to and including a bore diameter of 1000 mm.

Thermal reference speed n_{Or} : speed at which the bearing temperature reaches +70°C under the reference conditions.

REFERENCE CONDITIONS DETERMINING THE FORMATION OF HEAT THROUGH FRICTION:

- Reference temperature of the bearing on the stationary outer ring Θ_r : 70°C
- Reference ambient temperature of the bearing Θ_{Ar} : 20°C
- Reference load $P_{1r} = 0.05 \times C_{Or}$ (5% of the basic static radial load, as pure radial load)
- Lubricant: high-pressure, additive-free mineral oil with, at $\Theta_r = 70^\circ\text{C}$, a kinematic viscosity of $\nu_r = 12\text{mm}^2/\text{s}$ (ISO VG32).

MATHEMATICAL CALCULATION ACCORDING TO STANDARD ISO 15312

$$\frac{\pi \cdot n_{\theta r}}{30 \cdot 10^3} \cdot [10^{-7} \cdot f_{0r} \cdot (v_r \cdot n_{\theta r})^{2/3} \cdot d_m^3 + f_{1r} \cdot P_{1r} \cdot d_m] = q_r \cdot A_r$$

$n_{\theta r}$: Thermal reference speed

f_{0r} : Adjustment factor for the moment of friction independent of the load (the values as per ISO 15312 are for information purposes only)

f_{1r} : Adjustment factor for the moment of friction depending on the load (the values as per ISO 15312 are for information purposes only)

v_r : Kinematic viscosity of the lubricant

d_m : Average diameter of the bearing $D_m = 0.5(D+d)$

q_r : Reference thermal flow density $q_r = 0.016 \text{ W/mm}^2$. If $A_r > 50000 \text{ mm}^2$ then $q_r = 0.016(A_r/50000)^{-0.34}$

A_r : Reference thermogenic surface area $A_r = \pi \times B(D+d)$

LIMITING SPEED

The limiting speed is the maximum permissible speed which depends on the mechanical limits, such as the tensile strength of the constituent parts of the bearing.

The limiting rotational speed is based on practical experiments. It takes account of additional criteria such as silent operation, the seal functions, the stability or resistance of the cage, the lubrication of the cage guide surfaces, the centrifugal and gyrating forces that act on the rolling elements and other speed limitation factors.

THERMALLY SAFE OPERATING SPEED

The admissible rotational speed n_{adm} is the rotational speed at which the average temperature of the bearing reaches the permissible limiting value under actual operating conditions. To determine the thermally safe operating speed of the bearing in its application, it is necessary to take account of the influence of the load and of the kinematic viscosity on the reference speed. When the load and viscosity parameters are in excess of the reference values, the friction resistance will increase and the temperature of the bearing will be higher. In this case, the bearing cannot operate at the thermally safe reference speed unless higher temperatures are permitted by the bearing and its application.

The influence of the load and of the kinematic viscosity of the lubricant may be determined on the basis of diagrams 1 and 2, page 36.

To determine the permissible speed of your bearing (see from page 54)

OIL LUBRICATION

- f_p : for the influence of the equivalent dynamic load P
- f_v : for the influence of the viscosity

If the reference temperature needs to remain constant at 70°C, the thermally safe operating speed is determined based on:

$$n_{adm} = n_{\theta r} \cdot f_p \cdot f_v$$

n_{adm} = thermally safe operating speed of the bearing, rpm

$n_{\theta r}$ = thermal reference speed

f_p = adjustment factor for the equivalent dynamic load P

f_v = adjustment factor for the oil viscosity

GREASE LUBRICATION

The diagram for determining factor f_v is also suitable for grease lubrication. In this case, the standard stipulates a kinematic viscosity of the base oil of between ISO VG 100 and ISO VG200 at +40°C with a quantity of grease equal to 30% of the free volume in the bearing.

To determine factor f_v in the case of grease lubrication, select the value of f_v from diagram 1 for the viscosity of the base oil at +40°C for the chosen grease and divide by f_v for the viscosity of the base oil ISO VG 150 (average value of the base oils permitted by the standard)

$$n_{adm} = n_{thr} \cdot f_p \cdot \frac{f_v \text{ real viscosity of the base oil}}{f_v \text{ viscosity of the base oil ISO VG 150}}$$

Example

An NTN-SNR ULTAGE 22216EA spherical roller bearing with a factor of $P/C_0=0.2$ lubricated with an oil of oil viscosity of ISO VG 220 mm^2/s at 40°C.

$$d_m = 0.5(80+140) = 110\text{mm}$$

$$n_r = 4200 \text{ rpm}$$

$$\text{In diagram 1: } f_v = 0.83$$

$$\text{In diagram 2: } f_p = 0.5$$

The thermally safe operating speed in these conditions is:

$$N_{adm} = 4200 \times 0.83 \times 0.5 = 1740 \text{ rpm}$$

Diagram 1: correction factor f_v

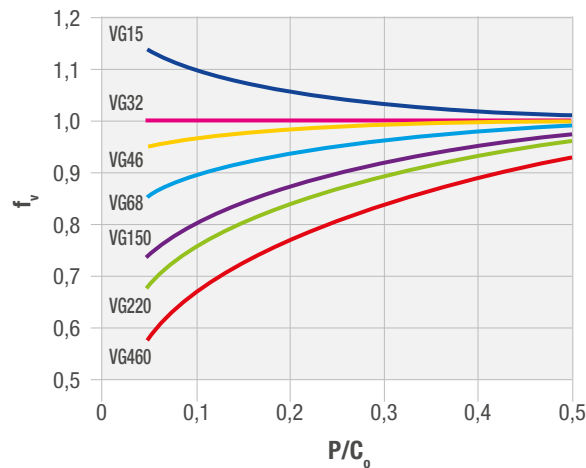
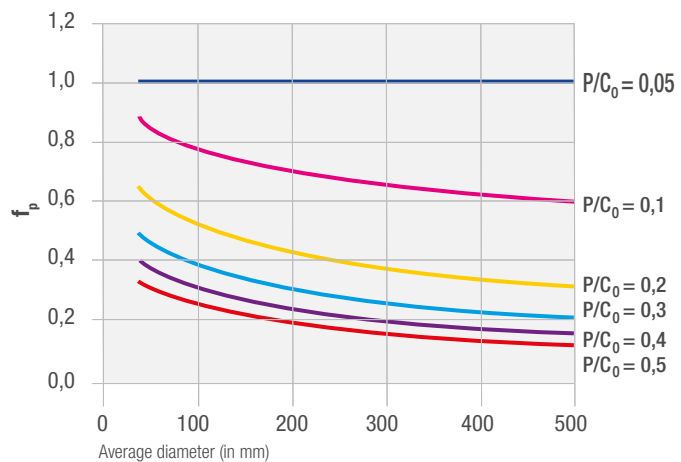


Diagram 2: correction factor f_p



In the case of operation at speeds approaching the limits stated in the bearing tables, please contact your NTN-SNR representative.

LUBRICATION

Only correct lubrication will guarantee optimal operation of the bearing and of the associated mechanical unit.

Our field experience shows that:

- 55% of premature faults with bearings result from inappropriate lubrication
- imperfect lubrication significantly reduces the service life of the bearing

Lubrication operations are often neglected on account of the difficulty of accessing the bearings and inadequate knowledge of the properties of many lubricants on the part of the user.

Since the choice of lubricant, the method of lubrication, the precise quantity to inject into the bearing and the monitoring frequency need to be studied carefully, our teams are on hand to advise you.

PRINCIPLE AND BENEFITS OF GOOD LUBRICATION

- By interposing a film of lubricant (oil film) between the rolling elements and the raceway, lubrication prevents wear and tear and seizure of the elements through metal-to-metal contact.
- It also protects the parts from corrosion.
- It provides a seal against liquids and external pollution and eliminates the impurities created by the movement of the parts.
- It reduces friction, and therefore limits the power consumed by the machine, thereby reducing energy costs.
- In the case of oil circulation, it evacuates the heat build-up and thus contributes to the thermal equilibrium of the machine.

The service life of the bearing is directly linked to the efficiency of the oil film, which depends:

- On the characteristics of the lubricant and therefore on its capability to resist high temperatures and vibrations, etc.
- On the load conditions and the bearing rotation speed

General-purpose greases do not always correspond to the specific requirements of certain applications. Since the bearings have to operate under conditions of high load, speed or temperature, or in the presence of water, humidity or vibrations, they require the use of carefully-selected lubricants.

NTN-SNR has consistently been involved in research in this field with the world's top lubricant manufacturers. In this way we have built up knowledge and practical experience of most of the lubricants applicable to bearings.

CHOICE OF LUBRICANT TYPE

	OIL LUBRICATION	GREASE LUBRICATION
BENEFITS	<ul style="list-style-type: none"> • Good bearing penetration • Good physical-chemical stability • Cooling • Easy control of the lubricant: state and levels 	<ul style="list-style-type: none"> • Cleanliness of the mechanism • Easier to ensure a good seal • Protective barrier • Easy assembly • Easy handling • Reduced or zero lubricant top-ups • Possible use of pre-lubricated bearings
DRAWBACKS	<ul style="list-style-type: none"> • Perfect seal required on assembly • In the event of prolonged stoppage, poor protection against oxidisation and humidity • Start-up delays when independent circulation prior to rotation is required 	<ul style="list-style-type: none"> • Higher friction coefficient than with oil • Inferior heat evacuation • Replacement (if needed) requires removal and cleaning of the bearing • No possibility of checking the grease level, therefore necessary to use a reliable grease or periodically top-up in order to compensate for leakage, pollution or ageing

CHARACTERISTICS OF GREASES

A grease is a semi-fluid to solid product obtained by dispersal of a thickening agent (soap) in a lubricating liquid (mineral or synthetic oil).

To provide certain specific properties, additives may be included. The growing use of bearings lubricated with grease, associated with the development of lifelong lubrication, makes the grease an integral component of the bearing. The service life of the bearing and its behaviour in various environments are largely determined by the properties of the grease used.

PHYSICAL-CHEMICAL CHARACTERISTICS

Consistency

- The NLGI (National Lubrication Grease Institute) grade corresponds to a penetration value in the grease used (according to test specification ASTM/D217).
- For bearings, the chosen consistency is in general grade 2.

NLGI GRADES	PENETRATION	Consistency
0	385 - 355	Semi-fluid
1	340 - 310	Very soft
2	295 - 265	Soft
3	250 - 220	Mean
4	205 - 175	Semi-hard

Viscosity of the base oil: generally defined in cSt (mm²/s) at 40°C

Density: in the region of 0.9

Drop point: temperature at which the first liquefied drop falls following heating of a sample

Order of magnitude: 180°C/260°C depending on the constituent components of the grease. The maximum temperature of use of the grease is always far below the drop point.

FUNCTIONAL SPECIFICATIONS

The working conditions to which the lubricant is subjected (rolling, blending) require special bearing greases that cannot be selected exclusively on the basis of their physical-chemical characteristics.

The NTN-SNR Research & Testing centre is constantly carrying out approval tests on bearings to allow us to provide advice about the grease best suited to a given application.

The approval specifications relate to the following basic criteria:

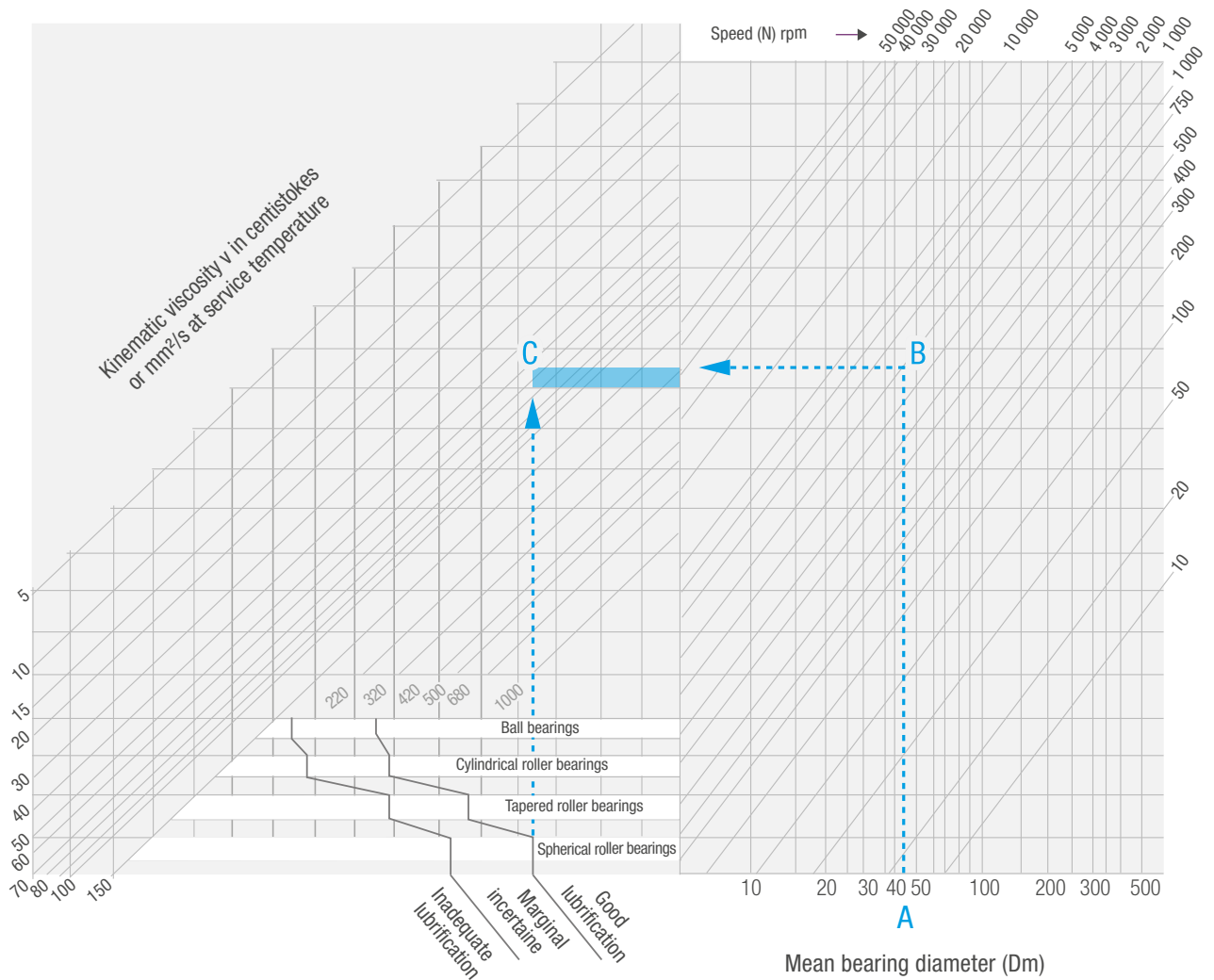
- Endurance of ball bearings
- Endurance of roller bearings
- Water resistance
- Resistance at high and low temperatures
- Adherence (centrifugation)
- Resistance to vibrations (false brinelling)
- Resistance to high speeds

These criteria may be supplemented depending on the result that the customer seeks. Grease selection for a particular application is a compromise carried out on the basis of the technical specifications of the application.

For further information about the technical characteristics of lubricants and their selection criteria, please consult our Experts & Tools catalogues or contact your NTN-SNR representative.

Tools for calculating bearing lubrication needs

CHOICE OF LUBRICANT VISCOSITY (OIL OR GREASE)



- Determine the average diameter of the bearing $A = (\text{Bore} + \text{outer diameter})/2$
- Find, by following point B on the graph, the intersection with the bearing rotation speed line
- Identify point C, intersection of the horizontal line deriving from B and the vertical line starting from the efficient lubrication limit, according to the type of bearing
- Determine the value of the oblique line passing via C (60 in the present case)
- Calculate the viscosity of the lubricant to be chosen, taking account of the operating temperature of the bearing

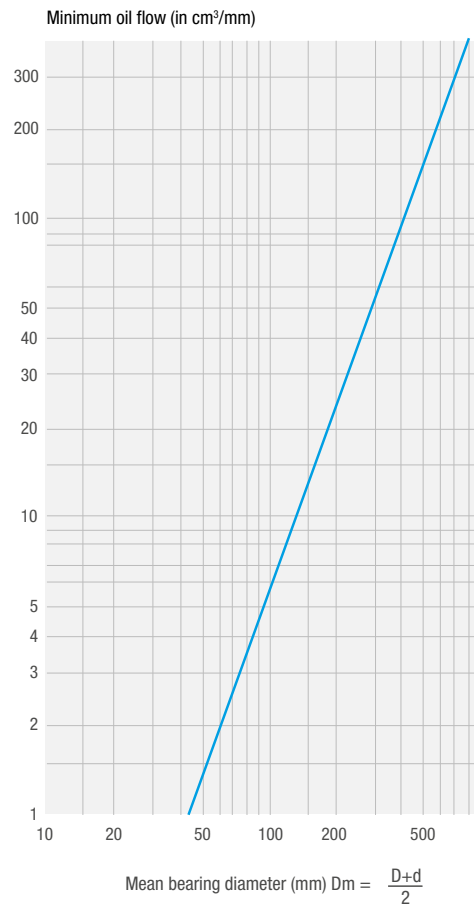
On the vertical scale (table on page 30), note the value of the calculated basic viscosity.

Identify the intersection between this value and the operating temperature of the bearing

The desired viscosity is the value of the oblique line passing via this intersection (approximately SAE 50, or VG300 in the present case)

DOSAGE OF LUBRICANTS AND RELUBRICATION

OIL LUBRICATION (MINIMUM QUANTITY)



LUBRICATION WITH GREASE (DOSAGE)

Excessive grease may cause overheating.
The grease must occupy 20 to 30% of the free volume inside the bearing.

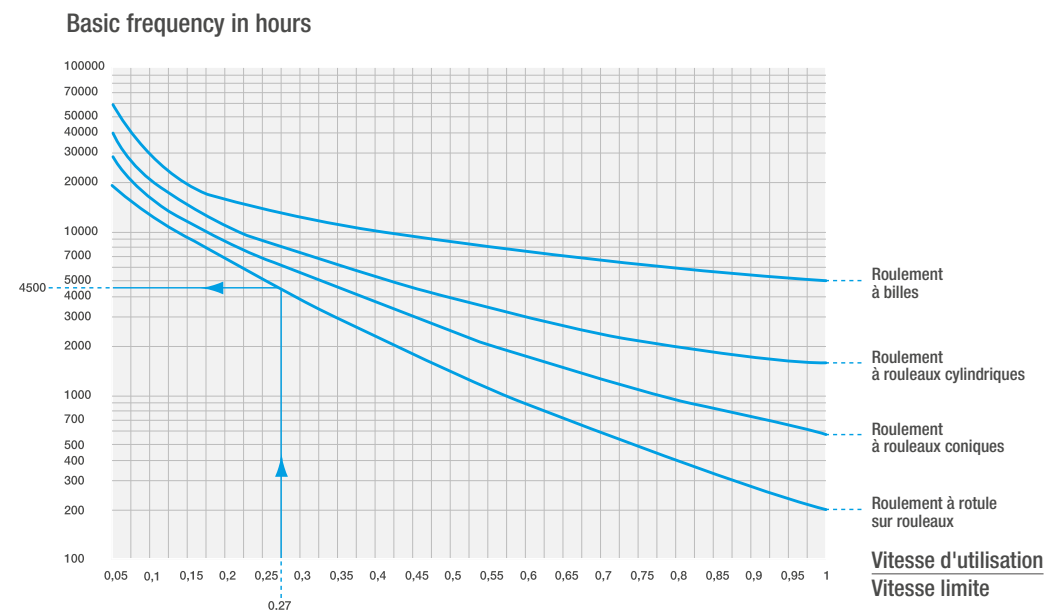
Calculation formula for the weight of grease required:
 $G = 0,005 D.B$

G = Gram (or cm³)
D = External diameter of the bearing in mm
B = Width of the bearing in mm

Exceptions:

- The quantity of grease may be increased by 20% for housings equipped with a grease evacuation orifice
- A bearing rotating at very low speed will tolerate complete filling

RELUBRICATION FREQUENCY



The basic relubrication frequency (F_b) depends on the type of bearing and the ratio of the speed of usage to the limiting speed stated in the bearing specifications.

