



## Sealed Spherical Roller Bearings

Reliable protection against contamination

Technical Product Information



## Foreword

Spherical roller bearings are double row, self-retaining units comprising solid outer rings with a concave raceway, solid inner rings and barrel rollers with cages.

The symmetrical barrel rollers orient themselves freely on the concave outer ring raceway and, as a result, can compensate for shaft deflections and misalignments of the bearing seats.

Sealed spherical roller bearings are characterised by having sealing washers mounted on the external edge of both sides of the bearing. These sealing washers provide protection against the ingress of particles into the bearing and create a barrier against the egress of lubricant from the bearing.

### Advantages

Sealed spherical roller bearings offer benefits for a wide range of applications:

- longer operating life of the bearing
- lower grease consumption and disposal costs
- fewer expensive relubrication systems required
- reduced maintenance outlay
- reconditioning available from Schaeffler Services for outside diameters > 160mm
- environmentally friendly characteristics

### Properties

Sealed spherical roller bearings have the following properties:

- very high basic dynamic and static load ratings
- contact seal
- bearing materials dimensionally stabilised up to +200 °C (S1)
- two different sealing materials available
- angular adjustment facility 0,5° from the central position
- Standard dimensions in many cases. Extra-wide bearings have the prefix WS.
- different greases available
- limiting speed  $n_G$  depending on the grease and grease fill level
- X-life quality

Sealed spherical roller bearings are suitable for applications such as continuous casting plant, conveyor belts, elevator plant or the food industry.

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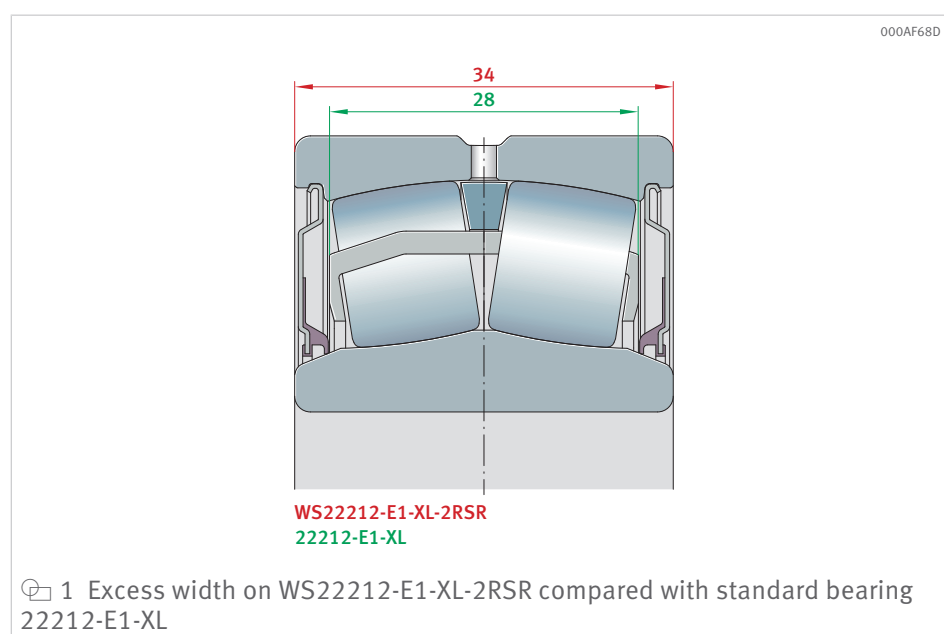
# 1 Bearing design

## 1.1 Sealing concepts

The sealed spherical roller bearings are fitted with different sealing concepts depending on the side. This ensures that a reliable working seal is achieved for each bearing size.

Sealed spherical roller bearings in the small diameter range are sometimes wider than standard bearings. In spite of the lateral sealing washers, it is possible to achieve a high degree of swivel motion and the same basic load ratings as for unsealed spherical roller bearings. Extra-wide spherical roller bearings are indicated by the prefix WS (Wide Size).