This basic frequency needs to be adjusted by the following coefficients according to the specific environmental conditions of the mechanism (dust, humidity, impacts, vibration, vertical axis, operating temperature, etc) according to the relation: $F_c = F_b \times T_e \times T_a \times T_t$

Conditions	Environment	Applications	Temperature		
	Dust Humidity Condensation	With impacts Vibrations Vertical axis	Level	For standard grease	For high-temperature grease
Coefficients	T_e	T_a		T_t	T_t
Mean	0.7 to 0.9	0.7 to 0.9	75°C	0.7 to 0.9	-
High	0.4 to 0.7	0.4 to 0.7	75°C to 85°C	0.4 to 0.7	0.7 to 0.9
Very high	0.1 to 0.4	0.1 to 0.4	85°C to 125°C	0.1 to 0.4	0.4 to 0.7
	-	-	130°C to 170°C	-	0.1 to 0.4

Example: a 22212EA bearing, lubricated with standard grease, turning at 1500 rpm in a dusty environment, at 90°C with no other application constraints:

22212 = spherical roller bearing

Thermal reference speed $n_{\theta r} = 5600$ rpm

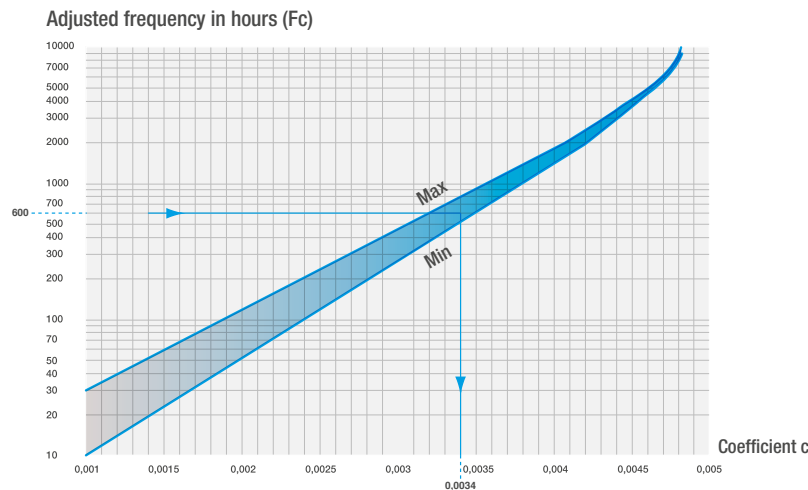
Utilisation speed = 1500 rpm

$$\frac{\text{Utilisation speed} = 1500 \text{ rpm}}{n_{\theta r} \text{ speed} = 5600 \text{ rpm}} = \frac{1500}{5600} = 0.27 \longrightarrow \text{Basic frequency } F_b = 4500 \text{ h}$$

$$\text{Adjusted frequency } F_c = 4500 \times 0.5 \times 0.9 \times 0.3 = 600 \text{ h}$$

$T_e = 0.5 \longrightarrow$ dust
 $T_a = 0.9 \longrightarrow$ normal
 $T_t = 0.3 \longrightarrow$ 90°C

WEIGHT OF GREASE TO BE RENEWED



The adjusted frequency is used to determine the weight of the grease to be used, according to:

- The bearing width B
- Its outer diameter D
- Coefficient c read off the curve by the relation $P = D \times B \times c$ where P = weight of grease (gram)

Example:

for the 22212

(D = 110, B = 28, c = 0.0034)

$P = 110 \times 28 \times 0.0034 = 10$

We shall therefore add approximately 10 g every 600 hours of operation.

In first approximation, we may consider the following values:

FLOW RATE ADJUSTMENT PARAMETERS

Shaft diameter	Manual lubrication frequency (one pump action = 1 cm ³)	Quantity per day	Frequency of replacement of automatic lubricator 120 to 130 cm ³
100 to 120 mm	4 pump actions per day	3 to 4 cm ³	1 month
80 to 100 mm	2 pump actions per day	2 cm ³	2 month
65 to 80 mm	8 to 10 pump actions per week	1.5 cm ³	3 month
50 to 65 mm	8 to 10 pump actions every 15 days	0.7 cm ³	6 month
< 50 mm	8 to 10 pump actions per month	0.3 cm ³	12 month

ADJUSTMENTS

Conditions	Shaft diameter (mm)		ISO tolerance of the shaft	Comments	
	>	≤			
Cylindrical bore bearing (Class 0)					
Rotating inner ring load or indefinite direction load	Light load (1) standard (1) or varying load	18	25	k5	
		25	40	m5	
		40	60	n5	
		60	100	n6	
		100	200	p6	
		200	500	r6	
Static inner ring load	Heavy load or impact load (1)	50	70	n5	Requires a bearing with a radial clearance greater than CN.
		70	140	p6	
		140	200 (2)	r6	
	Inner ring should slide smoothly on shaft	All shaft diameters		g6	For large bearings, tolerance f6 may be applied to ensure that the bearing is capable of moving freely.
Inner ring may not slide smoothly on shaft	All shaft diameters		h6		
Tapered bore bearing (Class 0; complete with an adapter or mounting sleeve)					
All types of load	All shaft diameters		h9/IT5 (3)	h10/IT7 (3) will be sufficient for power transmitting shafts.	

1 Criteria for light, standard and heavy loads.

Light loads:	Dynamic equivalent radial loads $\leq 0.05 C$
Standard loads:	$0.05 C < \text{Dynamic equivalent radial loads} \leq 0.10 C$
Heavy loads:	$0.10 C < \text{Dynamic equivalent radial loads}$

2 If using shaft diameter over 200 mm with impacts or heavy loads, please contact our NTN-SNR experts.

3 "IT5" or "IT7" means that the shaft form tolerance (circularity, cylindricity, etc.) must satisfy tolerance class IT5 or IT7.

Note 1: the table above table applies to solid steel shafts.

Note 2: please use the following formula to calculate the required interference; it determines the value to 1/1000 of the maximum shaft diameter:

If $F^r \leq 0.3C_0$	Required interference $\Delta dF(\mu\text{m})$ is $\Delta dF = 0.08 \cdot (d^*F^r/B)^{1/2}$
If $F^r > 0.3C_0$	$\Delta dF = 0.02 \cdot (F^r/B)$

(d = Bearing bore (mm) / B = Inner ring width (mm) / F^r = Radial load / C_0 = Basic static load)

By taking account of the difference between the ambient temperature and the temperature of an in-service bearing, the appropriate effective interference must be used according to the temperature difference $\Delta T(\mu\text{m})$.

$$\Delta dF = 0.0015 \cdot d^* \Delta T$$

(ΔT corresponds to the temperature difference between the bearing in continuous service and the external ambient temperature in °C)

Housing	Conditions		ISO tolerance of the housing	Comments	
	Type of load, etc.	Axial displacement of the outer ring			
Single or two-part housing	Static outer ring load	All types of load	Movable	H7	When a large bearing is used or in case of a significant temperature difference between the outer ring and the housing, tolerance G7 may be applied
		Light load (1) or standard load (1)	Movable	H8	-
		High heat build-up in the shaft and inner ring	Easily movable	G7	When a large bearing is used or in case of a significant temperature difference between the outer ring and the housing, tolerance F7 may be applied
Single housing		Precision rotation must be possible under light to standard load	Generally immovable	K6	-
			Movable	JS6	-
		Very light load	Movable	H6	-
	Indefinite direction load	Light to standard load	Movable	JS7	-
		Standard to heavy load (1)	Generally immovable	K7	-
		High-impact load	Immovable	M7	-
	Rotating outer ring load	Light load	Immovable	M7	-
Standard to heavy load (1)		Immovable	N7	-	
High impacts or heavy loads on thin-walled housings		Immovable	P7	-	

1 Criteria for light, standard and heavy loads

- Light loads: Dynamic equivalent radial loads $\leq 0.05 C$
- Standard loads: $0.05 C < \text{Dynamic equivalent radial loads} \leq 0.10 C$
- High loads: $0.10 C < \text{Dynamic equivalent radial loads}$

Note: the table above applies to steel or cast-iron housings



PRACTICAL INFORMATION

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PRACTICAL INFORMATION

MOUNTING AND REMOVAL

Mounting the bearing is an essential stage that determines the service life and proper functioning of the installation. Feedback has shown that incorrect mounting is the cause of 17% of bearing faults remove out in the field.

COLD MOUNTING

Cold mounting is the simplest mode of assembly.

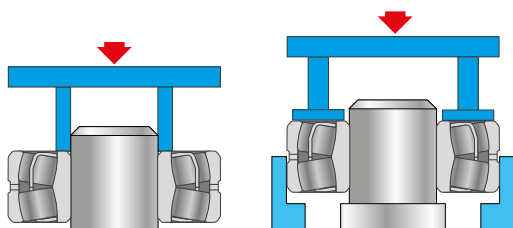
It is particularly suited to small and medium-sized bearings with a moderately tight adjusting.

NTN-SNR RECOMMENDATIONS

Rule 1 the bearing must be firmly fixed to the rotating part

	Analysis of rotation (% Incidence)		Fixing principle
Load fixed in relation to the outer ring (frequency of cases)	Stationary housing and load (95%) Rotating inner ring	Rotating housing and load (0.5%) Stationary inner ring	Inner ring tight on shaft
	Stationary shaft and load (3%) Rotating outer ring	Rotating shaft and load (1.5%) Stationary outer ring	

Rule 2 the sleeve is mounted by applying against the bearing ring with a tight adjusting or simultaneously on both rings. This avoids stressing the rotating body and damaging the bearing.



"For easier mounting and in order to avoid fretting corrosion with the shaft or housing":

- Always use NTN-SNR fitting compound. This thick lubricant preserves the surface quality of parts with mating surfaces. Without this compound, corrosion would progressively cause the adjusting between bearing and shaft (or housing) to deteriorate, ultimately leading to vibrations and ring rotation, causing premature damage to the bearing and the mating surfaces.
- Avoid introducing any pollutant during assembly (metal chips, liquid, etc.)

Principle of the adapter sleeve

Principle of the withdrawal sleeve

Special case of a smooth shaft for mounting requiring a tight adjusting and longitudinal adjustment of the bearing: use a mechanical sleeve with tapered seat associated with a tapered bore bearing

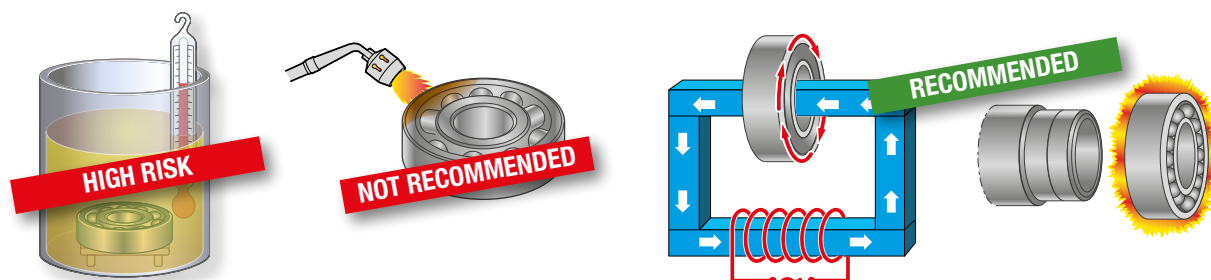
HOT MOUNTING

hot mounting: raising the temperature of the inner ring causes it to expand in order that it can fit effortlessly onto its shaft.

- In the event of tight adjusting on the outer ring, prior to the insertion of the bearing, the housing may be made to expand through heating.
- Conversely, a shaft or a bearing ring can also be frozen using liquefied gas in order to facilitate insertion of the bearing.

NTN-SNR's induction heaters provide the best solution in terms of safety, cleanliness and speed compared with oil-bath heating, hot plates or ovens.

Heating using a blowtorch is to be prohibited. This may generate temperatures locally that alter the hardness of the bearing, and therefore shorten its service life.



Keeping the temperature under control is vitally important for hot-mounting parts correctly.

Therefore, depending on the bearing dimensions, the following temperatures are recommended:

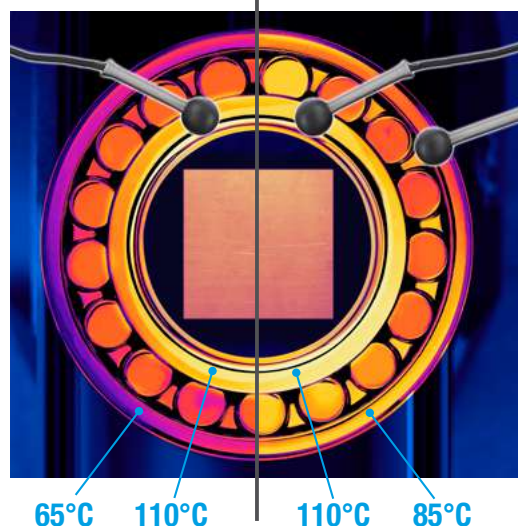
Bore diameter	T° heating temp
Up to 100 mm	+90°C
100 to 150 mm	+120°C
Over 150 mm	+ 130°C

Bearings with seals should not be heated above 80°C.

Heating too fast and too much can alter the properties of the material and significantly reduce the life of the bearing.

However, expanding the inner ring too quickly relative to the outer ring, can subject the rolling housings to significant stresses that can lead to their deterioration or that of the raceway.

ONE SENSOR TWO SENSORS



"A function such as the Temperature mode with 2 probes of SmartTEMP devices makes it possible to control the temperature delta between the rings."

HYDRAULIC MOUNTING

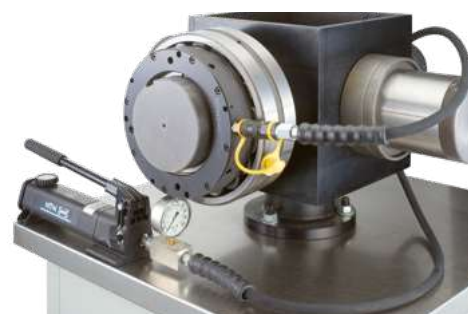
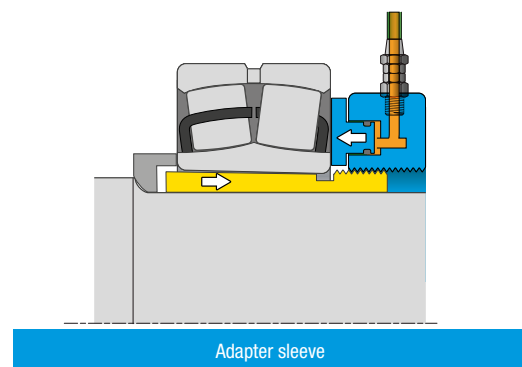
The mounting of large bearings with tapered bores requires considerable effort that is difficult to produce by mechanical screw tightening. The use of hydraulic technology is required in such cases.

Oil is injected under high pressure to create an oil film over the whole of the contact surface between the seat and the inner ring. This reduces the friction generated by the mounting and facilitates tightening of the nut. A hydraulic nut can be used at the same time to develop the necessary mounting force.

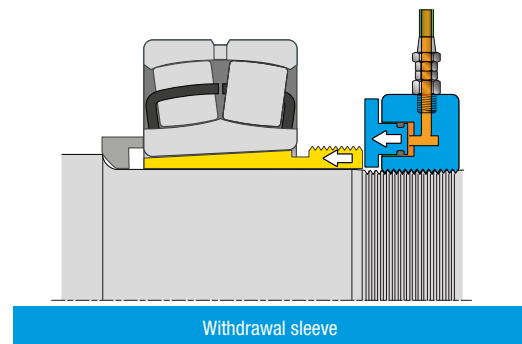
The two principles may also be used simultaneously to make mounting easier. The residual clearance is checked using feeler gauges or a comparator which measures the sink depth on the tapered seat.

TWO TYPES OF MOUNTING ARE SUITED TO THIS METHOD:

Cylindrical shaft associated with an adapter sleeve



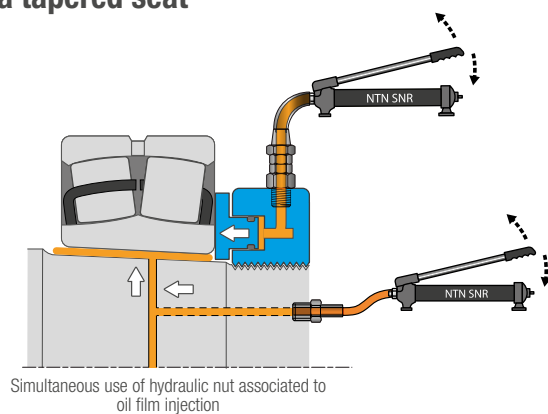
Mounting on adapter sleeve with a hydraulic nut



Mounting on withdrawal sleeve by indirect pushing of the hydraulic nut

Note: You could use the same hydraulic nut for assembly and disassembly.

On a tapered seat



"For bore diameters above 60 mm, a hydraulic solution must be used."

CHECKING THE INTERNAL RADIAL CLEARANCE ON ASSEMBLY

AXIAL CLEARANCE

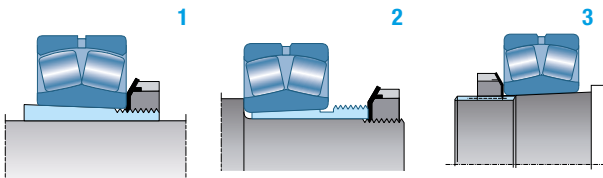
Since the axial clearance J_a is a function of the radial clearance J_r , it can be calculated by means of the following approximation formula:

$$J_a = 2.27 Y_0 \cdot J_r$$

WHY IS IT IMPORTANT TO MEASURE THE RADIAL CLEARANCE?

Spherical roller bearings with two rows of tapered bore can be mounted in various ways:

- By using an adapter sleeve (1)
- A withdrawal sleeve (2)
- Or directly on the tapered shaft seat (3)



Locking the nut allows the bearing to be tightened. This causes the inner ring to expand and reduces the internal clearance.

To prevent the bearing from locking due to too great a reduction in clearance, it is necessary to check the degree of tightness of the nut. The tightness is checked by measuring the bearing clearance before and after mounting.

Prior to measurement of clearance

Locate the radial clearance before mounting (catalogue data) shown in the table on the following page (see blue area).

Bearing clearance is measured with feeler gauges.

Place the bearing in a vertical position, facing, with the rollers in line with the bearing.

Turn the bearing manually in order to put the rollers in place.

Radial clearance measurement

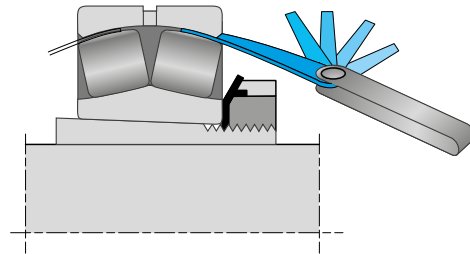
The bearing must be held still during this measurement.

The feeler gauges are used as follows.

Slide them at an angle between the outer ring raceway and the rollers without load, without rotating the bearing.

Start with the mini gauge and insert gauges of increasing thickness until the value of the radial clearance is reached.

The actual radial clearance value is located between the gauge that passes and the one that fails to pass.



How to measure the clearance after mounting?

There are two ways to check that the clearance has been correctly reduced after mounting:

- **Using feeler gauges:** proceed in the same way as above (see green area in the table on the following page)
- **By axial displacement:** using a comparator and a hydraulic pump, position the bearing within the range of corresponding values indicated by the rest blade (see grey area in the table on the following page)



During tightening, monitor the reduction of clearance so that the prescribed limit is not exceeded.

SPECIAL CASE: SEALED BEARINGS

Only the axial displacement can be checked to obtain the right radial clearance that also corresponds to a rotation in °.

The last column of the table contains our recommendations for the rotation of the nut in order to obtain the right axial displacement for your sealed bearing.

SPECIAL CASE: OVERSIZE BEARINGS

For large bearings, do not use feeler gauges larger than 15/100th of a mm, which are too rigid to fit the curve of the bearing raceway and prefer using a combination of thinner distance pieces.

If using an EE sealed spherical roller bearing, a feeler gauge cannot be used.

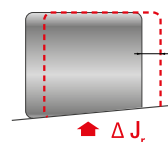
Bearing nominal bore (mm)		Before assembly According to ISO 5753 (mm)						After assembly Feeler gauge*						Axial displacement (mm)				Recommended rotation for the locking nut
>	≤	Normal CN		C3		C4		Normal CN		C3		C4		Taper 1:12		Taper 01:30		
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
24	30	0,03	0,04	0,04	0,055	0,055	0,075	1	3	2	5	4	7	0,15	0,2	-	-	-
30	40	0,035	0,05	0,05	0,065	0,065	0,085	1	4	3	5	4	7	0,25	0,3	-	-	65°
40	50	0,045	0,06	0,06	0,08	0,08	0,1	2	4	3	6	5	8	0,35	0,4	-	-	90°
50	65	0,055	0,075	0,075	0,095	0,095	0,12	2	5	4	7	6	10	0,4	0,45	-	-	75°
65	80	0,07	0,095	0,095	0,12	0,12	0,15	3	6	5	9	8	12	0,5	0,6	-	-	100°
80	100	0,08	0,11	0,11	0,14	0,14	0,18	3	7	6	10	9	14	0,6	0,7	-	-	120°
100	120	0,1	0,135	0,135	0,17	0,17	0,22	3	8	7	12	10	17	0,8	0,9	1,8	2,3	-
120	140	0,12	0,16	0,16	0,2	0,2	0,26	4	10	8	14	12	20	0,9	1	1,95	2,7	-
140	160	0,13	0,18	0,18	0,23	0,23	0,3	4	11	9	16	14	23	1	1,2	2,35	3,1	-
160	180	0,14	0,2	0,2	0,26	0,26	0,34	4	12	10	18	16	26	1,1	1,4	2,8	3,55	-
180	200	0,16	0,22	0,22	0,29	0,29	0,37	5	13	11	20	18	28	1,2	1,5	3,2	3,95	-
200	225	0,18	0,25	0,25	0,32	0,32	0,41	5	14	12	21	19	30	1,5	1,8	3,85	4,6	-
225	250	0,2	0,27	0,27	0,35	0,35	0,45	6	15	13	23	21	33	1,6	1,9	4,2	4,95	-
250	280	0,22	0,3	0,3	0,39	0,39	0,49	6	17	14	26	23	36	1,6	2,1	4,25	5,4	-
280	315	0,24	0,33	0,33	0,43	0,43	0,54	6	18	15	28	25	39	1,9	2,4	4,45	5,7	-
315	355	0,27	0,36	0,36	0,47	0,47	0,59	8	20	17	31	28	43	2,1	2,5	5,1	6,1	-
355	400	0,3	0,4	0,4	0,52	0,52	0,65	8	22	18	34	30	47	2,3	3	5,75	7,5	-
400	450	0,33	0,44	0,44	0,57	0,57	0,72	8	23	19	36	32	51	3	3,6	-	-	-
450	500	0,37	0,49	0,49	0,63	0,63	0,79	11	28	23	42	37	58	3,3	4	8,25	10	-
500	560	0,41	0,54	0,54	0,68	0,68	0,87	11	30	24	44	38	63	3,7	4,6	4	5,1	-

*Practical measurement of clearance per 1/100 mm using feeler gauges. The values less than 4/100 mm, use laminated shims.

Relation between the axial displacement (a) of a bearing with tapered bore and the corresponding reduction of its clearance J_r :

Taper 1/12 $a = 12 \Delta J_r / t_i$

Taper 1/30 $a = 30 \Delta J_r / t_i$



a = axial displacement
 J_r = radial clearance reduction

t_i = clearance reduction rate on inner ring: $t_i = 0.75$ if the bearing is directly mounted on a solid shaft tapered seat.
 $t_i = 0.7$ if the bearing is mounted on a tapered sleeve.

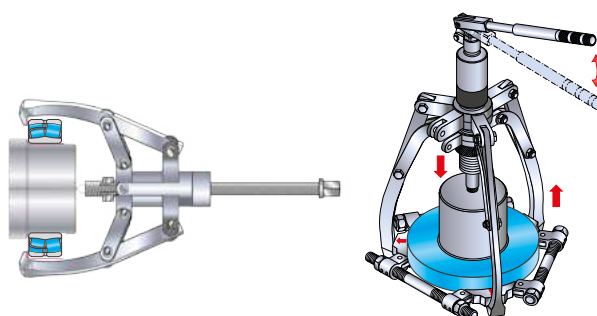
MECHANICAL DISMOUNTING

Dismount cleanly: look after your equipment and save time, safely.

Wherever possible, the bearing should be extracted by exerting force on the tightened ring. There are numerous types of extractor, depending on the grip offered by the bearing, its accessibility and the extraction force required.

Extractors equipped with a pump and hydraulic cylinder allow the operator to develop very high extraction efforts, using their own muscular strength. They are easy to use, due to the fact that their arms are self-centring.

To remove a damaged or oscillating bearing, slide a ring separator between the puller and bearing if possible.



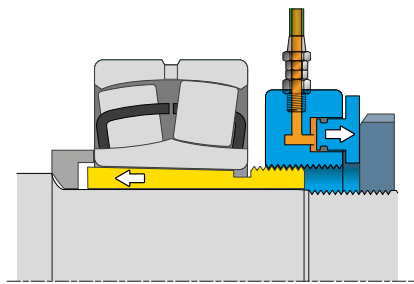
HYDRAULIC DISMOUNTING

bearing seats are equipped with distribution channels and grooves for removal by means of hydraulic pressurisation. Likewise, the NTN-SNR adapter and withdrawal sleeves are equipped with these devices for shafts of 200 mm and above.

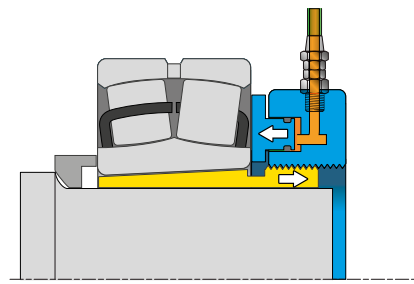
This method is quick and reliable: it requires a high pressure pump with a maximum power rating in the case of tapered seats. In the case of a cylindrical seat, it is necessary to maintain high pressure and accompany this with the removal of the bearing using mechanical extraction methods.

If an adapter or withdrawal sleeve was used during mounting, a hydraulic nut can be used for quick and effortless dismounting.

HYDRAULIC DISMOUNTING ON ADAPTER / WITHDRAWAL SLEEVE



Screw the hydraulic nut on the adapter sleeve without pressing against the bearing.
Inject oil extraction up the sleeve.



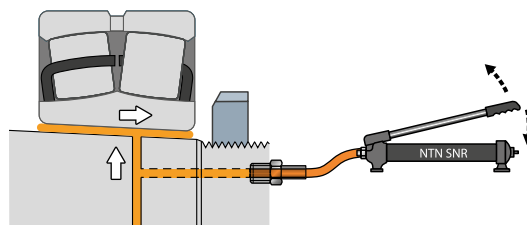
Screw the hydraulic nut on the sleeve removal, the piston in contact with the bearing.
Inject oil extraction up the sleeve.



Extraction of the adapter sleeve with a hydraulic nut



Extraction of the withdrawal sleeve with a hydraulic nut



Principle of removing hydraulic oil injection channels



Hydraulic dismounting

FITTING & REMOVAL TOOLS

SmartTEMP

THE ONLY TOOL FOR THE SAFE, CONTROLLED HEATING OF BEARINGS, PINIONS, COLLAR RINGS, ETC.

Drawing strength from a 30-year track record in the professional induction heating market, NTN-SNR is now able to present its innovative new range of induction heaters. These new-generation heaters effectively address all your needs, from heating workpieces through to more sensitive parts that require cutting-edge technology for safe heating. Heaters are easy and safe to use with their touchscreen. The interface menu is displayed in the operator's language to maximise efficiency, the likes of which have never been seen before in the market.



ELIMINATE ALL RISKS WHEN MOUNTING BEARINGS

17%

of premature bearing failures are caused by poor mounting

CORRECT BEARING MOUNTING

is essential for increasing the service life

HOT MOUNTING METHOD

with the induction heater reduces any damage during assembly



COLD MOUNTING

Tool case for quick, accurate bearing fitting in complete safety.



DISMOUNTING TOOLS

Hydraulic or mechanical dismounting: All kinds of pullers (2 or 3 arms) for a safe and clean operation whatever the position and the size of the bearing.



HYDRAULIC MOUNTING

Precise, effortless with a revolutionary nut, always ready for use thanks to its "back & forth" feature!

SERVICES

Experts
& Tools

EXPERTS & TOOLS: THE NTN-SNR TEAM OF EXPERTS CAN SUPPORT YOUR ORGANISATION TO OBTAIN THE BEST PERFORMANCE FROM YOUR BEARINGS AND YOUR OPERATIONS



TRAINING

Improve the skills of your maintenance technicians and designers in bearing selection and maintenance. Whether at our training school or on your premises with our BEBOX van, we can provide made-to-measure training courses covering both theory and practice, because all customers are different.



DAMAGED BEARING DIAGNOSIS

Let our experts determine the causes of your bearing failures in our lab or on your site. Their reactivity and advice can provide the keys to your improvements.



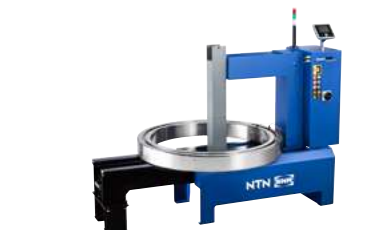
TECHNICAL ASSISTANCE FOR BEARINGS AND LUBRICATION SYSTEMS

Rely on our experts to supervise your maintenance operations: bearing dismounting and fitting, lubrication system set-up and improvement, vibration analysis and so on.



MAINTENANCE AUDIT

Benefit from a unique appraisal of your maintenance organisation, performed by our plant maintenance managers. Gain productivity thanks to a pragmatic action plan resulting from a peer-to-peer approach.



TOOL HIRE

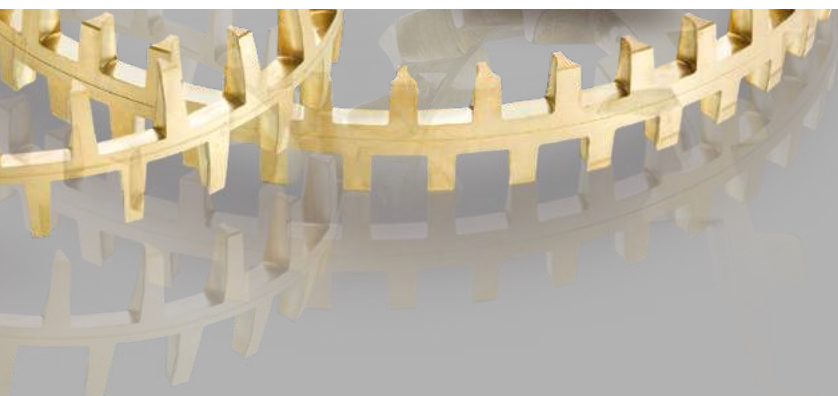
Experts & Tools offers a wide range of large bearing maintenance tools for rent, whether induction heaters, hydraulic nuts or pumps.





LIST OF REFERENCES

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Mounting / withdrawal sleeves	70
Associated plummer blocks	74
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LIST OF REFERENCES

PREFIXES / SUFFIXES

PREFIXES		SKF correspondence	NSK correspondence	TIMKEN correspondence	FAG correspondence
TSx	Temperature-stabilised version (up to +250°C)				
WA	Non-ISO ring width for LSS sealed version (NTN)	BS2			WS2
10X	Non-ISO ring width for EE sealed version (SNR)	BS2			WS2
SUFFIXES					
A	Two steel plate cages with window centred on the inner ring	C(J), CC (BI)	A, C, CD	J	-
B	Optimised internal design, asymmetrical rollers				
C2	Internal radial clearance less than normal	C2	C2	C2	C2
CN	Standard clearance	CN	CN	CN	CN
C3	Internal radial clearance greater than normal	C3	C3	C3	C3
C4	Internal radial clearance greater than C3	C4	C4	C4	C4
C5	Internal radial clearance greater than C4	C5	C5	C5	C5
E « ULTAGE »	Increased capacity design, symmetrical rollers	E « EXPLORER »	E, HPS	E	E1 « X-LIFE »
EE	Reinforced seal properties (NBR) on both sides of the bearing. 30% grease-filled with high-pressure grease	2CS, 2RS	-		2RSR
LLS	Reinforced seal properties (NBR) on both sides of the bearing (NTN)	2CS, 2RS	-		2RSR
F800	Bearing with machined brass cage for high-vibration applications, special C4 clearance	VA405	U15, VS	W800	T41A, T41D
EMD1V800	Similar to EF800, NTN designation	VA405	U15, VS	W800	T41A, T41D
F801	Bearing with machined brass cage for high-vibration applications, special C3 clearance				
F802	Bearing with machined brass cage for high-vibration applications, special C0 clearance				
G15	Two glass fibre-reinforced polyamide cages		H		TVPB (BI)
K	Tapered bore, taper 1:12	K	K	K	K
K30	Tapered bore, taper 01:30	K30	K30	K30	K30
LLS	Reinforced seal properties (NBR) on both sides of the bearing (NTN)				
M	One-piece machined brass cage centred on rollers	CA, CAC		M, MB	M, MB
N	Groove for stop segment on outer ring				
P5	ISO accuracy class 5	P5		P5	P5
P6	ISO accuracy class 6	P6		P6	P6
V	Standard internal design, symmetrical rollers			C, VCS, Y	
W33	Lubrication groove and holes on the outer ring	W33	E4	W33	S
W34	Lubrication holes on inner ring				SY
W45A	Tapped holes on one side of outer ring	VE 553			
D1	Lubrication groove and holes on the outer ring	W33	E4	W33	S
F1	Two solid machined carbon steel cages centred on inner ring				
F3	Two solid machined steel cages centred on inner ring				
L1	Two solid machined brass cages centred on inner ring	CA, CAC		M, MB	M, MB
LS0	Solid lubrication, SNR designation	W64, W64F,	L11, L12		
LP03	Solid lubrication, NTN designation	W64H, W64L			

NTN-SNR offers different solutions for countless applications. This is only a partial list of the most commonly used codes.

- Every reasonable effort has been made to guarantee the accuracy of the information in this table.

The information is provided for guidance only and NTN-SNR shall in no way be held liable.

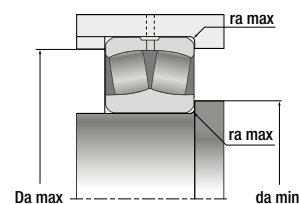
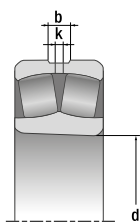
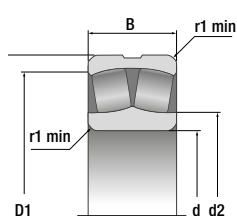
- SKF Explorer, FAG X-life and NSK HPS bearings are trademarks registered by their respective companies.

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C _u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C ₀	e	Y ₁	Y ₂			Y ₀
mm							kN							
25	52	18	*	22205EAW33	5,6	57,3	46,1	0,34	2	2,98	1,96	13000	17000	
	52	18	*	22205EMW33	5,2	54,2	42,8	0,34	2	2,98	1,96	14000	17000	
	52	23	*	10X22205EAW33EE	5,6	57,3	46,1	0,34	2	2,98	1,96		3900	
	62	17	*	21305V	4,9	51,1	40,3	0,29	2,33	3,47	2,28	8800	14000	
30	62	20	*	22206EAW33	7,9	75,7	64,5	0,31	2,15	3,2	2,1	11000	14000	
	62	20	*	22206EMW33	7,3	71,9	60,2	0,31	2,15	3,2	2,1	11000	14000	
	62	25	*	10X22206EAW33EE	7,9	75,7	64,5	0,31	2,15	3,2	2,1		3100	
	72	19	*	21306V	6,1	64,6	52,1	0,28	2,45	3,64	2,39	7800	12000	
35	72	23	*	22207EAW33	11,2	100	92	0,31	2,21	3,29	2,16	9500	12000	
	72	23	*	22207EMW33	11,2	100	92	0,31	2,21	3,29	2,16	9500	12000	
	72	28	*	10X22207EAW33EE	11,2	100	92	0,31	2,21	3,29	2,16		2600	
	80	21	*	21307EAW33	9,6	88,5	78,5	0,24	2,79	4,15	2,73	6900	10000	
40	80	23	*	22208EAW33	12,8	116	105	0,27	2,47	3,68	2,41	8200	11000	
	80	23	*	22208EAW33ZZ	12,8	116	105	0,27	2,47	3,68	2,41	8200	11000	
	80	23	*	22208EMW33	12,0	110	98	0,27	2,47	3,68	2,41	8300	11000	
	80	28	*	10X22208EAW33EE	12,8	116	105	0,27	2,47	3,68	2,41		2300	
	90	23	*	21308V	10,6	97,7	86,7	0,26	2,55	3,8	2,5	6400	9300	
	90	33	*	22308EAW33	18,5	169	152	0,36	1,87	2,79	1,83	5800	7400	
	90	33	*	22308EMW33	18,5	169	152	0,36	1,87	2,79	1,83	5800	7400	
	90	33	*	22308EF800	18,5	169	152	0,36	1,87	2,79	1,83	5800	7400	
	45	85	23	*	22209EAW33	13,8	121	113	0,26	2,64	3,94	2,58	7400	9800
85		23	*	22209EAW33ZZ	13,8	121	113	0,26	2,64	3,94	2,58	7400	9800	
85		23	*	22209EMW33	12,9	116	106	0,26	2,64	3,94	2,58	7500	9800	
85		28	*	10X22209EAW33EE	13,8	121	113	0,26	2,64	3,93	2,58		2100	
100		25	*	21309EAW33	16,3	138	134	0,23	2,9	4,31	2,83	5600	8300	
100		36	*	22309EAW33	22,8	206	187	0,36	1,9	2,83	1,86	5300	6700	
100		36	*	22309EMW33	22,8	206	187	0,36	1,9	2,83	1,86	5300	6700	
100		36	*	22309EF800	22,8	206	187	0,36	1,9	2,83	1,86	5300	6700	
50	90	23	*	22210EAW33	15,1	130	124	0,24	2,84	4,23	2,78	6700	9100	
	90	23	*	22210EAW33ZZ	15,1	130	124	0,24	2,84	4,23	2,78	6700	9100	
	90	23	*	22210EMW33	14,3	125	117	0,24	2,84	4,23	2,78	6700	9100	
	90	28	*	10X22210EAW33EE	15,1	130	124	0,24	2,84	4,23	2,78		1900	
	90	28	*	10X22210EAW33EEL	15,1	130	124	0,24	2,84	4,23	2,78		1900	
	110	27	*	21310V	16,3	142	134	0,25	2,71	4,04	2,65	5400	7600	
	110	40	*	22310EAW33	28,3	250	232	0,36	1,87	2,79	1,83	4900	6100	
	110	40	*	22310EMW33	28,3	250	232	0,36	1,87	2,79	1,83	4900	6100	
55	100	25	*	22211EAW33	18,0	155	148	0,23	2,95	4,39	2,89	6100	8200	
	100	25	*	22211EAW33ZZ	18,0	155	148	0,23	2,95	4,39	2,89	6100	8200	
	100	25	*	22211EMW33	17,1	148	140	0,23	2,95	4,39	2,89	6100	8200	
	100	31	*	10X22211EAW33EE	18,0	155	148	0,23	2,95	4,4	2,89		1700	
	100	31	*	10X22211EAW33EEL	18,0	155	148	0,23	2,95	4,4	2,89		1700	
	120	29	*	21311V	20,0	172	164	0,24	2,83	4,21	2,76	5000	6900	
	120	43	*	22311EAW33	33,4	296	274	0,36	1,87	2,79	1,83	4600	5600	
	120	43	*	22311EMW33	33,4	296	274	0,36	1,87	2,79	1,83	4600	5600	
	120	43	*	22311EF800	33,4	296	274	0,36	1,87	2,79	1,83	4600	5600	

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



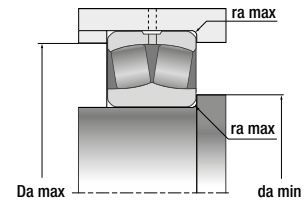
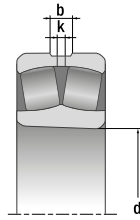
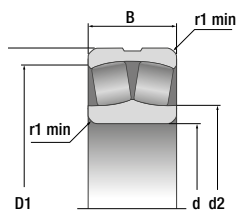
	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max
				mm							
22205EAW33	0,155	3 or 4	3	1,5	1	30,5	45,5	30,6	46,4	1	
22205EMW33	0,16	3 or 4	3	1,5	1	30,5	45,5	30,6	46,4	1	
10X22205EAW33EE	0,21	3 or 4	3	1,5	1	28,6	47,7	28,6	47,7	1	
21305V	0,257	0	-	-	1,1	34,5	51,2	32	55	1	
22206EAW33	0,272	3 or 4	4,4	2	1	37,5	54,3	35,6	56,4	1	
22206EMW33	0,276	3 or 4	4,4	2	1	37,5	54,3	35,6	56,4	1	
10X22206EAW33EE	0,33	3 or 4	4,4	2	1	35,2	56,4	35,2	56,4	1	
21306V	0,394	0	-	-	1,1	40,8	59,7	37	65	1	
22207EAW33	0,42	3 or 4	4,9	2	1,1	45,1	63	42	65	1	
22207EMW33	0,44	3 or 4	4,9	2	1,1	45,1	63	42	65	1	
10X22207EAW33EE	0,51	3 or 4	4,9	2	1,1	42,8	65,1	42	65,1	1	
21307EAW33	0,527	3 or 4	6,2	2,5	1,5	50,6	69	44	71	1,5	
22208EAW33	0,515	3 or 4	5,4	2,5	1,1	50,2	70,8	47	73	1	
22208EAW33ZZ	0,54	3 or 4	5,4	2,5	1,1	50,2	70,8	47	73	1	
22208EMW33	0,5	3 or 4	5,4	2,5	1,1	50,2	70,8	47	73	1	
10X22208EAW33EE	0,62	3 or 4	5,4	2,5	1,1	47,8	73,9	47	73,9	1	
21308V	0,715	0	-	-	1,5	53,5	75,4	49	81	1,5	
22308EAW33	1,006	3 or 4	5,9	3	1,5	52,5	77	49	81	1,5	
22308EMW33	1,021	3 or 4	5,9	3	1,5	52,5	77	49	81	1,5	
22308EF800	1,021	3 or 4	5,9	3	1,5	52,5	77	49	81	1,5	
22209EAW33	0,565	3 or 4	5,8	2,5	1,1	54,9	75,6	52	78	1	
22209EAW33ZZ	0,59	3 or 4	5,8	2,5	1,1	54,9	75,6	52	78	1	
22209EMW33	0,5	3 or 4	5,8	2,5	1,1	54,9	75,6	52	78	1	
10X22209EAW33EE	0,66	3 or 4	5,8	2,5	1,1	52,4	78,7	52	78,7	1	
21309EAW33	0,95	3 or 4	6,84	3	1,5	65	86,7	54	91	1,5	
22309EAW33	1,352	3 or 4	6,4	3	1,5	58	85,8	54	91	1,5	
22309EMW33	1,369	3 or 4	6,4	3	1,5	58	85,8	54	91	1,5	
22309EF800	1,369	3 or 4	6,4	3	1,5	58	85,8	54	91	1,5	
22210EAW33	0,603	3 or 4	5,8	2,5	1,1	59,5	80,7	57	83	1	
22210EAW33ZZ	0,63	3 or 4	5,8	2,5	1,1	59,5	80,7	57	83	1	
22210EMW33	0,585	3 or 4	5,8	2,5	1,1	59,5	80,7	57	83	1	
10X22210EAW33EE	0,7	3 or 4	5,8	2,5	1,1	57,1	82,2	57	83	1	
10X22210EAW33EEL	0,7	3 or 4	5,8	2,5	1,1	57,1	82,2	57	83	1	
21310V	1,251	0	-	-	2	66,8	92,4	61	99	2	
22310EAW33	1,81	3 or 4	7	3,5	2	63,8	93,2	61	99	2	
22310EMW33	1,834	3 or 4	7	3,5	2	63,8	93,2	61	99	2	
22310EF800	1,834	3 or 4	7	3,5	2	63,8	93,2	61	99	2	
22211EAW33	0,823	3 or 4	6,4	3	1,5	66	89,7	64	91	1,5	
22211EAW33ZZ	0,85	3 or 4	6,4	3	1,5	66	89,7	64	91	1,5	
22211EMW33	0,84	3 or 4	6,4	3	1,5	66	89,7	64	91	1,5	
10X22211EAW33EE	0,965	3 or 4	6,4	3	1,5	63,4	93,9	63,4	93,9	1,5	
10X22211EAW33EEL	0,965	3 or 4	6,4	3	1,5	63,4	93,9	63,4	93,9	1,5	
21311V	1,537	0	-	-	2	73,6	102	66	109	2	
22311EAW33	2,29	3 or 4	7,8	3,5	2	68,7	102,9	66	109	2	
22311EMW33	2,34	3 or 4	7,8	3,5	2	68,7	102,9	66	109	2	
22311EF800	2,34	3 or 4	7,8	3,5	2	68,7	102,9	66	109	2	