The example shows the width of a sealed spherical roller bearing compared with an unsealed bearing of the basic type 22212.



### Sealing concept 1 (OD ≤ 160 mm)

Sealed spherical roller bearings with a pressed-in sheet steel seal with elastomer coating are supplied if the outside diameter of the spherical roller bearing is less than or equal to 160 mm.



### Sealing concept 2 (160 mm < OD ≤ 320 mm)

If the outside diameter of the spherical roller bearings is between 160 mm and 320 mm, the spherical roller bearings will be supplied with a snapped-in seal. The sealing washer is made from sheet steel with an elastomer coating. The sealing washer is pressed into a groove in the outer ring and is thus self-retaining.

Most spherical roller bearings have standard ISO dimensions.



### Sealing concept 3 (OD > 320 mm)

For outside diameters larger than 320 mm, two sealing concepts are used. The bearing size at which the sealing concept switches from one to the other depends on the series. Sealing concept 3 is used more frequently for small bearings than concept 4.

In sealing concept 3, the bearings are sealed using a sealing washer and a retaining ring. The elastomer-coated sheet steel sealing washer is axially located in the outer ring with a retaining ring.

Sealed spherical roller bearings with this sealing concept have standard ISO dimensions.





### Sealing concept 4 (OD > 320 mm)

For outside diameters larger than 320 mm, two sealing concepts are used. The bearing size at which the sealing concept switches from one to the other depends on the series. Sealing concept 3 is used more frequently for small bearings than concept 4.

In sealing concept 4, the sealing washer consists of an elastomer seal lip attached to a steel washer. The sealing washer is fixed to the outer ring with screws.

Sealed spherical roller bearings with this sealing concept have standard ISO dimensions.



## 1.2 X-life

X-life is the premium brand that identifies particularly high performance products under the INA and FAG brands. These products are characterised by a longer rating life and operating life.

This improved performance results from the use of state of the art manufacturing techniques and improved internal constructions. Products identified as the X-life premium brand have higher basic dynamic load ratings.

At Schaeffler, basic load ratings are systematically calculated using the “Method to investigate rolling bearing rating life” procedure. This describes all calculation and test methods that are necessary in order to determine all the reference values that influence rating life. This procedure has been certified by Germanischer Lloyd (GL-CER-002-2015).

Spherical roller bearings for rotor bearing arrangements in wind turbines are predominantly designed, due to their improved macrogeometry and microgeometry, in the X-life premium brand.



## 2 Lubrication

### 2.1 Lubricating greases

Sealed spherical roller bearings are always supplied greased and sealed. This ensures that the bearing is correctly lubricated from the outset and no contaminants can enter the bearing from the outside.

Two greases are available as standard which have proven themselves in practice and are versatile in application.

Arcanol LOAD400 (suffix L040) is a grease that is also suitable for high demands and shocks. It is used as standard in combination with an NBR seal (suffix 2RSR): a special suffix is not required in this instance.


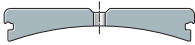
Arcanol TEMP120 (suffix L195) is a grease that is particularly suitable for increased temperatures and loads. Bearings with an FKM seal (suffix 2VSR) are lubricated as standard with this grease. In this instance, where the bearing has a suffix 2VSR, the special suffix for the grease TEMP120 is not used.

Other greases may be necessary for specific applications. In these instances, Schaeffler can draw on a wide range of proven greases. If the standard grease is not suitable for a specific application, please raise this with your Schaeffler contact.

### 2.2 Outer ring variations

Sealed spherical roller bearings have a circumferential groove and three lubrication holes in the outer ring as standard (no suffix). This allows easy relubrication. In some applications, relubrication is not required. In this case, a closed outer ring can be requested using the suffix H40.