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2			Y_0
mm							kN							
60	110	28	*	22212EAW33	22,1	187	181	0,24	2,84	4,23	2,78	5600	7500	
	110	28	*	22212EAW33ZZ	22,1	187	181	0,24	2,84	4,23	2,78	5600	7500	
	110	28	*	22212EMW33	20,9	179	171	0,24	2,84	4,23	2,78	5700	7500	
	110	28	*	22212EF800	20,9	179	171	0,24	2,84	4,23	2,78	5700	7500	
	110	34	*	10X22212EAW33EE	22,1	187	181	0,24	2,84	4,23	2,78		1600	
	110	34	*	10X22212EAW33EEL	22,1	187	181	0,24	2,84	4,23	2,78		1600	
	130	31	*	21312V	22,7	192	186	0,24	2,82	4,19	2,75	4700	6400	
	130	46	*	22312EAW33	38,9	340	319	0,35	1,95	2,9	1,91	4300	5100	
	130	46	*	22312EMW33	38,9	340	319	0,35	1,95	2,9	1,91	4300	5100	
130	46	*	22312EF800	38,9	340	319	0,35	1,95	2,9	1,91	4300	5100		
65	120	31	*	22213EAW33	27,3	226	224	0,24	2,79	4,15	2,73	5300	6900	
	120	31	*	22213EAW33ZZ	27,3	226	224	0,24	2,79	4,15	2,73	5300	6900	
	120	31	*	22213EMW33	25,9	217	212	0,24	2,79	4,15	2,73	5300	6900	
	120	38	*	10X22213EAW33EE	27,3	226	224	0,24	2,79	4,15	2,73		1500	
	120	38	*	10X22213EAW33EEL	27,3	226	224	0,24	2,79	4,15	2,73		1500	
	140	33	*	21313V	25,8	224	215	0,23	2,91	4,33	2,84	4400	5900	
	140	48	*	22313EAW33	41,2	369	343	0,33	2,06	3,06	2,01	4000	4800	
	140	48	*	22313EMW33	41,2	369	343	0,33	2,06	3,06	2,01	4000	4800	
	140	48	*	22313EF800	41,2	369	343	0,33	2,06	3,06	2,01	4000	4800	
70	125	31	*	22214EAW33	29,3	235	240	0,22	3,01	4,48	2,94	4900	6500	
	125	31	*	22214EMW33	29,3	235	240	0,22	3,01	4,48	2,94	4900	6500	
	125	38	*	10X22214EAW33EE	29,3	235	240	0,22	3,01	4,48	2,94		1400	
	125	38	*	10X22214EAW33EEL	29,3	235	240	0,22	3,01	4,48	2,94		1400	
	150	35	*	21314V	28,3	246	240	0,23	2,9	4,31	2,83	4200	5500	
	150	51	*	22314EAW33	46,7	420	396	0,34	2	2,98	1,96	3800	4500	
	150	51	*	22314EMW33	46,7	420	396	0,34	2	2,98	1,96	3800	4500	
150	51	*	22314EF800	46,7	420	396	0,34	2	2,98	1,96	3800	4500		
75	130	31	*	22215EAW33	29,9	244	249	0,22	3,13	4,67	3,06	4600	6200	
	130	31	*	22215EAW33ZZ	29,9	244	249	0,22	3,13	4,67	3,06	4600	6200	
	130	31	*	22215EMW33	29,9	244	249	0,22	3,13	4,67	3,06	4600	6200	
	130	38	*	10X22215EAW33EE	29,9	244	249	0,22	3,14	4,67	3,07		1300	
	130	38	*	10X22215EAW33EEL	29,9	244	249	0,22	3,13	4,67	3,06		1300	
	160	37	*	21315V	31,7	280	274	0,23	2,93	4,37	2,87	4000	5200	
	160	55	*	22315EAW33	53,9	491	467	0,34	2	2,98	1,96	3600	4200	
	160	55	*	22315EMW33	53,9	491	467	0,34	2	2,98	1,96	3600	4200	
	160	55	*	22315EF800	53,9	491	467	0,34	2	2,98	1,96	3600	4200	
80	140	33	*	22216EAW33	33,8	278	287	0,22	3,14	4,67	3,07	4300	5800	
	140	33	*	22216EAW33ZZ	33,8	278	287	0,22	3,14	4,67	3,07	4300	5800	
	140	33	*	22216EMW33	32,0	267	272	0,22	3,13	4,67	3,06	4300	5800	
	140	33	*	22216EF800	32,0	267	272	0,22	3,13	4,67	3,06	4300	5800	
	140	40	*	10X22216EAW33EE	33,8	278	287	0,22	3,14	4,67	3,07		1200	
	140	40	*	10X22216EAW33EEL	33,8	278	287	0,22	3,14	4,67	3,07		1200	
	170	39	*	21316V	33,6	300	296	0,23	2,95	4,39	2,89	3800	4900	
	170	58	*	22316EAW33	59,1	541	522	0,34	2	2,98	1,96	3400	3900	
	170	58	*	22316EMW33	59,1	541	522	0,34	2	2,98	1,96	3400	3900	
	170	58	*	22316EF800	59,1	541	522	0,34	2	2,98	1,96	3400	3900	

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



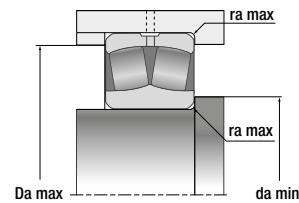
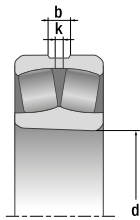
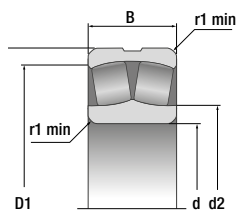
	Designations	Mass	Dimensions	Fitting dimensions			Fitting dimensions						
							kg	Number of lubrication holes on the outer ring	b	k	r ₁ min	d ₂	D ₁
				mm									
	22212EAW33	1,134	3 or 4	6,9	3	1,5	71,9	98,5	69	101	1,5		
	22212EAW33ZZ	1,176	3 or 4	6,9	3	1,5	71,9	98,5	69	101	1,5		
	22212EMW33	1,147	3 or 4	6,9	3	1,5	71,9	98,5	69	101	1,5		
	22212EF800	1,165	3 or 4	6,9	3	1,5	71,9	98,5	69	101	1,5		
	10X22212EAW33EE	1,33	3 or 4	6,9	3	1,5	69,2	102,5	69	102,5	1,5		
	10X22212EAW33EEL	1,33	3 or 4	6,9	3	1,5	69,2	102,5	69	102,5	1,5		
	21312V	1,986	0	-	-	2,1	79,5	109,9	72	118	2		
	22312EAW33	2,804	3 or 4	8,7	4	2,1	75,3	111,9	72	118	2		
	22312EMW33	2,892	3 or 4	8,7	4	2,1	75,3	111,9	72	118	2		
	22312EF800	2,892	3 or 4	8,7	4	2,1	75,3	111,9	72	118	2		
	22213EAW33	1,512	3 or 4	7,8	3,5	1,5	78,2	107	74	111	1,5		
	22213EAW33ZZ	1,57	3 or 4	7,8	3,5	1,5	78,2	107	74	111	1,5		
	22213EMW33	1,589	3 or 4	7,8	3,5	1,5	78,2	107	74	111	1,5		
	10X22213EAW33EE	1,908	3 or 4	7,8	3,5	1,5	75,3	116,4	74	116,5	1,5		
	10X22213EAW33EEL	1,93	3 or 4	7,8	3,5	1,5	75,3	116,4	74	111	1,5		
	21313V	2,41	0	-	-	2,1	85,8	119,7	77	128	2		
	22313EAW33	3,413	3 or 4	9,2	4	2,1	81,3	121,2	77	128	2		
	22313EMW33	3,493	3 or 4	9,2	4	2,1	81,3	121,2	77	128	2		
	22313EF800	3,493	3 or 4	9,2	4	2,1	81,3	121,2	77	128	2		
	22214EAW33	1,586	3 or 4	7,4	3,5	1,5	84,1	112,7	79	116	1,5		
	22214EMW33	1,52	3 or 4	7,4	3,5	1,5	84,1	112,7	79	116	1,5		
	10X22214EAW33EE	1,89	3 or 4	7,4	3,5	1,5	81,2	117,1	79	117,1	1,5		
	10X22214EAW33EEL	1,89	3 or 4	7,4	3,5	1,5	81,2	117,1	79	117,1	1,5		
	21314V	2,99	0	-	-	2,1	91,3	126,8	82	138	2		
	22314EAW33	4,176	3 or 4	10,4	5	2,1	86	128,7	82	138	2		
	22314EMW33	4,274	3 or 4	10,4	5	2,1	86	128,7	82	138	2		
	22314EF800	4,274	3 or 4	10,4	5	2,1	86	128,7	82	138	2		
	22215EAW33	1,644	3 or 4	7,4	3,5	1,5	88,4	117,8	84	121	1,5		
	22215EAW33ZZ	1,72	3 or 4	7,4	3,5	1,5	88,4	117,8	84	121	1,5		
	22215EMW33	1,72	3 or 4	7,4	3,5	1,5	88,4	117,8	84	121	1,5		
	10X22215EAW33EE	1,95	3 or 4	7,4	3,5	1,5	85,1	121,6	84	121,6	1,5		
	10X22215EAW33EEL	1,92	3 or 4	7,4	3,5	1,5	85,1	121,6	84	121	1,5		
	21315V	3,59	0	-	-	2,1	97,7	136	87	148	2		
	22315EAW33	5,083	3 or 4	10,5	5	2,1	91,9	138,3	87	148	2		
	22315EMW33	5,21	3 or 4	10,5	5	2,1	91,9	138,3	87	148	2		
	22315EF800	5,21	3 or 4	10,5	5	2,1	91,9	138,3	87	148	2		
	22216EAW33	2,071	3 or 4	7,87	3,5	2	94	127	91	129	2		
	22216EAW33ZZ	2,152	3 or 4	7,87	3,5	2	94	127	91	129	2		
	22216EMW33	2,157	3 or 4	7,9	3,5	2	94,9	126,7	91	129	2		
	22216EF800	2,071	3 or 4	7,9	3,5	2	94,9	126,7	91	129	2		
	10X22216EAW33EE	2,43	3 or 4	7,9	3,5	2	91,3	131,5	91	131,5	2		
	10X22216EAW33EEL	2,43	3 or 4	7,9	3,5	2	91,3	131,5	91	129	2		
	21316V	4,26	0	-	-	2,1	104,3	144,6	92	158	2		
	22316EAW33	6,03	3 or 4	10,5	5	2,1	98,6	147,4	92	158	2		
	22316EMW33	6,2	3 or 4	10,5	5	2,1	98,6	147,4	92	158	2		
	22316EF800	6,2	3 or 4	10,5	5	2,1	98,6	147,4	92	158	2		

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2	Y_0	rpm	
mm							kN							
85	150	36	*	22217EAW33	38,0	324	330	0,22	3,07	4,58	3,01	4100	5400	
	150	36	*	22217EAW33ZZ	38,0	324	330	0,22	3,07	4,58	3,01	4100	5400	
	150	36	*	22217EMW33	38,0	324	330	0,22	3,07	4,58	3,01	4100	5400	
	150	44	*	10X22217EAW33EE	38,0	324	330	0,22	3,07	4,57	3		1100	
	150	44	*	10X22217EAW33EEL	38,0	324	330	0,22	3,07	4,57	3		1100	
	180	41	*	21317VM	38,4	341	344	0,23	2,99	4,46	2,93	3600	4600	
	180	60	*	22317EAW33	67,0	599	604	0,32	2,09	3,11	2,04	3200	3600	
	180	60	*	22317EMW33	67,0	599	604	0,32	2,09	3,11	2,04	3200	3600	
180	60	*	22317EF800	67,0	599	604	0,32	2,09	3,11	2,04	3200	3600		
90	160	40	*	22218EAW33	45,2	384	398	0,23	2,9	4,31	2,83	3900	5100	
	160	40	*	22218EAW33ZZ	45,2	384	398	0,23	2,9	4,31	2,83	3900	5100	
	160	40	*	22218EMW33	45,2	384	398	0,23	2,9	4,31	2,83	3900	5100	
	160	40	*	22218EF800	45,2	384	398	0,23	2,9	4,31	2,83	3900	5100	
	160	48	*	10X22218EAW33EE	45,2	384	398	0,23	2,9	4,31	2,83		1100	
	160	48	*	10X22218EAW33EEL	45,2	384	398	0,23	2,9	4,31	2,83		1100	
	190	43	*	21318VM	41,3	370	377	0,22	3	4,47	2,93	3400	4300	
	190	64	*	22318EAW33	71,4	668	652	0,33	2,06	3,07	2,01	3000	3500	
	190	64	*	22318EMW33	71,4	668	652	0,33	2,06	3,07	2,01	3000	3500	
	190	64	*	22318EF800	71,4	668	652	0,33	2,06	3,07	2,01	3000	3500	
	160	52,4	*	23218EAW33	58,3	467	513	0,3	2,25	3,34	2,2	2900	3700	
	160	52,4	*	23218EMW33	58,3	467	513	0,3	2,25	3,34	2,2	2900	3700	
95	170	43	*	22219EAW33	46,5	416	417	0,23	2,95	4,4	2,89	3800	4800	
	170	43	*	22219EMW33	46,5	416	417	0,23	2,95	4,4	2,89	3800	4800	
	170	51	*	10X22219EAW33EE	46,5	416	417	0,23	2,95	4,4	2,89		1000	
	200	45	*	21319D1	54,0	375	420	0,23	3	4,46	2,93			
	200	67	*	22319EAW33	80,6	732	750	0,32	2,09	3,11	2,04	2800	3300	
	200	67	*	22319EMW33	80,6	732	750	0,32	2,09	3,11	2,04	2800	3300	
	200	67	*	22319EF800	80,6	732	750	0,32	2,09	3,11	2,04	2800	3300	
100	150	50	*	24020EAW33	54,4	361	479	0,29	2,35	3,5	2,3	3000	4100	
	165	52	*	23120EAW33	62,8	464	563	0,28	2,39	3,56	2,34	3200	3900	
	165	52	*	23120EMW33	64,1	471	575	0,28	2,39	3,56	2,34	3200	3900	
	180	46	*	22220EAW33	54,3	472	495	0,24	2,84	4,23	2,78	3600	4600	
	180	46	*	22220EAW33ZZ	54,3	472	495	0,24	2,84	4,23	2,78	3600	4600	
	180	46	*	22220EMW33	54,3	472	495	0,24	2,84	4,23	2,78	3600	4600	
	180	46	*	22220EF800	54,3	472	495	0,24	2,84	4,23	2,78	3600	4600	
	180	55	*	10X22220EAW33EE	54,3	472	495	0,24	2,84	4,23	2,78		1000	
	180	60,3	*	23220EAW33	72,3	586	661	0,31	2,18	3,24	2,13	2600	3300	
	180	60,3	*	23220EMW33	72,3	586	661	0,31	2,18	3,24	2,13	2600	3300	
	215	47	*	21320D1	42,5	410	465	0,22	3,01	4,48	2,94			
	215	73	*	22320EAW33	88,9	827	844	0,34	1,98	2,94	1,93	2600	3100	
	215	73	*	22320EMW33	88,9	827	844	0,34	1,98	2,94	1,93	2600	3100	
	215	73	*	22320EF800	88,9	827	844	0,34	1,98	2,94	1,93	2600	3100	
110	170	45	*	23022EAW33	56,7	417	517	0,23	2,95	4,4	2,89	3500	4200	
	170	45	*	23022EMW33	56,7	417	517	0,23	2,95	4,4	2,89	3500	4200	
	170	60	*	24022EAW33	72,9	518	663	0,31	2,15	3,2	2,1	2800	3700	
	170	60	*	24022EMW33	72,9	518	663	0,31	2,15	3,2	2,1	2800	3700	
	180	56	*	23122EAW33	72,7	547	669	0,28	2,43	3,61	2,37	3000	3500	
	180	56	*	23122EMW33	72,7	547	669	0,28	2,43	3,61	2,37	3000	3500	
	180	69	*	24122EAW33	83,7	622	769	0,36	1,9	2,83	1,86	2200	2900	
	200	53	*	22222EAW33	68,4	602	643	0,25	2,69	4	2,63	3300	4100	
	200	53	*	22222EMW33	68,4	602	643	0,25	2,69	4	2,63	3300	4100	
	200	53	*	22222EF800	68,4	602	643	0,25	2,69	4	2,63	3300	4100	
	200	69,8	*	23222EAW33	92,3	752	869	0,32	2,12	3,15	2,07	2300	3000	
	200	69,8	*	23222EMW33	92,3	752	869	0,32	2,12	3,15	2,07	2300	3000	
	240	50	*	21322D1	61,5	550	615	0,21	3,2	4,77	3,13			
	240	80	*	22322EAW33	99,4	975	972	0,32	2,09	3,11	2,04	2300	2800	
	240	80	*	22322EMW33	99,4	975	972	0,32	2,09	3,11	2,04	2300	2800	
	240	80	*	22322EF800	99,4	975	972	0,32	2,09	3,11	2,04	2300	2800	

Bearings available with cylindrical and tapered bores Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