#### 1 Outer ring designs

Description		Example
	Closed outer ring	24028-BE-XL-2VSR-H40
	Circumferential groove and three lubrication holes, with relubrication facility	24028-BE-XL-2VSR

## 3 Sealing

Two different, proven elastomers are available to choose from when selecting the material:

- nitrile rubber (NBR), suffix 2RSR
- fluoro rubber (FKM, FPM), suffix 2VSR

### Nitrile rubber (NBR)

- suitable for temperatures from  $-30\text{ °C}$  to  $+100\text{ °C}$
- standard for series 222, 223 and 231
- Standard for use with the lubricant Arcanol LOAD400 recommended by Schaeffler for a temperature range of  $-20\text{ °C}$  to  $+130\text{ °C}$ , grease filling level 25 % to 40 %.
- other greases are available by agreement

### Fluoro rubber (FKM, FPM)

- suitable for temperatures from  $-20\text{ °C}$  to  $+200\text{ °C}$
- standard for series 240 and 241
- Standard for use with the lubricant Arcanol TEMP120 recommended by Schaeffler for a temperature range of  $-30\text{ °C}$  to  $+180\text{ °C}$ , grease filling level 55 % to 65 %.
- other greases are available by agreement



Seals made from fluoro rubber (FKM, FPM) are made from particularly high performance materials that may release vapour when heated to approx.  $+300\text{ °C}$ . This may occur if, for example, a welding torch is used in the dismantling of a bearing. In such cases, please observe the safety data sheet for the seal, which is available on request.

## 4 Cages

Sealed spherical roller bearings have a sheet steel cage as standard (no suffix) or a solid brass cage (suffix MB, MB1, M). A polyamide cage (suffix TVPA, TVPB) can be used in special cases.