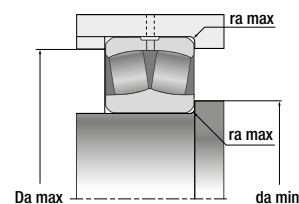
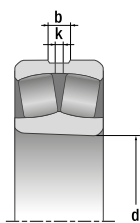
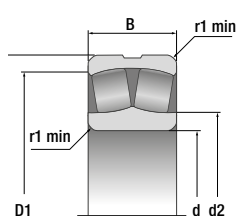
	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max
				mm					mm		
	22217EAW33	2,56	3 or 4	7,9	3,5	2	100,7	136,5	96	139	2
	22217EAW33ZZ	2,64	3 or 4	7,9	3,5	2	100,7	136,5	96	139	2
	22217EMW33	2,6	3 or 4	7,9	3,5	2	100,7	136,5	96	139	2
	10X22217EAW33EE	2,99	3 or 4	7,9	3,5	2	97,2	140,8	96	140,8	2
	10X22217EAW33EEL	2,99	3 or 4	7,9	3,5	2	97,2	140,8	96	140,8	2
	21317VM	5,16	0	-	-	3	111	153,1	99	166	2,5
	22317EAW33	7,061	3 or 4	11	5	3	107,9	156,7	99	166	2,5
	22317EMW33	7,16	3 or 4	11	5	3	107,9	156,7	99	166	2,5
	22317EF800	7,16	3 or 4	11	5	3	107,9	156,7	99	166	2,5
	22218EAW33	3,283	3 or 4	10,2	4,5	2	105,3	143,2	101	149	2
	22218EAW33ZZ	3,39	3 or 4	10,2	4,5	2	105,3	143,2	101	149	2
	22218EMW33	3,3	3 or 4	10,2	4,5	2	105,3	143,2	101	149	2
	22218EF800	3,283	3 or 4	10,2	4,5	2	105,3	143,2	101	149	2
	10X22218EAW33EE	3,71	3 or 4	10,2	4,5	2	101,9	147,4	101	149	2
	10X22218EAW33EEL	3,71	3 or 4	10,2	4,5	2	101,9	147,4	101	149	2
	21318VM	6,03	0	-	-	3	117,6	161,5	104	176	2,5
	22318EAW33	8,285	3 or 4	11,6	5	3	110,1	165,1	104	176	2,5
	22318EMW33	8,501	3 or 4	11,6	5	3	110,1	165,1	104	176	2,5
	22318EF800	8,501	3 or 4	11,6	5	3	110,1	165,1	104	176	2,5
	23218EAW33	4,43	3 or 4	8,9	4	2	104,3	141	101	149	2
	23218EMW33	4,42	3 or 4	8,9	4	2	104,3	141	101	149	2
	22219EAW33	3,95	3 or 4	9,9	4,5	2,1	110,8	152,8	107	158	2
	22219EMW33	4,09	3 or 4	9,9	4,5	2,1	110,8	152,8	107	158	2
	10X22219EAW33EE	4,45	3 or 4	9,9	4,5	2,1	107,3	156,4	107	158	2
	21319D1	7,1	4	7	4	3	131,4	171	109	186	2,5
	22319EAW33	9,82	3 or 4	12,1	6	3	120	174	109	186	2,5
	22319EMW33	10,06	3 or 4	12,1	6	3	120	174	109	186	2,5
	22319EF800	10	3 or 4	12,1	6	3	120	174	109	186	2,5
	24020EAW33	2,96	3 or 4	6,1	2,5	1,5	111,1	135,3	107	143	1,5
	23120EAW33	4,34	3 or 4	8,4	4	2	114,7	146,9	111	154	2
	23120EMW33	5	3 or 4	8,4	4	2	114,6	146,9	111	154	2
	22220EAW33	4,815	3 or 4	11,2	5	2,1	118,2	160,8	112	168	2
	22220EAW33ZZ	4,989	3 or 4	11,2	5	2,1	118,2	160,8	112	168	2
	22220EMW33	4,76	3 or 4	11,2	5	2,1	118,2	160,8	112	168	2
	22220EF800	4,815	3 or 4	11,2	5	2,1	118,2	160,8	112	168	2
	10X22220EAW33EE	5,58	3 or 4	11,2	5	2,1	114,4	166,4	112	168	2
	23220EAW33	6,4	3 or 4	9,4	4,5	2,1	118,2	158,9	112	168	2
	23220EMW33	6,53	3 or 4	9,4	4,5	2,1	118,2	158,9	112	168	2
	21320D1	8,89	4	9	5	3	137	178,7	114	201	2,5
	22320EAW33	12,47	3 or 4	13,3	6	3	126,7	186,7	114	201	2,5
	22320EMW33	12,776	3 or 4	13,3	6	3	126,7	186,7	114	201	2,5
	22320EF800	12,776	3 or 4	13,3	6	3	126,7	186,7	114	201	2,5
	23022EAW33	3,55	3 or 4	7,8	3,5	2	123,8	154,6	118,8	161,2	2
	23022EMW33	3,62	3 or 4	7,8	3,5	2	123,8	154,6	118,8	161,2	2
	24022EAW33	4,8	3 or 4	7,2	3	2	120,5	151,6	118,8	161,2	2
	24022EMW33	4,8	3 or 4	7,21	3	2	0	151,6	118,8	161,2	2
	23122EAW33	5,48	3 or 4	8,9	4	2	125,3	160,9	121	169	2
	23122EMW33	5,51	3 or 4	8,9	4	2	125,3	160,9	121	169	2
	24122EAW33	6,68	3 or 4	8,4	4	2	121,7	157,2	121	169	2
	22222EAW33	6,929	3 or 4	12,2	6	2,1	130,1	178,4	122	188	2
	22222EMW33	7,224	3 or 4	12,2	6	2,1	130,1	178,4	122	188	2
	22222EF800	6,929	3 or 4	12,2	6	2,1	130,1	178,4	122	188	2
	23222EAW33	9,25	3 or 4	10,5	5	2,1	130,2	175,8	122	188	2
	23222EMW33	9,39	3 or 4	10,5	5	2,1	130,2	175,8	122	188	2
	21322D1	11,2	4	9	5	3	150,2	202,7	124	226	2,5
	22322EAW33	16,87	3 or 4	15,6	7	3	138,9	208,1	124	226	2,5
	22322EMW33	17,406	3 or 4	15,6	7	3	138,9	208,1	124	226	2,5
	22322EF800	17,406	3 or 4	15,6	7	3	138,9	208,1	124	226	2,5

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C _u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C ₀	e	Y ₁	Y ₂			Y ₀
mm							kN							
120	180	46	*	23024EAW33	51,7	446	577	0,22	3,14	4,67	3,07	3300	3900	
	180	55	*	10X23024EAW33EEL	51,7	446	446	0,22	3,14	4,67	3,07	446	850	
	180	46	*	23024EMW33	51,7	446	577	0,22	3,14	4,67	3,07	3300	3900	
	180	60	*	24024EAW33	76,0	535	705	0,3	2,28	3,39	2,23	2500	3400	
	180	60	*	24024EAW33ZZ	76,0	535	535	0,3	2,28	3,39	2,23	2500	3400	
	200	62	*	23124EAW33	62,3	663	820	0,28	2,43	3,61	2,37	2600	3200	
	200	62	*	23124EMW33	62,3	663	820	0,28	2,43	3,61	2,37	2600	3200	
	200	80	*	24124EAW33	60,2	749	950	0,39	1,74	2,59	1,7	2000	2600	
	215	58	*	22224EAW33	71,3	688	753	0,25	2,74	4,08	2,68	3000	3800	
	215	58	*	22224EMW33	71,3	688	753	0,25	2,74	4,08	2,68	3000	3800	
	215	76	*	23224EAW33	72,4	857	998	0,32	2,09	3,11	2,04	2100	2800	
	215	76	*	23224EMW33	72,4	857	998	0,32	2,09	3,11	2,04	2100	2800	
	260	86	*	22324EAW33	96,2	1170	1280	0,32	2,09	3,11	2,04	2000	2500	
	130	200	52	*	23026EAW33	75,3	565	721	0,22	3,01	4,48	2,94	3000	3600
200		52	*	23026EMW33	75,3	565	721	0,22	3,01	4,48	2,94	3000	3600	
200		69	*	24026EAW33	95,1	684	909	0,31	2,18	3,25	2,13	2300	3100	
210		64	*	23126EAW33	93,7	710	906	0,27	2,51	3,74	2,46	2400	3000	
210		64	*	23126EMW33	93,7	710	906	0,27	2,51	3,74	2,46	2400	3000	
210		80	*	24126EAW33	111,0	795	1070	0,34	1,96	2,92	1,92	1800	2400	
230		64	*	22226EAW33	91,4	808	898	0,25	2,69	4	2,63	2800	3600	
230		64	*	22226EMW33	91,4	808	898	0,25	2,69	4	2,63	2800	3600	
230		80	*	23226EAW33	115,0	958	1130	0,32	2,12	3,15	2,07	1900	2600	
230		80	*	23226EMW33	115,0	958	1130	0,32	2,12	3,15	2,07	1900	2600	
280		93	*	22326EAW33	136,0	1330	1400	0,33	2,06	3,06	2,01	1800	2400	
280		93	*	22326EMW33	136,0	1330	1400	0,33	2,06	3,06	2,01	1800	2400	
280		93	*	22326EF800	136,0	1330	1400	0,33	2,06	3,06	2,01	1800	2400	
140		210	53	*	23028EAW33	80,4	597	783	0,22	3,14	4,67	3,07	2800	3400
	210	53	*	23028EMW33	80,4	597	783	0,22	3,14	4,67	3,07	2800	3400	
	210	69	*	24028EAW33	98,6	704	958	0,28	2,39	3,56	2,34	2100	2900	
	225	68	*	23128EAW33	104,0	802	1030	0,26	2,55	3,8	2,5	2200	2800	
	225	68	*	23128EMW33	104,0	802	1030	0,26	2,55	3,8	2,5	2200	2800	
	225	85	*	24128EAW33	130,0	951	1280	0,34	1,98	2,94	1,93	1600	2300	
	250	68	*	22228EAW33	100	867	1010	0,25	2,74	4,08	2,68	2500	3300	
	250	68	*	22228EMW33	100	867	1010	0,25	2,74	4,08	2,68	2500	3300	
	250	88	*	23228EAW33	136,0	1140	1370	0,33	2,06	3,06	2,01	1700	2400	
	250	88	*	23228EMW33	136,0	1140	1370	0,33	2,06	3,06	2,01	1700	2400	
	300	102	*	22328EAW33	163,0	1540	1720	0,33	2,03	3,02	1,98	1600	2200	
	300	102	*	22328EMW33	163,0	1540	1720	0,33	2,03	3,02	1,98	1600	2200	
	300	102	*	22328EF800	163,0	1540	1720	0,33	2,03	3,02	1,98	1600	2200	
	150	225	56	*	23030EAW33	89,7	660	893	0,21	3,2	4,77	3,13	2600	3100
225		56	*	23030EMW33	89,7	660	893	0,21	3,2	4,77	3,13	2600	3100	
225		75	*	24030EAW33	115,0	832	1140	0,3	2,25	3,34	2,2	1900	2700	
250		80	*	23130EAW33	133	1060	1350	0,29	2,35	3,5	2,3	2000	2600	
250		80	*	23130EMW33	133	1060	1350	0,29	2,35	3,5	2,3	2000	2600	
250		100	*	24130EAW33	138,0	1120	1400	0,38	1,78	2,66	1,74	1600	2000	
270		73	*	22230EAW33	118,0	1080	1220	0,25	2,74	4,08	2,68	2200	3000	
270		73	*	22230EMW33	118,0	1080	1220	0,25	2,74	4,08	2,68	2200	3000	
270		96	*	23230EAW33	157,0	1340	1620	0,33	2,03	3,02	1,98	1500	2200	
270		96	*	23230EMW33	157,0	1340	1620	0,33	2,03	3,02	1,98	1500	2200	
320		108	*	22330EAW33	177,0	1740	1890	0,34	2	2,98	1,96	1500	2100	
320		108	*	22330EF800	177,0	1740	1890	0,34	2	2,98	1,96	1500	2100	
160		220	45	*	23932EMD1	45,6	455	683	0,17	3,9	5,81	3,81		
		240	60	*	23032EAW33	98,6	748	1000	0,21	3,2	4,77	3,13	2400	2900
	240	60	*	23032EMW33	98,6	748	1000	0,21	3,2	4,77	3,13	2400	2900	
	240	80	*	24032EAW33	130,0	953	1320	0,29	2,32	3,45	2,26	1800	2600	
	270	86	*	23132EAW33	152,0	1220	1580	0,29	2,35	3,5	2,3	1800	2400	
	270	86	*	23132EMW33	152,0	1220	1580	0,29	2,35	3,5	2,3	1800	2400	
	270	109	*	24132EAW33	168,0	1330	1740	0,38	1,76	2,62	1,72	1400	1900	
	290	80	*	22232EAW33	132,0	1220	1390	0,25	2,69	4	2,63	2000	2800	
	290	80	*	22232EMW33	132,0	1220	1390	0,25	2,69	4	2,63	2000	2800	
	290	104	*	23232EAW33	180,0	1550	1890	0,33	2,03	3,02	1,98	1400	2100	
	290	104	*	23232EMW33	180,0	1550	1890	0,33	2,03	3,02	1,98	1400	2100	
	340	114	*	22332EAW33	202,0	1950	2210	0,33	2,03	3,02	1,98	1400	1900	
	340	114	*	22332EF800	202,0	1950	2210	0,33	2,03	3,02	1,98	1400	1900	

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



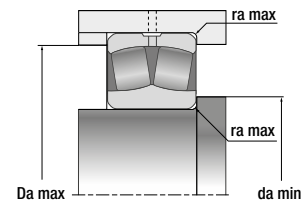
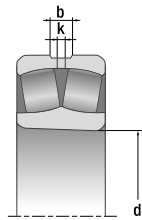
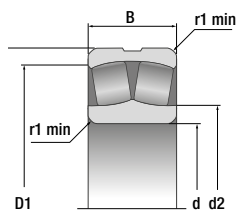
	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max
				mm							
23024EAW33	3,99	3	7,8	3,5	2	134	164,9	128,8	171,2	2	
10X23024EAW33EEL	4,51	3	7,8	3,5	2	130,1	170,8	128,8	171,2	2	
23024EMW33	3,99	3	7,8	3,5	2	134	164,9	128,8	171,2	2	
24024EAW33	5,1	3	6,4	3,5	2	130,6	162,2	128,8	171,2	2	
24024EAW33ZZ	5,14	3	6,4	3,5	2	130,6	162,2	128,8	171,2	2	
23124EAW33	7,67	3	10	4,5	2	138,9	178,4	131	189	2	
23124EMW33	7,76	3	10	4,5	2	138,9	178,4	131	189	2	
24124EAW33	10	3	10	4,5	2	133,2	171,8	131	189	2	
22224EAW33	8,693	3	12,2	6	2,1	141,9	192,3	132	203	2	
22224EMW33	8,78	3	12,2	6	2,1	141,9	192,3	132	203	2	
23224EAW33	11,89	3	11	5	2,1	139,9	189	132	203	2	
23224EMW33	11,624	3	11	5	2,1	139,9	189	132	203	2	
22324EAW33	22,17	3	18	8	3	156,9	224	134	246	2,5	
23026EAW33	5,81	3 or 4	8,9	4	2	146	182,6	138,8	191,2	2	
23026EMW33	5,87	3 or 4	8,9	4	2	146	182,6	138,8	191,2	2	
24026EAW33	7,5	3 or 4	8,34	4	2	143	178,6	138,8	191,2	2	
23126EAW33	8,4	3 or 4	10	4,5	2	148,5	188,3	141	199	2	
23126EMW33	8,5	3 or 4	10	4,5	2	148,5	188,3	141	199	2	
24126EAW33	10,5	3 or 4	10,32	4,5	2	146	183,2	141	199	2	
22226EAW33	10,771	3 or 4	13,2	6	3	151,4	205,4	144	216	2,5	
22226EMW33	10,9	3 or 4	13,2	6	3	151,4	205,4	144	216	2,5	
23226EAW33	13,64	3 or 4	11,6	5	3	150,7	202,7	144	216	2,5	
23226EMW33	13,77	3 or 4	11,6	5	3	150,7	202,7	144	216	2,5	
22326EAW33	26,917	3 or 4	18,9	9	4	164,7	243	147	263	3	
22326EMW33	27,9	3 or 4	18,9	9	4	164,7	243	147	263	3	
22326EF800	27,9	3 or 4	18,9	9	4	164,7	243	147	263	3	
23028EAW33	6,33	3 or 4	8,9	4	2	155,6	192,7	148,8	201,2	2	
23028EMW33	6,44	3 or 4	8,9	4	2	155,6	192,7	148,8	201,2	2	
24028EAW33	8,03	3 or 4	8,9	4	2	152,9	188,2	148,8	201,2	2	
23128EAW33	10,9	3 or 4	10,5	5	2,1	159,3	202	152	213	2	
23128EMW33	11,3	3 or 4	10,5	5	2,1	159,3	202	152	213	2	
24128EAW33	12,77	3 or 4	10,05	4,5	2,1	156,2	197,6	152	213	2	
22228EAW33	14,2	3 or 4	14,2	7	3	163,9	223,9	154	236	2,5	
22228EMW33	14,4	3 or 4	14,2	7	3	163,9	223,9	154	236	2,5	
23228EAW33	17,92	3 or 4	12,6	6	3	162,6	219,6	154	236	2,5	
23228EMW33	18,215	3 or 4	12,6	6	3	162,6	219,6	154	236	2,5	
22328EAW33	34,13	3 or 4	18,9	9	4	181,7	260,3	157	283	3	
22328EMW33	34,903	3 or 4	18,9	9	4	181,7	260,3	157	283	3	
22328EF800	34,903	3 or 4	18,9	9	4	181,7	260,3	157	283	3	
23030EAW33	7,62	3 or 4	10	4,5	2,1	168,5	206,6	160,2	214,8	2	
23030EMW33	7,75	3 or 4	10	4,5	2,1	168,5	206,6	160,2	214,8	2	
24030EAW33	10,04	3 or 4	8,9	4	2,1	162,9	202,8	160,2	214,8	2	
23130EAW33	15,72	3 or 4	12,6	6	2,1	171,9	222,4	162	238	2	
23130EMW33	15,72	3 or 4	12,6	6	2,1	171,9	222,4	162	238	2,1	
24130EAW33	19,9	3 or 4	10,4	5	2,1	165,8	218,1	162	238	2	
22230EAW33	17,8	3 or 4	15,3	7	3	177,3	241,1	164	256	2,5	
22230EMW33	17,992	3 or 4	15,3	7	3	177,3	241,1	164	256	2,5	
23230EAW33	23,52	3 or 4	13,7	6	3	174,6	236,6	164	256	2,5	
23230EMW33	23,52	3 or 4	13,7	6	3	174,6	236,6	164	256	2,5	
22330EAW33	41,96	3 or 8	19,9	9	4	201	278,3	167	303	3	
22330EMW33	41,96	3 or 8	19,9	9	4	201	278,3	167	303	3	
23932EMD1	4,9	3	9,5	4	2	181	201,7	168,8	211,2	2	
23032EAW33	9,3	3 or 4	10,5	5	2,1	178,5	220,2	170,2	229,8	2	
23032EMW33	9,58	3 or 4	10,5	5	2,1	178,5	220,2	170,2	229,8	2	
24032EAW33	11,84	3 or 4	9,5	4,5	2,1	173,8	216,2	170,2	229,8	2	
23132EAW33	20,12	3 or 4	13,7	6	2,1	185,7	239,8	172	258	2	
23132EMW33	20,12	3 or 4	13,7	6	2,1	185,7	239,8	172	258	2	
24132EAW33	25,6	3 or 4	11,7	5	2,1	180,8	234,9	172	258	2	
22232EAW33	23	3 or 4	16,9	8	3	190	258,7	174	276	2,5	
22232EMW33	23,2	3 or 4	16,9	8	3	190	258,7	174	276	2,5	
23232EAW33	29,19	3 or 4	14,9	7	3	187,1	253,7	174	276	2,5	
23232EMW33	29,58	3 or 4	14,9	7	3	187,1	253,7	174	276	2,5	
22332EAW33	50,7	3 or 8	20,3	10	4	219	295,2	177	323	3	
22332EMW33	50,7	3 or 8	20,3	10	4	219	295,2	177	323	3	

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2			Y_0
mm							kN							
170	230	45	*	23934EMD1	69,7	468	723	0,16	4,11	6,12	4,02	2400	2900	
	260	67	*	23034EAW3ZZ	98,9	914	914	0,22	3,07	4,58	3,01	2200	2700	
	260	67	*	23034EMW33	98,9	914	1240	0,22	3,07	4,58	3,01	2200	2700	
	260	90	*	24034EAW33	97,4	1120	1580	0,31	2,21	3,29	2,16	1600	2400	
	280	88	*	23134EAW33	112	1270	1700	0,28	2,39	3,56	2,34	1700	2300	
	280	88	*	23134EMW33	112	1270	1700	0,28	2,39	3,56	2,34	1700	2300	
	280	109	*	24134EAW33	111	1370	1840	0,37	1,83	2,72	1,79	1300	1800	
	310	86	*	22234EMW33	136	1400	1610	0,26	2,6	3,87	2,54	1900	2700	
	310	110	*	23234EMW33	136	1700	2070	0,33	2,03	3,02	1,98	1300	1900	
	360	120	*	22334EMW33	175	2200	2630	0,32	2,09	3,11	2,04	1200	1800	
	360	120	*	22334EF800	175	2200	2630	0,32	2,09	3,11	2,04	1200	1800	
	180	250	52	*	23936EMD1	57,2	573	869	0,17	3,9	5,81	3,81		
280		74	*	23036EAW33	137,0	1080	1450	0,23	2,95	4,4	2,89	2000	2500	
280		74	*	23036EMW33	137,0	1080	1450	0,23	2,95	4,4	2,89	2000	2500	
280		100	*	24036EAW33	173,0	1270	1830	0,31	2,21	3,29	2,16	1500	2200	
300		96	*	23136EAW33	183,0	1490	1960	0,29	2,32	3,45	2,26	1600	2100	
300		96	*	23136EMW33	183,0	1490	1960	0,29	2,32	3,45	2,26	1600	2100	
300		118	*	24136EAW33	192,0	1550	2050	0,38	1,78	2,66	1,74	1200	1700	
320		86	*	22236EMW33	153,0	1450	1660	0,25	2,74	4,08	2,68	1800	2600	
320		112	*	23236EF800	209,0	1800	2270	0,33	2,06	3,06	2,01	1200	1900	
320		112	*	23236EMW33	209,0	1800	2270	0,33	2,06	3,06	2,01	1200	1900	
380		126	*	22336EF800	249,0	2420	2810	0,32	2,09	3,11	2,04	1200	1700	
380		126	*	22336EMW33	249,0	2420	2810	0,32	2,09	3,11	2,04	1200	1700	
190	260	52	*	23938EMD1	62,8	603	935	0,17	4,05	6,04	3,96			
	290	75	*	23038EAW33	147,0	1140	1570	0,22	3,01	4,48	2,94	1900	2400	
	290	75	*	23038EMW33	147,0	1140	1570	0,22	3,01	4,48	2,94	1900	2400	
	290	100	*	24038EMW33	169,0	1310	1800	0,31	2,15	3,2	2,1	1500	2100	
	320	104	*	23138EMW33	206,0	1670	2250	0,29	2,32	3,45	2,26	1500	2000	
	320	128	*	24138EAW33	228,0	1850	2480	0,38	1,76	2,62	1,72	1100	1600	
	340	92	*	22238EMW33	169,0	1620	1870	0,25	2,74	4,08	2,68	1600	2400	
	340	120	*	23238EMW33	225,0	1990	2480	0,33	2,03	3,02	1,98	1200	1800	
	400	132	*	22338EF800	272,0	2600	3120	0,32	2,12	3,15	2,07	1100	1600	
	400	132	*	22338EMW33	272,0	2600	3120	0,32	2,12	3,15	2,07	1100	1600	
	200	280	60	*	23940EMD1	71,8	766	1190	0,18	3,76	5,59	3,67		
		310	82	*	23040EAW33	164,0	1310	1790	0,23	2,95	4,4	2,89	1800	2300
310		82	*	23040EMW33	164,0	1310	1790	0,23	2,95	4,4	2,89	1800	2300	
310		109	*	24040EMW33	195,0	1520	2120	0,33	2,06	3,07	2,01	1400	2000	
340		112	*	23140EMW33	226,0	1890	2510	0,3	2,25	3,34	2,2	1400	1900	
340		140	*	24140EMW33	265,0	2130	2930	0,39	1,74	2,59	1,7	1000	1500	
360		98	*	22240EMW33	187,0	1810	2100	0,25	2,74	4,08	2,68	1500	2300	
360		128	*	23240EMW33	253,0	2250	2840	0,34	1,98	2,94	1,93	1100	1700	
420		138	*	22340EF800	302,0	2830	3530	0,31	2,15	3,2	2,1	1000	1500	
420		138	*	22340EMW33	302,0	2830	3530	0,31	2,15	3,2	2,1	1000	1500	
220		300	60	*	23944EMW33	111,0	741	1210	0,18	3,76	5,59	3,67	1800	2200
		340	90	*	23044EMW33	188,0	1530	2110	0,23	2,95	4,4	2,89	1600	2100
	340	118	*	24044EAW33	246,0	1930	2750	0,31	2,18	3,25	2,13	1200	1800	
	340	118	*	24044EMW33	246,0	1930	2750	0,31	2,18	3,25	2,13	1200	1800	
	370	120	*	23144EMW33	258,0	2190	2940	0,3	2,28	3,39	2,23	1200	1700	
	370	150	*	24144EMW33	311,0	2600	3540	0,39	1,74	2,59	1,7	850	1400	
	400	108	*	22244EMW33	232,0	2210	2690	0,25	2,74	4,08	2,68	1300	2000	
	400	144	*	23244EMW33	330,0	2890	3830	0,34	2	2,98	1,96	850	1500	
	460	145	*	22344EMD1	163,0	3010	3560	0,32	2,1	3,13	2,06			
	240	320	60	*	23948EMD1	87,7	815	1190	0,15	4,4	6,56	4,31		
360		92	*	23048EMW33	205,0	1630	2350	0,22	3,07	4,58	3,01	1400	2000	
360		118	*	24048EMW33	267,0	2020	3050	0,29	2,32	3,45	2,26	1100	1700	
400		128	*	23148EMW33	299,0	2510	3500	0,29	2,32	3,45	2,26	1100	1600	
400		160	*	24148EAW33	342,0	2860	3990	0,35	1,92	2,86	1,88	800	1300	
440		120	*	22248EMD1	159	2470	3110	0,27	2,53	3,77	2,47			
440		160	*	23248EMD1	156	3140	4260	0,36	1,86	2,77	1,82			
500		155	*	22348EMD1	193,0	3500	4170	0,32	2,12	3,15	2,07			