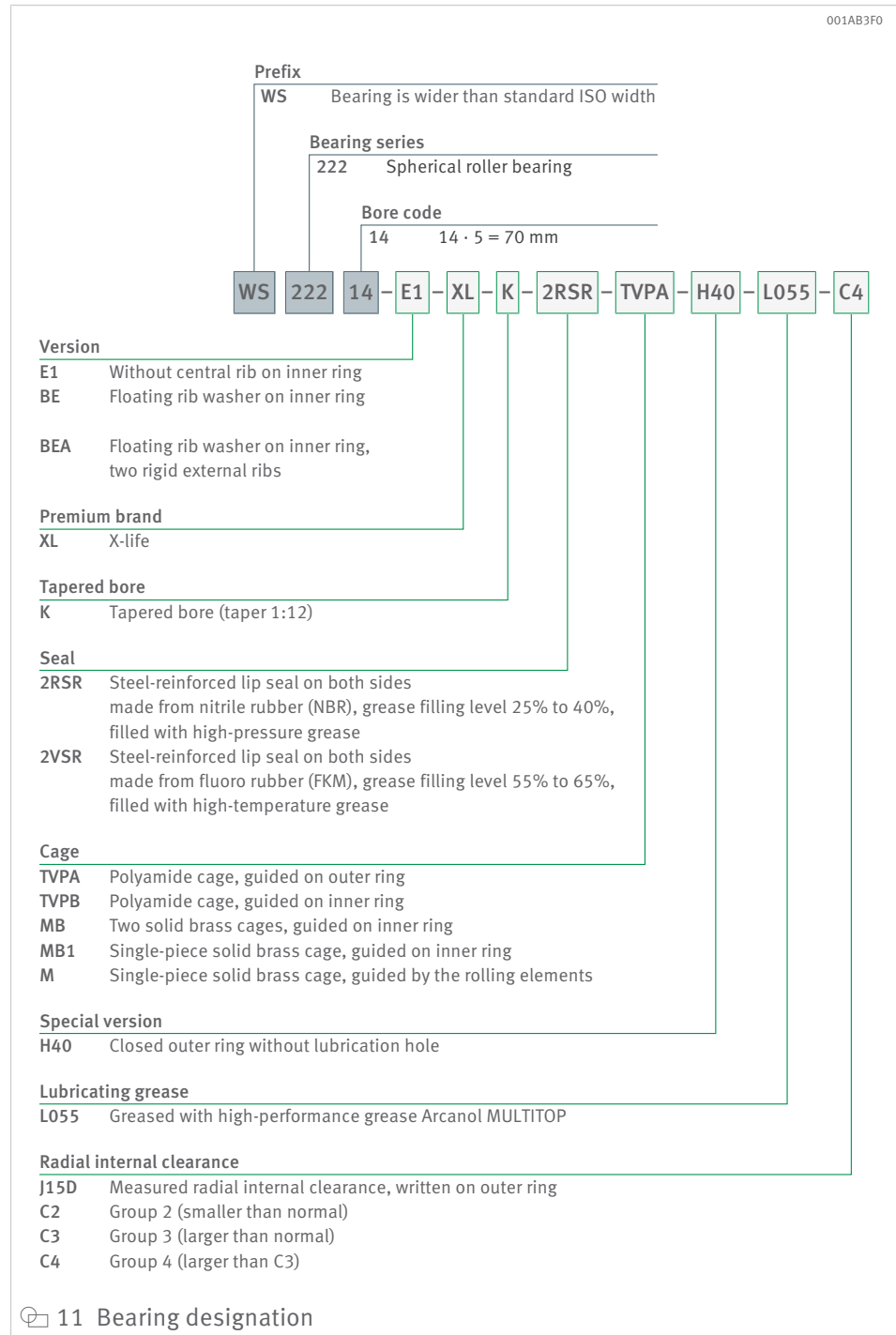
## 5 Internal clearance

Sealed spherical roller bearings with cylindrical and tapered bore are manufactured as standard with the radial internal clearance CN (no suffix). The bearings are also available by agreement with reduced internal clearance C2 as well as with larger internal clearances C3 or C4. The required internal clearance depends on the specific application and installation situation.

In some applications with conical shaft seats, the internal clearance of the sealed spherical roller bearing may need to be more accurate than the internal clearance groups allow. In this case, there is an option to order the sealed bearing with the specific actual internal clearance using the suffix J15D. With this suffix, the actual internal clearance is permanently written on the outer ring and the packaging, with the result that the actual internal clearance is immediately assignable to the bearing even after extended periods of storage or multiple relocations.

## 6 Structure of the bearing designation

The designation of bearings follows a set model. The composition of designations is subject to DIN 623-1.



## 7 Design of the bearing arrangement

### 7.1 Adapter sleeves

The Schaeffler adapter sleeves have been adapted specially for the sealed spherical roller bearings, in order to fulfil the particular requirements of these designs.

Appropriate adapter sleeves for the relevant spherical roller bearings can be found in the product tables ► 25|14.

Other bearing sizes are available by agreement.

### 7.2 Housings

Sealed spherical roller bearings can, in many cases, be mounted in our split FAG plummer block housings. The housings are specifically designed for the location of spherical roller bearings. Split FAG plummer block housings and the associated bearings form bearing arrangement units that can be matched to a wide range of requirements through the specific selection of the housing seal design, lubrication type and bearing mounting.



Sealed spherical roller bearings with a cylindrical bore can be axially braced with a specially tailored tab washer (MB..-T) and a locknut (KM).

In order to ensure selection of the correct combination of housing and bearing when using sealed spherical roller bearings, please contact Schaeffler.

Further information on FAG housings and FAG spherical roller bearings can be found in the following publication:

GK 1, Bearing Housings,  
<https://www.schaeffler.de/std/1FC0>

## 8 Dimensioning

### 8.1 Basic rating life

The basic rating lives  $L_{10}$  and  $L_{10h}$

$$f1 \quad L_{10} = \left(\frac{C}{P}\right)^p$$

$$f1 \quad L_{10h} = \frac{16\,666}{n} \cdot \left(\frac{C}{P}\right)^p$$

C	N	Basic dynamic load rating
$L_{10}$	$10^6 \text{ min}^{-1}$	Basic rating life
$L_{10h}$	h	Basic rating life in operating hours
n	$\text{min}^{-1}$	Operating speed (nominal speed)
P	N	Equivalent dynamic bearing load
p	–	Life exponent for roller bearings: $p = 10/3$ for ball bearings: $p = 3$

### 8.2 Equivalent dynamic bearing load

The equivalent dynamic bearing load P is valid for bearings that are subjected to radial and axial dynamic loads. It gives the same rating life as the combined bearing load occurring in practice.

For bearings under dynamic loading, the following applies:

Load ratio	Equivalent dynamic load
$\frac{F_a}{F_r} \leq e$	$P = F_r + Y_1 \cdot F_a$
$\frac{F_a}{F_r} > e$	$P = 0,67 \cdot F_r + Y_2 \cdot F_a$

e	–	Calculation factor
$F_a$	N	Axial load
$F_r$	N	Radial load
P	N	Equivalent dynamic bearing load
$Y_1$	–	Calculation factor
$Y_2$	–	Calculation factor



### 8.3 Equivalent static bearing load

The equivalent static bearing load for combined loads  $P_0$  is valid for bearings that are subjected to static radial and axial loads.

It induces the same load at the centre point of the most heavily loaded contact point between the rolling element and raceway as the combined bearing load occurring in practice.

$$f_3 \quad P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

$F_{0a}$	N	Largest axial load present (maximum load)
$F_{0r}$	N	Largest radial load present (maximum load)
$P_0$	N	Equivalent static bearing load
$Y_0$	–	Calculation factor

## 9 Fitting and dismantling

The new hydraulic nut HYDNUT-E from Schaeffler provides easy and reliable mounting of sealed spherical roller bearings with a tapered bore. The HYDNUT-E is a further development of the proven HYDNUT. A dial gauge, which can be mounted in the press ring, can precisely determine the drive-up distance. For sealed rolling bearings in particular, this method enables secure fitting and precise adjustment of the internal clearance, particularly in conjunction with the specific actual radial internal clearance (suffix J15D).

In addition, the HYDNUT-E has many other new and useful features such as a safety marking to indicate the maximum stroke or easy dismantling courtesy of lifting screws.



Further information can be found in the following publication:

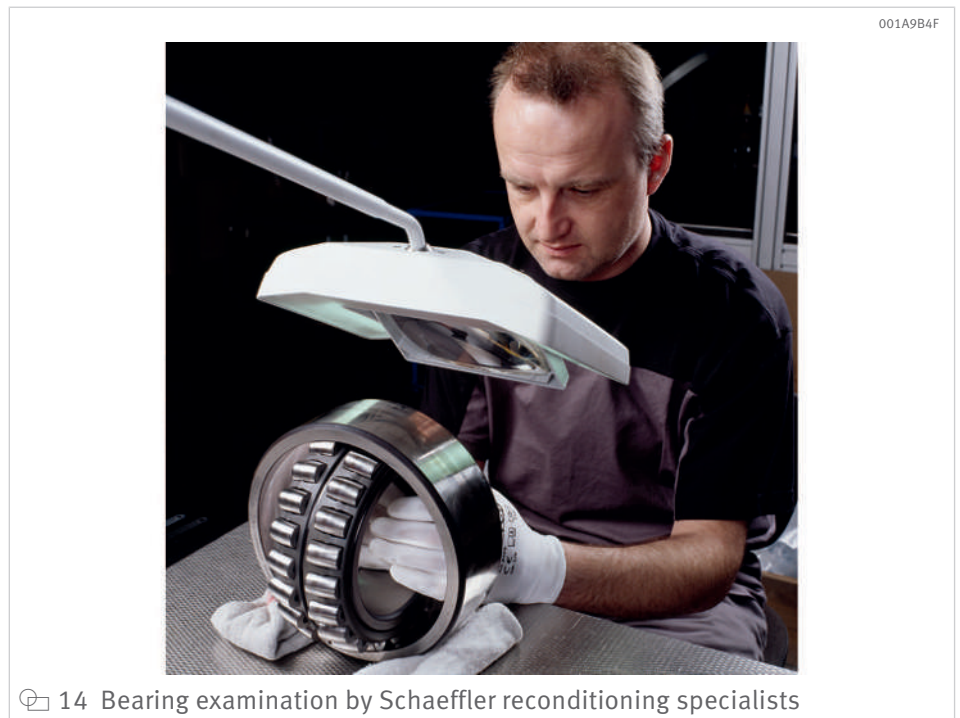
BA 04, Hydraulic nuts,  
<https://www.schaeffler.de/std/1FBF>