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



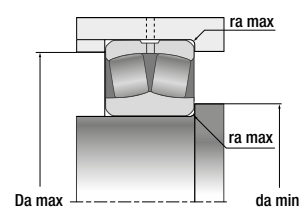
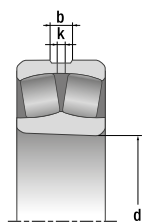
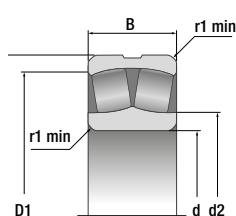
	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max
				mm					mm		
23934EMD1		5,2	3	9,8	4,5	2	185	215	178,8	221,2	2
23034EAW33ZZ		13	3	11,6	5	2,1	191,8	237,4	180,2	249,8	2
23034EMW33		13	3	11,6	5	2,1	191,8	237,4	180,2	249,8	2
24034EAW33		16,73	3	10,67	5	2,1	188	232,3	180,2	249,8	2
23134EAW33		21,55	3	13,7	6	2,1	196,2	249,7	182	268	2
23134EMW33		21,55	3	13,7	6	2,1	196,2	249,7	182	268	2
24134EAW33		26,6	3	13,2	6	2,1	189,5	243,6	182	268	2
22234EMW33		28,177	3	18	8	4	211,3	276,4	187	293	3
23234EMW33		35,7	3	16,35	8	4	210,4	271,2	187	293	3
22334EMW33		59	3	20,3	10	4	236	312,9	187	343	3
22334EF800		59	3	20,3	10	4	236	312,9	187	343	3
23936EMD1		7,95	4	9	5	2	199	232	188,8	241,2	2
23036EAW33		16,9	3 or 4	13,2	6	2,1	203,6	255	190,2	269,8	2
23036EMW33		16,9	3 or 4	13,2	6	2,1	203,6	255	190,2	269,8	2
24036EAW33		21,5	3 or 4	11,8	5	2,1	202,5	249	190,2	269,8	2
23136EAW33		27,21	3 or 4	14,9	7	3	206	266,8	194	286	2,5
23136EMW33		27,21	3 or 4	14,9	7	3	206	266,8	194	286	2,5
24136EAW33		33,9	3 or 4	14,1	6	3	200,8	260,4	194	286	2,5
22236EMW33		28,941	3 or 8	18	8	4	220,2	286,8	197	303	3
23236EF800		37,8	3 or 8	16,4	8	4	220	281,2	197	303	3
23236EMW33		37,8	3 or 8	16,4	8	4	210	281,2	197	303	3
22336EF800		70,2	3 or 8	20,9	10	4	241,8	328,2	197	363	3
22336EMW33		70,2	3 or 8	20,9	10	4	241,8	328,2	197	363	3
23938EMD1		8,34	4	9	5	2	209	243	198,8	251,2	2
23038EAW33		17,47	3 or 4	13,2	6	2,1	213,4	265,1	200,2	279,8	2
23038EMW33		17,97	3 or 4	13,2	6	2,1	213,4	265,1	200,2	279,8	2
24038EMW33		22,53	3 or 4	11,6	5	2,1	216,2	260,1	200,2	279,8	2
23138EMW33		33,5	3 or 8	16,55	8	3	230	283,8	204	306	2,5
24138EAW33		42,1	3 or 8	14,2	6	3	213	277,9	204	306	2,5
22238EMW33		35,314	3 or 8	19,6	9	4	232,8	304,8	207	323	3
23238EMW33		46	3 or 8	17,5	8	4	220,8	298,1	207	323	3
22338EF800		76,2	3 or 8	20,8	10	5	262,2	345,6	210	380	4
22338EMW33		81,6	3 or 8	20,8	10	5	262,2	345,6	210	380	4
23940EMD1		11,7	4	9	5	2,1	221	260	210,2	269,8	2
23040EAW33		22,5	3 or 4	14,28	7	2,1	227,3	282,3	210,2	299,8	2
23040EMW33		24,1	3 or 4	14,3	7	2,1	234,9	282,3	210,2	299,8	2
24040EMW33		29,2	3 or 4	12,7	6	2,1	229,7	283,3	210,2	299,8	2
23140EMW33		41,7	3 or 8	17,7	8	3	242	305,8	214	326	2,5
24140EMW33		51,3	3 or 8	17	8	3	236,8	291	214	326	2,5
22240EMW33		42,528	3 or 8	20	10	4	245,6	322,3	217	343	3
23240EMW33		55,8	3 or 8	18,8	9	4	244,8	314,8	217	343	3
22340EF800		95	8	21,1	10	5	280	363,1	220	400	4
22340EMW33		95	8	21,1	10	5	280	363,1	220	400	4
23944EMW33		12,4	3 or 8	13,7	6	2,1	247,7	277,5	230,2	289,8	2
23044EMW33		31,8	3 or 8	15,4	7	3	258,1	310	232,4	327,6	2,5
24044EAW33		37,8	3 or 8	14,1	6	3	250,2	303,4	232,4	327,6	2,5
24044EMW33		38,4	3 or 8	14,1	6	3	0	303,4	232,4	327,6	2,5
23144EMW33		52,21	3 or 8	19,1	9	4	263	327,9	237	353	3
24144EMW33		63,5	3 or 8	15,9	7	4	255,6	320,3	237	353	3
22244EMW33		59,474	3 or 8	20,6	11	4	276,3	357,7	237	383	3
23244EMW33		77,2	3 or 8	20	10	4	276,3	348,5	237	383	3
22344EMD1		119	8	20	12	5	277	388	240	440	5
23948EMD1		13,6	4	9	5	2,1	262	301	250,2	309,8	2
23048EMW33		32,7	3 or 8	16,4	8	3	276,7	328,9	252,4	347,6	2,5
24048EMW33		41,6	3 or 8	15,3	7	3	262	323	252,4	347,6	2,5
23148EMW33		64,72	3 or 8	19,6	9	4	288	355,3	257	383	3
24148EAW33		76,7	3 or 8	19,37	12	4	269	348,1	257	383	3
22248EMD1		82,6	8	16	10	4	288	383	257	423	4
23248EMD1		108	8	20	12	4	284	372	257	423	4
22348EMD1		149	8	20	12	5	299	421	260	480	5

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTRAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2			Y_0
mm							kN							
260	360	75	*	23952EMD1	105,0	1130	1940	0,17	3,9	5,81	3,81			
	400	104	*	23052EMW33	247,0	2060	2910	0,23	2,95	4,4	2,89	1300	1800	
	400	140	*	24052EAW33	325,0	2520	3820	0,31	2,16	3,22	2,12	950	1600	
	440	144	*	23152EMD1	160	2780	4020	0,31	2,15	3,2	2,1			
	440	180	*	24152EMD1	147,0	3290	4880	0,4	1,69	2,52	1,65			
	480	130	*	22252EMD1	183	2890	3680	0,27	2,53	3,77	2,47			
	480	174	*	23252EMD1	180	3650	5050	0,36	1,87	2,79	1,83			
	540	165	*	22352EMD1	221	4020	4830	0,31	2,16	3,22	2,12			
280	380	75	*	23956EMD1	115,0	1180	2050	0,16	4,16	6,2	4,07			
	420	106	*	23056EMW33	263,0	2170	3150	0,22	3,07	4,58	3	1200	1700	
	420	140	*	24056EMW33	344,0	2720	4120	0,3	2,25	3,34	2,2	900	1500	
	460	146	*	23156EMD1	182	2980	4400	0,3	2,23	3,32	2,18			
	460	180	*	24156EMD1	167	3550	5450	0,38	1,78	2,65	1,74			
	500	130	*	22256EMD1	198	3010	3920	0,25	2,69	4	2,63			
	500	176	*	23256EMD1	193,0	3810	5420	0,35	1,95	2,9	1,91			
	580	175	*	22356EMD1	249,0	4490	5450	0,31	2,18	3,24	2,13			
300	420	90	*	23960EMD1	145,0	1600	2620	0,2	3,42	5,09	3,34			
	460	118	*	23060EMD1	176	2400	3610	0,24	2,81	4,19	2,75			
	460	160	*	24060EMD1	166	3150	5190	0,33	2,04	3,04	2			
	500	160	*	23160EMD1	205,0	3540	5170	0,31	2,2	3,27	2,15			
	500	200	*	24160EMD1	198,0	4270	6610	0,39	1,74	2,59	1,7			
	540	140	*	22260EMD1	232	3470	4590	0,25	2,69	4	2,63			
	540	192	*	23260EMD1	228,0	4520	6280	0,35	1,92	2,86	1,88			
	320	440	90	*	23964EMD1	154	1670	2820	0,19	3,62	5,39	3,54		
480		121	*	23064EMD1	191	2540	4020	0,23	2,92	4,35	2,86			
480		160	*	24064EMD1	184,0	3250	5400	0,31	2,15	3,2	2,1			
540		176	*	23164EMD1	227,0	4020	6020	0,31	2,15	3,2	2,1			
540		218	*	24164EMD1	225,0	5010	7720	0,39	1,71	2,54	1,67			
580		150	*	22264EMD1	261	3950	5100	0,25	2,69	4	2,63			
580		208	*	23264EMD1	259,0	5230	7370	0,35	1,91	2,85	1,87			
340		460	90	*	23968EMD1	162,0	1710	2980	0,18	3,8	5,66	3,72		
	520	133	*	23068EMD1	219,0	2990	4690	0,24	2,87	4,27	2,8			
	520	180	*	24068EMD1	206	3910	6510	0,33	2,06	3,06	2,01			
	580	190	*	23168EMD1	257,0	4670	6870	0,32	2,12	3,15	2,07			
	580	243	*	24168EMD1	254,0	5980	9340	0,41	1,65	2,46	1,61			
	620	224		23268B	585	4950	8000	0,37	1,84	2,75	1,8			
	620	224		23268BL1	585	4950	8000	0,37	1,84	2,75	1,8			
	360	480	90	*	23972EMD1	171,0	1750	3090	0,17	4	5,96	3,91		
540		134	*	23072EMD1	232,0	3070	4910	0,23	2,98	4,44	2,92			
540		180	*	24072EMD1	220,0	4040	6840	0,31	2,16	3,22	2,12			
600		192		23172B	530,0	4200	7050	0,32	2,11	3,15	2,07			
600		192		23172BL1	530,0	4200	7050	0,32	2,11	3,15	2,07			
600		243		24172B	470	5100	9150	0,4	1,67	2,48	1,63			
600		243		24172BL1	470	5100	9150	0,4	1,67	2,48	1,63			
650		232		23272B	620	5400	8700	0,36	1,87	2,78	1,83			
650		232		23272BL1	620	5400	8700	0,36	1,87	2,78	1,83			
380		520	106	*	23976EMD1	205,0	2300	3920	0,18	3,66	5,46	3,58		
	560	135	*	23076EMD1	247,0	3230	5270	0,22	3,07	4,57	3			
	560	180	*	24076EMD1	240	4140	7280	0,3	2,25	3,34	2,2			
	620	194		23176B	560	4350	7500	0,31	2,16	3,22	2,12			
	620	194		23176BL1	560	4350	7500	0,31	2,16	3,22	2,12			
	620	243		24176B	570	5350	9650	0,39	1,73	2,58	1,69			
	620	243		24176BL1	570	5350	9650	0,39	1,73	2,58	1,69			
	680	240		23276B	665	5800	9650	0,36	1,89	2,82	1,85			
	680	240		23276BL1	665	5800	9650	0,36	1,89	2,82	1,85			
	400	540	106	*	23980EMD1	215,0	2370	4170	0,18	3,8	5,66	3,72		
600		148		23080B	450,0	3300	6050	0,24	2,8	4,16	2,73			
600		148		23080BL1	450,0	3300	6050	0,24	2,8	4,16	2,73			
600		200		24080B	485	4250	8400	0,32	2,09	3,11	2,04			
650		200		23180B	630	4650	8050	0,31	2,21	3,28	2,16			
650		200		23180BL1	630	4650	8050	0,31	2,21	3,28	2,16			
650		250		24180B	585	5650	10300	0,38	1,77	2,63	1,73			
720		256		23280B	740	6500	10600	0,37	1,81	2,69	1,77			

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTRAGE bearing



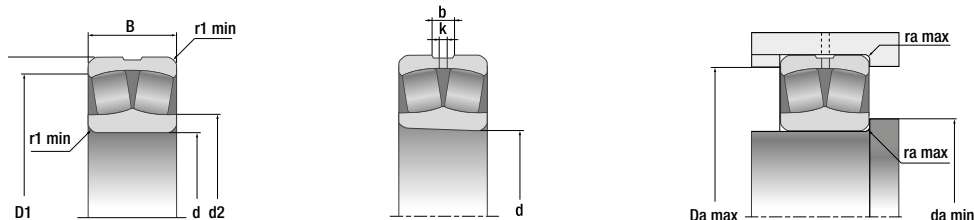
Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions						Fitting dimensions		
			b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max	
			mm						mm		
23952EMD1	23,3	8	11	6	2,1	292	335	270,2	349,8	2	
23052EMW33	47,28	3 or 8	18,3	8	4	301,5	365,1	274,6	385,4	3	
24052EAW33	62,42	3 or 8	19,3	8	4	286,2	353,9	275	385	3	
23152EMD1	92,2	8	20	12	4	302	380	277	423	4	
24152EMD1	111	8	27	16	4	295	371	277	423	4	
22252EMD1	108	8	20	12	5	312	415	280	460	5	
23252EMD1	143	8	27	16	5	310	405	280	460	5	
22352EMD1	186	8	27	16	6	324	456	286	514	6	
23956EMD1	25,6	8	11	6	2,1	310	356	290,2	369,8	2	
23056EMW33	51,2	8	18,3	8	4	310	385,2	294,6	405,4	3	
24056EMW33	66	8	16,4	8	4	0	377,4	294,6	405,4	3	
23156EMD1	98,4	8	20	12	5	322	403	300	440	5	
24156EMD1	118	8	27	16	5	316	394	300	440	5	
22256EMD1	113	8	20	12	5	333	437	300	480	5	
23256EMD1	152	8	27	16	5	331	426	300	480	5	
22356EMD1	228	8	27	16	6	349	489	306	554	6	
23960EMD1	40,1	8	14	8	3	329	387	313	407	3	
23060EMD1	72,9	8	16	10	4	338	413	315	445	4	
24060EMD1	98	8	20	12	4	332	401	315	445	4	
23160EMD1	129	8	20	12	5	345	436	320	480	5	
24160EMD1	159	8	27	16	5	340	425	320	480	5	
22260EMD1	134	8	20	12	5	358	469	320	520	5	
23260EMD1	194	8	27	16	5	352	461	320	520	5	
23964EMD1	42,1	8	14	8	3	350	407	333	427	3	
23064EMD1	78,9	8	20	12	4	360	433	335	465	4	
24064EMD1	104	8	20	12	4	352	423	335	465	4	
23164EMD1	169	8	27	16	5	373	468	340	520	5	
24164EMD1	204	8	33	20	5	363	457	340	520	5	
22264EMD1	177	8	20	12	5	383	510	340	560	5	
23264EMD1	245	8	33	20	5	376	493	340	560	5	
23968EMD1	44,5	8	14	8	3	370	427	353	447	3	
23068EMD1	98,5	8	20	12	5	384	466	358	502	5	
24068EMD1	140	8	27	16	5	377	456	358	502	5	
23168EMD1	213	8	27	16	5	393	500	360	560	5	
24168EMD1	266	8	33	20	5	385	486	360	560	5	
23268B	300	8	33	20	6	432	523,9	368	592	5	
23268BL1	300	8	33	20	6	432	523,9	368	592	5	
23972EMD1	46,2	4	14	8	3	390	447	373	467	3	
23072EMD1	111	8	20	12	5	405	488	378	522	5	
24072EMD1	147	8	27	16	5	398	478	378	522	5	
23172B	222	8	27	16	5	417	520	382	578	4	
23172BL1	222	8	27	16	5	417	520	382	578	4	
24172B	281	8	33	20	5	432	506,7	382	578	4	
24172BL1	281	8	33	20	5	432	506,7	382	578	4	
23272B	339	8	33	20	6	453	551	388	622	5	
23272BL1	339	8	33	20	6	453	551	388	622	5	
23976EMD1	68	8	16	10	4	412	481	395	505	4	
23076EMD1	117	8	20	12	5	425	509	398	542	5	
24076EMD1	154	8	27	16	5	420	499	398	542	5	
23176B	228	8	27	16	5	456	539,8	400	600	4	
23176BL1	235	8	27	16	5	456	539,8	402	598	4	
24176B	292	8	33	20	5	450	528,8	402	598	4	
24176BL1	287	8	33	20	5	450	528,8	400	600	4	
23276B	380	8	33	20	6	476	574,4	408	652	5	
23276BL1	380	8	33	20	6	476	574,4	408	652	5	
23980EMD1	71,4	8	16	10	4	433	501	415	525	4	
23080B	149	8	20	12	5	451	542	422	578	4	
23080BL1	149	8	20	12	5	451	542	422	578	4	
24080B	202	8	27	16	5	461	527,7	422	578	4	
23180B	264	8	27	16	6	479	567,4	426	624	5	
23180BL1	264	8	27	16	6	479	567,4	428	622	5	
24180B	329	8	33	20	6	477	551,9	428	622	5	
23280B	457	8	33	20	6	501	611,1	428	692	5	