## 10 Rolling bearing reconditioning

During the maintenance of machinery and plant, many rolling bearings are taken out of service and replaced by new ones as a precaution. In some cases, this safety-conscious approach blocks any appreciation of the potential cost savings. The fact is: reconditioned bearings generally give the same performance as new ones.

The reconditioning of rolling bearings and rolling bearing units is one of the core competences of the service arm of Schaeffler and is offered at several certified locations worldwide. Our services for rolling bearings of all types apply irrespective of manufacturer and are not restricted to Schaeffler products.

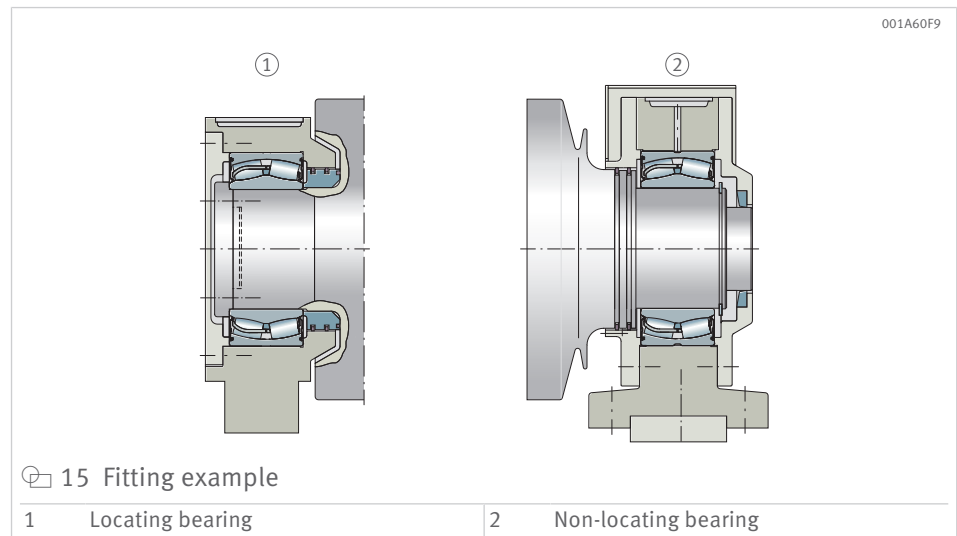
Schaeffler is able to recondition and modify rolling bearings with an outside diameter of up to 4250 mm. Schaeffler is thus an expert partner for customers from a very wide range of industrial sectors such as general and special machine building, steel and aluminium, pulp and paper production, wind power, shipbuilding, private and public railways and mining.



14 Bearing examination by Schaeffler reconditioning specialists

## 11 Potential savings

In continuous slab casting plant, sealed spherical roller bearings are fitted as locating bearings and as non-locating bearings.

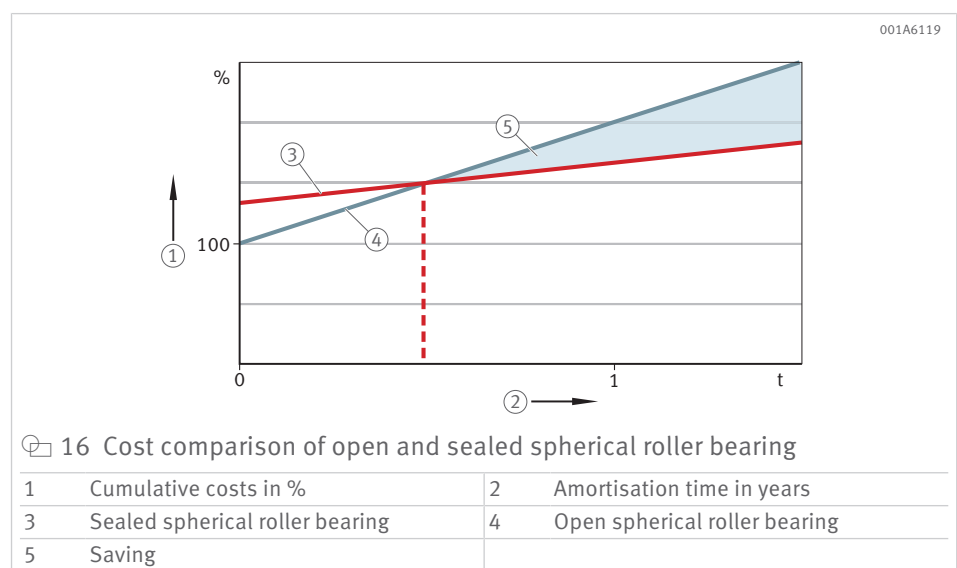


The following comparison from the continuous casting sector shows the savings that are possible by the use of sealed spherical roller bearings instead of open bearings.

The grease costs for relubrication of an open bearing and a sealed bearing (seal lubrication of the housing) were taken into consideration along with the specific disposal and separation of the grease from the cooling circuit.

Due to the lower maintenance outlay and the generally longer life of the sealed spherical roller bearing, the higher purchase price compared to the open bearing is recouped after only a short time.

The example shows the cost ratio and its development over time for a sealed and an open bearing for a selected bearing position in a continuous casting plant. In the example, 100 % corresponds to the bearing price for the open bearing.



## 12 Application examples

### 12.1 Continuous casting plant

In continuous casting plant, the cast strand is supported by rolls. In order to restrict deflection, the rolls are supported at several points along their length by rolling bearings. These bearings are subjected to high loads, low speeds, spray water and high temperatures. Spherical roller bearings of sealed design are used to support the rolls.



#### Requirements

The requirements placed on the design are:

- high static load carrying capacity
- maximum resistance to the ingress of foreign matter