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTRAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2			Y_0
mm							kN							
420	560	106	*	23984EMD1	230	2390	4320	0,17	3,95	5,88	3,86			
	620	150		23084B	475	3450	6400	0,24	2,85	4,24	2,78			
	620	150		23084BL1	475	3450	6400	0,24	2,85	4,24	2,78			
	620	200		24084B	470	4300	8450	0,32	2,13	3,18	2,09			
	620	200		24084BL1	470,0	4300	8450	0,32	2,13	3,18	2,09			
	700	224		23184B	680,0	5800	9950	0,32	2,11	3,15	2,07			
	700	280		24184B	755	6850	12200	0,4	1,69	2,51	1,65			
	700	280		24184BL1	755,0	6850	12200	0,4	1,69	2,51	1,65			
	760	272		23284B	820	7300	12000	0,36	1,86	2,77	1,82			
440	600	118		2398B	325	2260	4700	0,18	3,66	5,46	3,58			
	650	157		23088B	530	3650	6850	0,24	2,85	4,24	2,78			
	650	157		23088BL1	530,0	3650	6850	0,24	2,85	4,24	2,78			
	650	212		24088B	530	4800	9450	0,32	2,11	3,15	2,07			
	650	212		24088BL1	530	4800	9450	0,32	2,11	3,15	2,07			
	720	226		23188B	685	5800	10100	0,31	2,15	3,21	2,11			
	720	226		23188BL1	685	5800	10100	0,31	2,15	3,21	2,11			
	720	280		24188B	715	7200	13100	0,39	1,75	2,61	1,71			
	720	280		24188BL1	715	7200	13100	0,39	1,75	2,61	1,71			
	790	280		23288B	870,0	7700	12800	0,36	1,88	2,8	1,84			
	790	280		23288BL1	870	7700	12800	0,36	1,88	2,8	1,84			
460	620	118		23992	325	2340	4950	0,17	3,95	5,88	3,86			
	680	163		23092B	560	4000	7450	0,23	2,88	4,29	2,82			
	680	163		23092BL1	560,0	4000	7450	0,23	2,88	4,29	2,82			
	680	218		24092B	590	5100	10200	0,31	2,15	3,21	2,11			
	760	240		23192B	775,0	6350	11400	0,31	2,19	3,27	2,15			
	760	240		23192BL1	775	6350	11400	0,31	2,14	3,19	2,1			
	760	300		24192BL1	805	7900	14500	0,39	1,71	2,55	1,67			
	830	296		23292BL1	925	8650	14500	0,36	1,87	2,78	1,83			
480	650	128		23996	365	2590	5500	0,18	3,85	5,73	3,76			
	650	128		23996L1	365	2590	5500	0,18	3,85	5,73	3,76			
	700	165		23096B	570,0	4050	7700	0,23	2,94	4,38	2,88			
	700	165		23096BL1	570	4050	7700	0,23	2,94	4,38	2,88			
	700	218		24096B	610	5200	10500	0,3	2,22	3,3	2,17			
	700	218		24096BL1	610	5200	10500	0,3	2,22	3,3	2,17			
	790	248		23196B	860	6900	12300	0,31	2,15	3,21	2,11			
	790	248		23196BL1	860	6900	12300	0,31	2,15	3,21	2,11			
	790	308		24196B	860,0	8250	15300	0,39	1,74	2,59	1,7			
	790	308		24196BL1	860	8250	15300	0,39	1,74	2,59	1,7			
	870	310		23296B	1000	9200	15500	0,36	1,87	2,78	1,83			
	870	310		23296BL1	1000	9200	15500	0,36	1,87	2,78	1,83			
500	670	128		239/500	460	2640	5600	0,17	4,02	5,98	3,93			
	670	128		239/500L1	460	2640	5600	0,17	4,02	5,98	3,93			
	720	167		230/500B	645	4250	8300	0,23	2,98	4,44	2,91			
	720	167		230/500BL1	645	4250	8300	0,23	2,98	4,44	2,91			
	720	218		240/500B	640	5300	10900	0,3	2,28	3,4	2,23			
	720	218		240/500BL1	640	5300	10900	0,3	2,28	3,4	2,23			
	830	264		231/500BL1	875	7700	13700	0,32	2,12	3,16	2,08			
	830	325		241/500BL1	870	9000	16700	0,39	1,72	2,57	1,69			
	920	336		232/500BL1	1100	10500	17800	0,39	1,74	2,59	1,7			
530	710	136		239/530	400	2940	6450	0,17	3,94	5,87	3,86			
	710	136		239/530L1	400	2940	6450	0,17	3,94	5,87	3,86			
	780	185		230/530B	710	4850	9350	0,22	3,03	4,52	2,97			
	780	185		230/530BL1	710	4850	9350	0,22	3,03	4,52	2,97			
	780	250		240/530B	700	6200	12700	0,3	2,24	3,33	2,19			
	870	272		231/530B	920	7800	14200	0,3	2,22	3,3	2,17			
	870	272		231/530BL1	920	7800	14200	0,3	2,22	3,3	2,17			
	980	355		232/530BL1	1210	11500	19800	0,39	1,74	2,59	1,7			
	560	750	140		239/560	525	3200	6700	0,16	4,09	6,09	4		
820		195		230/560B	800	5350	10500	0,22	3,03	4,51	2,96			
820		195		230/560BL1	800,0	5350	10500	0,22	3,03	4,51	2,96			
820		258		240/560B	750	6750	14100	0,3	2,29	3,4	2,24			
920		280		231/560B	1000,0	8550	15500	0,3	2,27	3,38	2,22			
920		280		231/560BL1	1000	8550	15500	0,3	2,27	3,38	2,22			
920		355		241/560B	1030	11100	20800	0,39	1,75	2,61	1,71			
1030		365		232/560B	1320	12300	21100	0,36	1,88	2,8	1,84			

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTRAGE bearing



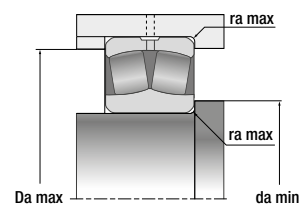
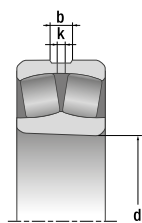
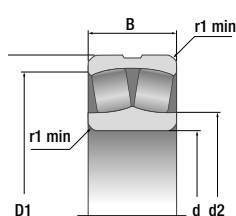
	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min	d ₂	D ₁	d _a min	D _a max	r _a max
				mm					mm		
	23984EMD1	74,9	8	16	10	4	454	522	435	545	4
	23084B	157	8	20	12	5	488	561,4	442	598	4
	23084BL1	152	8	20	12	5	488	561,4	438	602	4
	24084B	210	8	27	16	5	481	550,1	442	598	4
	24084BL1	207	8	27	16	5	481	550,1	438	602	4
	23184B	343	8	33	20	6	511	610,6	446	674	5
	24184B	440	8	33	20	6	499	592	448	672	5
	24184BL1	433	8	33	20	6	499	592	446	674	5
	23284B	544	8	33	20	7,5	528	642,7	456	724	6
	23988	101	8	16	10	4	495	550,6	458	582	3
	23088B	181	8	20	12	6	508	584,6	468	622	5
	23088BL1	175	8	20	12	6	508	584,6	463	627	5
	24088B	245	8	33	20	6	503	575,9	468	622	5
	24088BL1	245	8	33	20	6	503	575,9	468	622	5
	23188B	370	8	33	20	6	526,5	626,8	468	692	5
	23188BL1	370	8	33	20	6	526,5	626,8	468	692	5
	24188B	456	8	33	20	6	519,5	613,9	468	692	5
	24188BL1	456	8	33	20	6	519,5	613,9	468	692	5
	23288B	582	8	33	20	7,5	552	670,5	472	758	6
	23288BL1	600	8	33	20	7,5	552	670,5	476	754	6
	23992	107	8	16	10	4	514	571,1	478	602	3
	23092B	206	8	27	16	6	531	612	488	652	5
	23092BL1	200	8	27	16	6	531	612	483	657	5
	24092B	276	8	33	20	6	528	603,5	488	652	5
	23192B	429	8	33	20	7,5	558	659,7	492	728	6
	23192BL1	443	8	33	20	7,5	558	659,7	496	724	6
	24192BL1	550	8	33	20	7,5	546	644,4	496	724	6
	23292BL1	704	8	33	20	7,5	577	702,9	496	794	6
	23996	123	8	20	12	5	538	598	502	628	4
	23996L1	123	8	20	12	5	538	598	502	628	4
	23096B	209	8	27	16	6	551	632,2	503	677	5
	23096BL1	217	8	27	16	6	551	632,2	508	672	5
	24096B	285	8	33	20	6	547	624,7	508	672	5
	24096BL1	285	8	33	20	6	547	624,7	508	672	5
	23196B	492	8	33	20	7,5	579	687	516	754	6
	23196BL1	492	8	33	20	7,5	579	687	516	754	6
	24196B	600	8	33	20	7,5	570	670,7	512	758	6
	24196BL1	608	8	33	20	7,5	570	670,7	516	754	6
	23296B	814	8	33	20	7,5	605	736	516	834	6
	23296BL1	814	8	33	20	7,5	605	736	516	834	6
	239/500	131	8	20	12	5	561	620,5	522	648	4
	239/500L1	131	8	20	12	5	561	620,5	522	648	4
	230/500B	226	8	27	16	6	561	620,5	528	692	5
	230/500BL1	226	8	27	16	6	561	620,5	528	692	5
	240/500B	295	8	33	20	6	568	645,8	528	692	5
	240/500BL1	295	8	33	20	6	568	645,8	528	692	5
	231/500BL1	584	8	33	20	7,5	607	723	536	794	6
	241/500BL1	716	8	42	25	7,5	602	702,5	536	794	6
	232/500BL1	1000	8	42	25	7,5	635	772,8	536	884	6
	239/530	157	8	20	12	5	590	653,6	552	688	4
	239/530L1	157	8	20	12	5	590	653,6	552	688	4
	230/530B	306	8	27	16	6	614	704	558	752	5
	230/530BL1	306	8	27	16	6	614	704	558	752	5
	240/530B	413	8	33	20	6	605,5	688,4	558	752	5
	231/530B	653	8	33	20	7,5	643	757	566	834	6
	231/530BL1	653	8	33	20	7,5	643	757	566	834	6
	232/530BL1	1200	8	42	25	9,5	678	826,7	574	936	8
	239/560	182	8	20	12	5	625	691,5	582	728	4
	230/560B	353	8	27	16	6	648	740,6	588	792	5
	230/560BL1	340	8	27	16	6	648	740,6	583	797	5
	240/560B	467	8	33	20	6	639,5	725,9	588	792	5
	231/560B	729	8	33	20	7,5	678,5	800,8	592	888	6
	231/560BL1	752	8	33	20	7,5	678,5	800,8	596	884	6
	241/560B	948	8	42	25	7,5	666	786,4	596	884	6
	232/560B	1360	12	42	25	9,5	713	867	604	986	8

SPHERICAL ROLLER BEARING REFERENCES

Overall dimensions			ULTAGE	Designations	Fatigue load limit C_u	Load capacities		Calculation factors				Thermal reference speed	Limiting speed	
d	D	B				kN	Dynamic C	Static C_0	e	Y_1	Y_2			Y_0
mm							kN							
600	800	150		239/600L1	490,0	3600	7800	0,18	3,85	5,73	3,76			
	870	200		230/600B	835	5800	12000	0,21	3,17	4,72	3,1			
	870	200		230/600BL1	835	5800	12000	0,21	3,17	4,72	3,1			
	870	272		240/600BL1	750,0	7150	15600	0,29	2,33	3,47	2,27			
	980	300		231/600B	1160	10000	18400	0,3	2,22	3,3	2,17			
	980	375		241/600BL1	1130	11900	23200	0,37	1,81	2,7	1,77			
	1090	388		232/600B	930	13600	23700	0,36	1,86	2,77	1,82			
630	850	165		239/630	545	4100	9250	0,18	3,66	5,45	3,58			
	850	165		239/630L1	545	4100	9250	0,18	3,66	5,45	3,58			
	920	212		230/630B	950	6550	13000	0,22	3,14	4,67	3,07			
	920	290		240/630B	915	8400	17900	0,3	2,28	3,4	2,23			
	1030	315		231/630B	1190	10700	19900	0,3	2,27	3,38	2,22			
	1030	400		241/630B	1200	12900	25000	0,38	1,78	2,66	1,74			
	1150	412		232/630B	1540	15200	26800	0,36	1,87	2,78	1,83			
670	900	170		239/670	795	4550	10300	0,18	3,76	5,59	3,67			
	980	230		230/670B	1000	7300	14600	0,22	3,07	4,57	3			
	980	308		240/670B	1040	9650	20600	0,29	2,29	3,41	2,24			
	1090	336		231/670B	1400	12500	23600	0,3	2,22	3,3	2,17			
	1090	412		241/670B	1340	14100	28000	0,37	1,83	2,73	1,79			
	1220	438		232/670B	1770	17900	32000	0,36	1,89	2,81	1,85			
	710	950	180		239/710	665	4950	11500	0,18	3,85	5,73	3,76		
950		180		239/710L1	665	4950	11500	0,18	3,85	5,73	3,76			
1030		236		230/710B	1140	8000	16200	0,22	3,02	4,5	2,96			
1030		236		230/710BL1	1140	8000	16200	0,22	3,02	4,5	2,96			
1030		315		240/710B	1150	10300	22500	0,29	2,36	3,51	2,31			
1030		315		240/710BL1	1150	10300	22500	0,29	2,36	3,51	2,31			
1150		345		231/710B	1470	13000	24900	0,29	2,32	3,45	2,27			
1150		438		241/710B	1190	16100	32000	0,37	1,83	2,72	1,79			
1280		450		232/710B	1200	18100	32500	0,35	1,91	2,84	1,87			
750		1000	185		239/750L1	990	5600	13000	0,17	3,9	5,81	3,81		
	1090	250		230/750B	1290	9100	18300	0,21	3,2	4,76	3,13			
	1090	335		240/750BL1	1230	11300	24600	0,29	2,35	3,49	2,29			
	1220	365		231/750B	1130	14300	27200	0,29	2,32	3,45	2,27			
	1360	475		232/750B	1980	20300	36500	0,35	1,92	2,86	1,88			
800	1060	195		239/800	1040	6000	13700	0,17	4,05	6,04	3,96			
	1150	345		240/800B	1360	12400	27800	0,28	2,41	3,59	2,36			
	1280	375		231/800B	1780,0	16000	31000	0,29	2,32	3,45	2,27			
850	1120	200		239/850	1080	6500	15100	0,16	4,25	6,32	4,15			
	1120	200		239/850L1	1080	6500	15100	0,16	4,25	6,32	4,15			
	1220	272		230/850B	1510	10900	22700	0,2	3,32	4,95	3,25			
	1220	365		240/850B	1490	13900	31500	0,28	2,42	3,61	2,37			
	1360	400		231/850B	1380	17300	34000	0,28	2,37	3,54	2,32			
900	1180	206		239/900L1	1230	7400	17300	0,16	4,32	6,44	4,23			
	1280	280		230/900B	1580	11400	24700	0,2	3,32	4,95	3,25			
	1280	375		240/900B	1580	14700	33500	0,27	2,48	3,7	2,43			
	1420	412		231/900B	2030	18700	38000	0,28	2,42	3,6	2,36			
950	1250	224		239/950	1390	8650	20500	0,16	4,2	6,26	4,11			
	1360	300		230/950B	1750	12800	28400	0,21	3,26	4,85	3,18			
	1360	412		240/950B	1780	17200	40000	0,28	2,39	3,56	2,34			
1000	1320	236		239/1000L1	1520	9550	22700	0,16	4,21	6,26	4,11			
	1420	308		230/1000B	1460	13800	30000	0,2	3,37	5,02	3,29			
	1420	412		240/1000B	1890	17800	42000	0,27	2,51	3,73	2,45			
1060	1400	250		239/1060	1670,0	10400	24700	0,16	4,2	6,26	4,11			
	1500	325		230/1060B	1610,0	15100	33500	0,2	3,36	5	3,28			
	1500	438		240/1060B	2060,0	19800	47000	0,27	2,49	3,71	2,44			
1120	1460	250		239/1120	1470,0	10900	26700	0,15	4,42	6,58	4,32			
	1580	345		230/1120B	2310	17400	39000	0,21	3,29	4,8	3,21			
	1580	462		240/1120BL1	2230	21700	52500	0,27	2,5	3,72	2,44			
1180	1540	272		239/1180	1650	12200	29800	0,15	4,4	6,55	4,3			
1250	1630	280		239/1250	1810	13400	33500	0,15	4,42	6,58	4,32			
1320	1720	300		239/1320	1930	15100	38000	0,16	4,34	6,46	4,24			
1400	1820	315		239/1400	2570	16800	43000	0,15	4,39	6,54	4,29			

Bearings available with cylindrical and tapered bores. Bearings with tapered bores are generally fitted with adapter or withdrawal sleeves. All types of clearances are available from stock or on request. Special clearances and special precisions are available on request.

*NTN-SNR ULTAGE bearing



	Designations	Mass kg	Number of lubrication holes on the outer ring	Dimensions					Fitting dimensions		
				b	k	r ₁ min mm	d ₂	D ₁	d _a min	D _a max	r _a max
	239/600L1	211	8	20	12	5	667	738,5	618	782	4
	230/600B	400	8	27	16	6	690	784,8	628	842	5
	230/600BL1	400	8	27	16	6	690	784,8	628	842	5
	240/600BL1	544	8	33	20	6	682	769,7	628	824	5
	231/600B	908	8	33	20	7,5	720	859,5	636	944	6
	241/600BL1	1130	8	42	25	7,5	713,5	832,3	636	944	6
	232/600B	1540	12	42	25	9,5	722	919	644	1046	8
	239/630	277	8	27	16	6	705	780,4	658	822	5
	239/630L1	277	8	27	16	6	705	780,4	658	822	5
	230/630B	481	8	33	20	7,5	728	833,3	666	884	6
	240/630B	657	8	33	20	7,5	719	814,3	666	884	6
	231/630B	1050	12	33	20	7,5	764	898,8	666	994	6
	241/630B	1330	12	42	25	7,5	748	871,5	666	994	6
	232/630B	1900	12	42	25	12	760	969	684	1096	10
	239/670	317	8	27	16	6	751	829,4	698	872	5
	230/670B	594	8	33	20	7,5	775	885,5	706	944	6
	240/670B	794	8	33	20	7,5	741	870	706	944	6
	231/670B	1250	12	42	25	7,5	773	956	706	1054	6
	241/670B	1530	12	42	25	7,5	764	926	706	1054	6
	232/670B	2270	12	42	25	12	807	1034	724	1166	10
	239/710	375	8	27	16	6	795	875,3	738	922	5
	239/710L1	375	8	27	16	6	795	875,3	738	922	5
	230/710B	663	12	33	20	7,5	818	936,1	746	994	6
	230/710BL1	663	12	33	20	7,5	818	936,1	746	994	6
	240/710B	884	12	33	20	7,5	808	915,7	746	994	6
	240/710BL1	884	12	33	20	7,5	808	915,7	746	994	6
	231/710B	1420	12	42	25	9,5	822	1005	754	1106	8
	241/710B	1800	12	42	25	9,5	805	979	754	1106	8
	232/710B	2540	12	42	25	12	851	1081	754	1226	10
	239/750L1	412	8	27	16	6	837,5	923,3	778	972	5
	230/750B	790	12	33	20	7,5	834	991	786	1054	6
	240/750BL1	1060	12	42	25	7,5	850	968,1	786	1054	6
	231/750B	1700	12	42	25	9,5	868	1066	794	1176	8
	232/750B	3050	12	42	25	15	903	1149	814	1296	12
	239/800	487	12	27	16	6	868	983	828	1032	5
	240/800B	1190	12	42	25	7,5	909	1025,9	836	1114	6
	231/800B	1890	12	42	25	9,5	912	1122	844	1236	8
	239/850	550	12	27	16	6	947	1042,3	878	1092	5
	239/850L1	550	12	27	16	6	947	1042,3	878	1092	5
	230/850B	1050	12	33	20	7,5	976	1113,2	886	1184	6
	240/850B	1410	12	42	25	7,5	964,5	1088,9	886	1184	6
	231/850B	2270	12	42	25	12	979	1194	904	1306	10
	239/900L1	623	12	33	20	6	997	1100,5	928	1152	5
	230/900B	1170	12	33	20	7,5	1030	1166,8	936	1244	6
	240/900B	1570	12	42	25	7,5	1017,5	1146,6	936	1244	6
	231/900B	2500	12	42	25	12	1031	1251	954	1366	10
	239/950	774	12	33	20	7,5	1029	1165	986	1214	6
	230/950B	1430	12	33	20	7,5	1063	1239	986	1324	6
	240/950B	1970	12	42	25	7,5	1075	1212,4	986	1324	6
	239/1000L1	916	12	33	20	7,5	1111	1229,3	1036	1284	6
	230/1000B	1580	12	33	20	7,5	1107	1294	1036	1384	6
	240/1000B	2110	12	42	25	7,5	1097	1272	1036	1384	6
	239/1060	1090	12	33	20	7,5	1153	1400	1096	1364	6
	230/1060B	1850	12	42	25	9,5	1172	1368	1104	1456	8
	240/1060B	2450	12	42	25	9,5	1160	1343	1104	1456	8
	239/1120	1140	12	33	20	7,5	1208	1362	1156	1424	6
	230/1120B	2160	12	42	25	9,5	1265	1441,3	1164	1536	8
	240/1120BL1	2890	12	42	25	9,5	1262,5	1417,1	1164	1536	8
	239/1180	1390	12	33	20	7,5	1300	1436,3	1216	1504	6
	239/1250	1600	12	33	20	7,5	1352	1525	1286	1594	6
	239/1320	1900	12	33	20	7,5	1423	1605	1356	1684	6
	239/1400	2230	12	33	20	9,5	1513	1703	1444	1776	8

MOUNTING SLEEVES

Ø shaft	Ø Bearing	Nut	Brake washer	Sleeves for bearings									
				Sleeve 213XX	Bearing 213XX	Sleeve 222XX	Bearing 222XX	Sleeve 231XX	Bearing 231XX	Sleeve 223XX	Bearing 223XX	Bearing 232XX	
20	25	KM5	MB5	H305	05	H305	05			H2305			
25	30	KM6	MB6	H306	06	H306	06			H2306			
30	35	KM7	MB7	H307	07	H307	07			H2307			
35	40	KM8	MB8	H308	08	H308	08			H2308	08		
40	45	KM9	MB9	H309	09	H309	09			H2309	09		
45	50	KM10	MB10	H310	10	H310	10			H2310	10		
50	55	KM11	MB11	H311	11	H311	11			H2311	11		
55	60	KM12	MB12	H312	12	H312	12			H2312	12		
60	65	KM13	MB13	H313	13	H313	13			H2313	13		
60	70	KM14	MB14	H314	14	H314	14			H2314	14		
65	75	KM15	MB15	H315	15	H315	15			H2315	15		
70	80	KM16	MB16	H316	16	H316	16			H2316	16		
75	85	KM17	MB17	H317	17	H317	17			H2317	17		
80	90	KM18	MB18	H318	18	H318	18			H2318	18	18	
85	95	KM19	MB19	H319	19	H319	19			H2319	19		
90	100	KM20	MB20	H320	20	H320	20	H3120	20	H2320	20	20	
100	110	KM22	MB22	H322	22	H322	22	H3122	22	H2322	22	22	
110	120	KM24	MB24			H3124	24	H3124	24	H2324	24	24	
115	130	KM26	MB26			H3126	26	H3126	26	H2326	26	26	
125	140	KM28	MB28			H3128	28	H3128	28	H2328	28	28	
135	150	KM30	MB30			H3130	30	H3130	30	H2330	30	30	
140	160	KM32	MB32			H3132	32	H3132	32	H2332	32	32	
150	170	KM34	MB34			H3134	34	H3134	34	H2334	34	34	
160	180	KM36	MB36			H3136	36	H3136	36	H2336	36	36	
170	190	KM38	MB38			H3138	38	H3138	38	H2338	38	38	
180	200	KM40	MB40			H3140	40	H3140	40	H2340	40	40	
200	220	HM44T	MB44			H3144	44	H3144	44	H2344H	44	44	
220	240	HM48T	MB48			H3148H	48	H3148H	48	H2348H	48	48	
240	260	HM52T	MB52			H3152H	52	H3152H	52	H2352H	52	52	
260	280	HM56T	MB56			H3156H	56	H3156H	56	H2356H	56	56	
280	300	HM3160	MS3160			H3160H	60	H3160H	60	H3260H	60	60	
300	320	HM3164	MS3164			H3164H	64	H3164H	64	H3264H		64	
320	340	HM3168	MS3168					H3168H	68	H3268H		68	
340	360	HM3172	MS3172					H3172H	72	H3272H		72	
360	380	HM3176	MS3176					H3176H	76	H3276H		76	
380	400	HM3180	MS3180					H3180H	80	H3280H		80	
400	420	HM3184	MS3184					H3184H	84	H3284H		84	
410	440	HM3188	MS3188					H3188H	88	H3288H		88	
430	460	HM3192	MS3192					H3192H	92	H3292H		92	
450	480	HM3196	MS3196					H3196H	96	H3296H		96	
470	500	HM31/500	MS31/500					H31/500H	/500	H32/500H		/500	
500	530	HM31/530	MS31/530					H31/530H	/530	H32/530H		/530	
530	560	HM31/560	MS31/560					H31/560H	/560	H32/560H		/560	
560	600	HM31/600	MS31/600					H31/600H	/600	H32/600H		/600	
600	630	HM31/630	MS31/630					H31/630H	/630	H32/630H		/630	
630	670	HM31/670	MS31/670					H31/670H	/670	H32/670H		/670	
670	710	HM31/710	MS31/710					H31/710H	/710	H32/710H		/710	
710	750	HM31/750	MS31/750					H31/750H	/750	H32/750H		/750	
750	800	HM31/800	MS31/800										

	Ø shaft	Ø bearing	Nut	Brake washer	Sleeves for bearings			
					Sleeve 230XX	Bearing 230XX	Sleeve 239XX	Bearing 239XX
	20	25						
	25	30						
	30	35						
	35	40						
	40	45						
	45	50						
	50	55						
	55	60						
	60	65						
	60	70						
	65	75						
	70	80						
	75	85						
	80	90						
	85	95						
	90	100						
	100	110			H2322	22		
	110	120	KML24	MBL24	H3024	24		
	115	130	KML26	MBL26	H3026	26		
	125	140	KML28	MBL28	H3028	28		
	135	150	KML30	MBL30	H3030	30		
	140	160	KML32	MBL32	H3032	32		
	150	170	KML34	MBL34	H3034	34		
	160	180	KML36	MBL36	H3036	36	H3936	36
	170	190	KML38	MBL38	H3038	38	H3938	38
	180	200	KML40	MBL40	H3040	40	H3940	40
	200	220	HM3044	MS3044	H3044H	44	H3944H	44
	220	240	HM3048	MS3048	H3048H	48	H3948H	48
	240	260	HM3052	MS3052	H3052H	52	H3952H	52
	260	280	HM3056	MS3056	H3056H	56	H3956H	56
	280	300	HM3060	MS3060	H3060H	60	H3960H	60
	300	320	HM3064	MS3064	H3064H	64	H3964H	64
	320	340	HM3068	MS3068	H3068H	68	H3968H	68
	340	360	HM3072	MS3072	H3072H	72	H3972H	72
	360	380	HM3076	MS3076	H3076H	76	H3976H	76
	380	400	HM3080	MS3080	H3080H	80	H3980H	80
	400	420	HM3084	MS3084	H3084H	84	H3984H	84
	410	440	HM3088	MS3088	H3088H	88	H3988H	88
	430	460	HM3092	MS3092	H3092H	92	H3992H	92
	450	480	HM3096	MS3096	H3096H	96	H3996H	96
	470	500	HM30/500	MS30/500	H30/500H	/500	H39/500H	/500
	500	530	HM30/530	MS30/530	H30/530H	/530	H39/530H	/530
	530	560	HM30/560	MS30/560	H30/560H	/560	H39/560H	/560
	560	600	HM30/600	MS30/600	H30/600H	/600	H39/600H	/600
	600	630	HM30/630	MS30/630	H30/630H	/630	H39/630H	/630
	630	670	HM30/670	MS30/670	H30/670H	/670	H39/670H	/670
	670	710	HM30/710	MS30/710	H30/710H	/710	H39/710H	/710
	710	750	HM30/750	MS30/750	H30/750H	/750	H39/750H	/750
	750	800	HM30/800	MS30/800	H30/800H	/800	H39/800H	/800

WITHDRAWAL SLEEVES

Ø shaft	Ø Bearing	Nut for shaft	Brake washer	Nut	Sleeves for bearings									
					Sleeve 213XX / 222XX	Bearing 213XX	Bearing 222XX	Sleeve 223XX	Bearing 223XX	Sleeve 231XX	Bearing 231XX	Sleeve 232XX		Bearing 232XX
20	25					05	05							
25	30					06	06							
30	35					07	07							
35	40	KM7	MB7	KM9	AH308	08	08	AH2308	08					
40	45	KM8	MB8	KM10	AH309	09	09	AH2309	09					
45	50	KM9	MB9	KM11	AHX310	10	10	AHX2310	10					
50	55	KM10	MB10	KM12	AHX311	11	11	AHX2311	11					
55	60	KM11	MB11	KM13	AHX312	12	12	AHX2312	12					
60	65	KM12	MB12	KM14	AH313G	13	13	AH2313G	13					
65	70	KM13	MB13	KM15	AH314G	14	14	AHX2314G	14					
70	75	KM14	MB14	KM16	AH315G	15	15	AHX2315G	15					
75	80	KM15	MB15	KM18	AH316	16	16	AHX2316	16					
80	85	KM16	MB16	KM19	AHX317	17	17	AHX2317	17					
85	90	KM17	MB17	KM20	AHX318	18	18	AHX2318	18			AHX3218	18	
90	95	KM18	MB18	KM21	AHX319	19	19	AHX2319	19					
95	100	KM19	MB19	KM22	AHX320	20	20	AHX2320	20	AHX3120	20	AHX3220	20	
105	110	KM21	MB21	KM24	AHX322/ AHX3122	22	22			AHX3122	22	AHX3222G	22	
115	120	KM22	MB22	KM26	AHX3124		24	AHX2324G	24	AHX3124	24	AHX3224G	24	
125	130	KM24	MB24	KM28	AHX3126		26	AHX2326G	26	AHX3126	26	AHX3226G	26	
135	140	KM26	MB26	KM30	AHX3128		28	AHX2328G	28	AHX3128	28	AHX3228G	28	
145	150	KM28	MB28	KM32	AHX3130G		30	AHX2330G	30	AHX3130G	30	AHX3230G	30	
150	160	KM30	MB30	KM34	AH3132G		32	AH2332G	32	AH3132G	32	AH3232G	32	
160	170	KM32	MB32	KM36	AH3134G		34	AH2334G	34	AH3134G	34	AH3234G	34	
170	180	KM34	MB34	KM38	AH2236G		36	AH2336G	36	AH3136G	36	AH3236G	36	
180	190	KM36	MB36	KM40	AH2238G		38	AH2338G	38	AH3138G	38	AH3238G	38	
190	200	KM38	MB38	HM44T	AH2240		40	AH2340	40	AH3140	40	AH3240	40	
200	220	KM40	MB40	HM48T	AOH2244		44	AOH2344	44	AOH3144	44			
220	240	HM44T	MB44	HM52T	AOH2248		48	AOH2348	48	AOH3148	48			
240	260	HM48T	MB48	HM56T	AOH2252G		52	AOH2352G	52	AOH3152G	52			
260	280	HM52T	MB52	HM3160	AOH2256G		56	AOH2356G	56	AOH3156G	56			
280	300	HM56T	MB56	HM3164	AOH2260G		60			AOH3160G	60	AOH3260G	60	
300	320	HM3060	MS3060	HM3168	AOH2264G		64			AOH3164G	64	AOH3264G	64	
320	340	HM3064	MS3064	HM3172						AOH3168G	68	AOH3268G	68	
340	360	HM3068	MS3068	HM3176						AOH3172G	72	AOH3272G	72	
360	380	HM3072	MS3072	HM3180						AOH3176G	76	AOH3276G	76	
380	400	HM3076	MS3076	HM3184						AOH3180G	80	AOH3280G	80	
400	420	HM3080	MS3080	HM3188						AOH3184G	84	AOH3284G	84	
420	440	HM3084	MS3084	HM3192						AOHX3188G	88	AOHX3288G	88	
440	460	HM3088	MS3088	HM3196						AOHX3192G	92	AOHX3292G	92	
460	480	HM3092	MS3092	HM31/500						AOHX3196G	96	AOHX3296G	96	
480	500	HM3096	MS3096	HM31/530						AOHX31/500G	/500	AOHX32/500G	/500	
500	530	HM30/500	MS30/500	HM31/560						AOH31/530	/530	AOH32/530G	/530	
530	560	HM30/530	MS30/530	HM31/600						AOH31/560	/560	AOH32/560	/560	
570	600	HM30/560	MS30/560	HM31/630						AOHX31/600	/600	AOHX32/600G	/600	
600	630	HM30/600	MS30/600	HM31/670						AOH31/630	/630	AOH32/630G	/630	
630	670	HM30/630	MS30/630	HM31/710						AOHX31/670	/670	AOH32/670G	/670	
670	710	HM30/670	MS30/670	HM31/750						AOHX31/710	/710	AOH32/710G	/710	
710	750	HM30/710	MS30/710	HM31/800						AOH31/750	/750	AOH32/750	/750	
750	800	HM30/750	MS30/750	HM31/850						AOH31/800	/800			
800	850	HM30/800	MS30/800	HM31/900						AOH31/850	/850	AOH32/850	/850	
850	900	HM30/850	MS30/850	HM31/950						AOH31/900	/900			
900	950													

	Ø shaft	Ø Bearing	Shaft nut	Brake washer	Manchons pour Roulements								
					Nut	Sleeve 230XX	Bearing 230XX	Nut	Sleeve 240XX	Bearing 240XX	Nut	Sleeve 241XX	Bearing 241XX
20	25												
25	30												
30	35												
35	40	KM7	MB7										
40	45	KM8	MB8										
45	50	KM9	MB9										
50	55	KM10	MB10										
55	60	KM11	MB11										
60	65	KM12	MB12										
65	70	KM13	MB13										
70	75	KM14	MB14										
75	80	KM15	MB15										
80	85	KM16	MB16										
85	90	KM17	MB17										
90	95	KM18	MB18										
95	100	KM19	MB19										
105	110	KM21	MB21								KM23	AH24122	22
115	120	KM22	MB22		KM26	AHX3024	24	KM25	AH24024	24	KM26	AH24124	24
125	130	KM24	MB24		KM28	AHX3026	26	KM27	AH24026	26	KM28	AH24126	26
135	140	KM26	MB26		KM30	AHX3028	28	KM29	AH24028	28	KM30	AH24128	28
145	150	KM28	MB28		KM32	AHX3030	30	KM31	AH24030	30	KM32	AH24130	30
150	160	KM30	MB30		KM34	AH3032	32	KM34	AH24032	32	KM34	AH24132	32
160	170	KM32	MB32		KM36	AH3034	34	KM36	AH24034	34	KM36	AH24134	34
170	180	KM34	MB34		KM38	AH3036	36	KM38	AH24036	36	KM38	AH24136	36
180	190	KM36	MB36		KM40	AH3038G	38	KM40	AH24038	38	KM40	AH24138	38
190	200	KM38	MB38		HM44T	AH3040G	40	HM42T	AH24040	40	HM42T	AH24140	40
200	220	KM40	MB40		HM48T	AOH3044G	44	HM46T	AOH24044	44	HM46T	AOH24144	44
220	240	HM44T	MB44		HM52T	AOH3048	48	HM50T	AOH24048	48	HM52T	AOH24148	48
240	260	HM48T	MB48		HM56T	AOH3052	52	HM56T	AOH24052G	52	HM56T	AOH24152	52
260	280	HM52T	MB52		HM3060	AOH3056	56	HM3160	AOH24056G	56	HM3160	AOH24156	56
280	300	HM56T	MB56		HM3064	AOH3060	60	HM3164	AOH24060G	60	HM3164	AOH24160	60
300	320	HM3060	MS3060		HM3068	AOH3064G	64	HM3168	AOH24064G	64	HM3168	AOH24164	64
320	340	HM3064	MS3064		HM3072	AOH3068G	68	HM3072	AOH24068	68	HM3172	AOH24168	68
340	360	HM3068	MS3068		HM3076	AOH3072G	72	HM3076	AOH24072	72	HM3176	AOH24172	72
360	380	HM3072	MS3072		HM3080	AOH3076G	76	HM3080	AOH24076	76	HM3180	AOH24176	76
380	400	HM3076	MS3076		HM3084	AOH3080G	80	HM3084	AOH24080	80	HM3184	AOH24180	80
400	420	HM3080	MS3080		HM3088	AOH3084G	84	HM3088	AOH24084	84	HM3188	AOH24184	84
420	440	HM3084	MS3084		HM3092	AOHX3088G	88	HMLL92T	AOH24088	88	HM3192	AOH24188	88
440	460	HM3088	MS3088		HM3096	AOHX3092G	92	HMLL96T	AOH24092	92	HM3196	AOH24192	92
460	480	HM3092	MS3092		HM30/500	AOHX3096G	96	HMLL100T	AOH24096	96	HM31/500	AOH24196	96
480	500	HM3096	MS3096		HM30/530	AOHX30/500G	/500	HM106T	AOH240/500	/500	HM31/530	AOH241/500	/500
500	530	HM30/500	MS30/500		HM30/560	AOH30/530	/530	HM31/560	AOH240/530G	/530	HM31/560	AOH241/530G	/530
530	560	HM30/530	MS30/530		HM30/600	AOHX30/560	/560	HM31/600	AOH240/560G	/560	HM31/600	AOH241/560G	/560
570	600	HM30/560	MS30/560		HM30/630	AOHX30/600	/600	HMLL125T	AOHX240/600	/600	HM31/630	AOHX241/600	/600
600	630	HM30/600	MS30/600		HM30/670	AOH30/630	/630	HM31/670	AOH240/630G	/630	HM31/670	AOH241/630G	/630
630	670	HM30/630	MS30/630		HM30/710	AOH30/670	/670	HM31/710	AOH240/670G	/670	HM142T	AOH241/670	/670
670	710	HM30/670	MS30/670		HM30/750	AOHX30/710	/710	HM31/750	AOH240/710G	/710	HM150T	AOH241/710	/710
710	750	HM30/710	MS30/710		HM30/800	AOH30/750	/750	HM31/800	AOH240/750G	/750			
750	800	HM30/750	MS30/750		HM30/850	AOH30/800	/800	HM31/850	AOH240/800G	/800			
800	850	HM30/800	MS30/800		HM30/900	AOH30/850	/850	HM31/900	AOH240/850G	/850			
850	900	HM30/850	MS30/850		HM30/950	AOH30/900	/900	HM31/950	AOH240/900	/900			
900	950	HM30/950	MS30/950		HM30/1000	AOH30/950	/950	HM31/1000	AOH240/950	/950			

ASSOCIATED PLUMMER BLOCKS

SNCD OVERSIZE SPLIT PLUMMER BLOCK

In accordance with ISO 113:2010 for mounting spherical roller bearings with a cylindrical and tapered bore.



- Plummer block material: spheroidal graphite iron
- Compatible with temperatures down to -40°C
- Excellent heat dissipation with its extra-wide contact support surface
- Increased dimensional stability with a reinforced X-shaped sub-structure and wide circular rib around the bearing
- Less maintenance required and longer bearing service life
- For mounting spherical roller bearings in the 222XX, 223XX, 230XX and 231XX series
- Sealing systems: labyrinth and taconite seals for extreme conditions
- Different connection options available for lubrication or control systems
- For shaft diameters from 115 mm to 500 mm

SNC500 / SNCD500 SPLIT PLUMMER BLOCK

In accordance with ISO 113:2010 for mounting spherical roller bearings with a cylindrical and tapered bore.



- Plummer block material: lamellar graphite cast iron and/or spheroidal graphite iron (SNCD)
- Increased stability and dimensional rigidity with all types of load
- Excellent heat dissipation
- Fewer constraints in the bearing
- Less maintenance required and longer bearing service life
- Sealing systems: five types of seals available for all types of application
- Fast implementation and easy maintenance thanks to the enhanced design
- For shaft diameters from 20 mm to 140 mm

SPW/SFCW – ONE-PIECE PLUMMER BLOCK FOR HEAVY LOADS



- Suited to highly demanding, heavy industrial environments
- Components treated for corrosion protection
- Enables rapid replacement of patented inserts
- Equipped with sealed spherical roller bearings
- Reduced maintenance time and increased productivity
- SPW range interchangeable with SN bearing housing units
- Shaft diameter: 50 mm – 140 mm



FLANGED ONE-PIECE PLUMMER BLOCK 722500 WITH GREASE LUBRICATION

Flanged one-piece plummer block for positioning a cylindrical or tapered spherical roller bearing mounted on an adapter sleeve

- Compact and robust bearing unit design
- Housing material: lamellar graphite cast iron
- Suitable for bearings in the following series: 12..K, 22..K, 222..K
- Version available with a plug (type A) or through-shaft (type B)
- Flange design with 3 or 4 mounting holes
- Integrity using a felt strip seal
- For shaft diameters from 20 mm to 100 mm
- Relubrication possible



SNOE OIL-LUBRICATED SPLIT PLUMMER BLOCK-UNIT

- Suited to spherical roller bearings
- Perfectly suited to operating conditions with heavy loads and high rotation speeds
- Material: EN-GJS-600-3 for high rigidity
- Internal distribution of oil via a lubrication ring
- Seal by means of a labyrinth seal system
- Fitted with an oil level indicator
- Possible integration in an oil circulation system (with or without heating)
- Excellent heat dissipation
- Standard applications: industrial fans, hammer crushers, extraction, steelworks, chemical and petrochemical industries, power plants, ventilation mechanisms, drying systems, incinerators and air-conditioning systems
- Maximum shaft dimensions: 260 mm (the largest oil-lubricated plummer blocks available as standard on the market)



SNOE OIL-LUBRICATED SPLIT PLUMMER BLOCK-UNIT (COMPACT VERSION)

- Suited to spherical roller bearings
- Seal by means of a labyrinth seal system
- Can replace a grease-lubricated split plummer block-unit when the rotation speeds are too high or when the operating temperatures risk damaging the bearing
- Interchangeable with the same-size SN bearing housings
- Fitted with an oil level indicator
- Shaft diameter: 60 mm – 140 mm

LUBRICATION PRODUCTS

We can provide support for lubrication projects from design to installation, offering lubricants specially selected for specific applications, together with single-point or multi-point lubrication systems according to each process size and requirements.

TYPES OF GREASE AND OIL

Designed for the demands of each application to ensure that bearings operate at their best.



Universal



Heavy Duty



Vib



High Temp MP



Ultra High Temp



Food AL



High Speed+



Food Chain Oil



Chain Oil



AUTOMATIC SINGLE-POINT LUBRICATION SYSTEMS

Automatic single-point lubrication systems ensure constant and regular lubrication of the bearings.

They can easily be incorporated into different types of application (mechanical and motor industries, steelworks, paper mills, etc.) and they provide improved lubrication systems without involving any changes in installations.



MULTI-POINT LUBRICATION: POLIPUMP

A POLIPUMP is the lubrication system that is best suited to lubricate several points. Available in versions with 12, 24 or 35 outlets, providing independent output rates of between 0.01 cc and 0.13 cc per cycle for each point, at a maximum pressure level of 80 bar, and featuring a large grease tank, a POLIPUMP constitutes a very widespread lubrication system that is very easy to use.

"Our lubrication recommendations: it is vital that satisfactory lubrication is obtained as soon as the bearings start to rotate. In the case of lubrication using grease, the grease needs to occupy the entire available volume and, in particular, the space between the cage and the inner ring."



SPHERICAL ROLLER BEARINGS

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