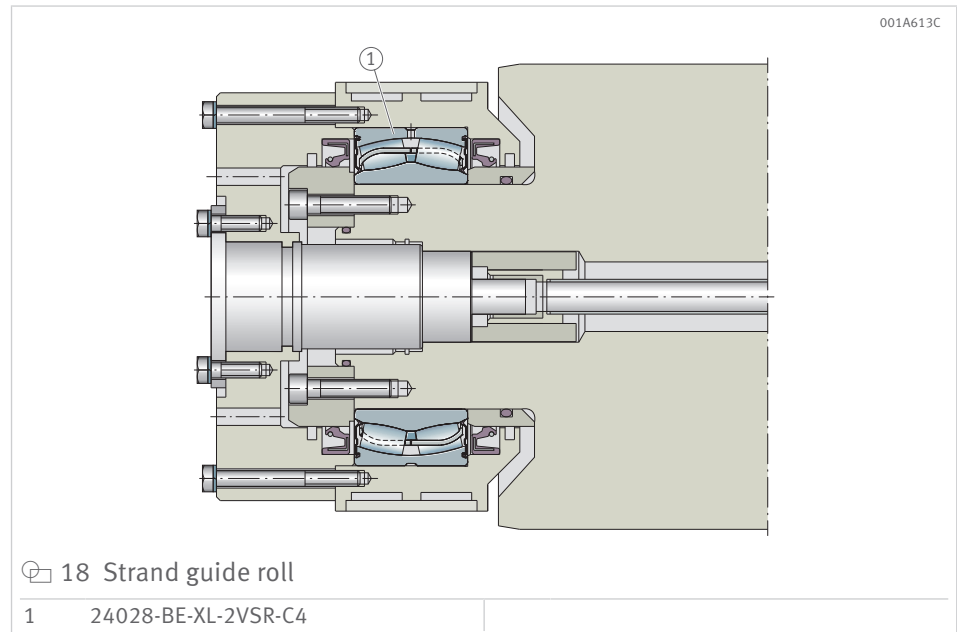
#### Design solution

Sealed spherical roller bearings E1 offer a high standard of reliability, cost-efficiency and technical performance capacity in the metal-producing and metal-processing industry.

Due to the particularly compact bearing seals in series 240 and 241, the internal construction used can be the same as in the open type. The advantages of the field tested design in the X-life premium brand are thus also accessible for sealed spherical roller bearings. The external dimensions of course remain identical to those of the unsealed variant. The reliable sealing arrangement using a high temperature elastomer (FKM) and a special high temperature lubricant extends the bearing operating life, leading to higher machine availability and thus to a greater added value.

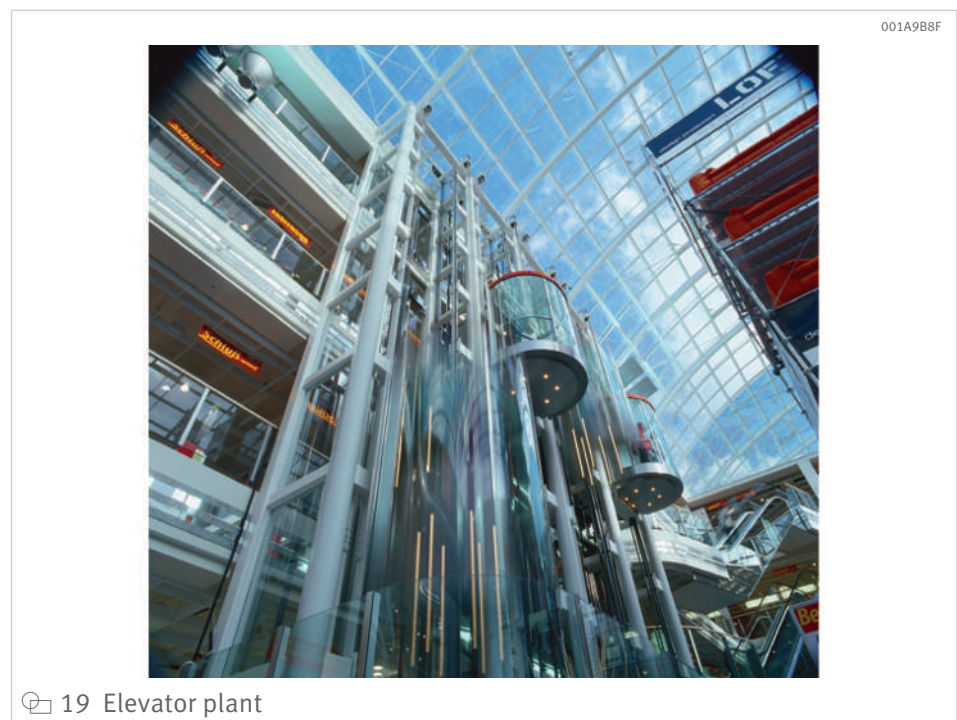
The maintenance-friendly sealing concept of the series also contributes to rapid amortisation.

For the specific applications, the grease operating life as well as the relubrication quantity and the service life must be checked.



## 12.2 Elevator plant

Due to their optimised bearing kinematics and minimal frictional torque, sealed spherical roller bearings are an ideal choice for use in elevator plant.



### Requirements

The demands on the design are:

- a low-maintenance bearing arrangement
- maximum operating life

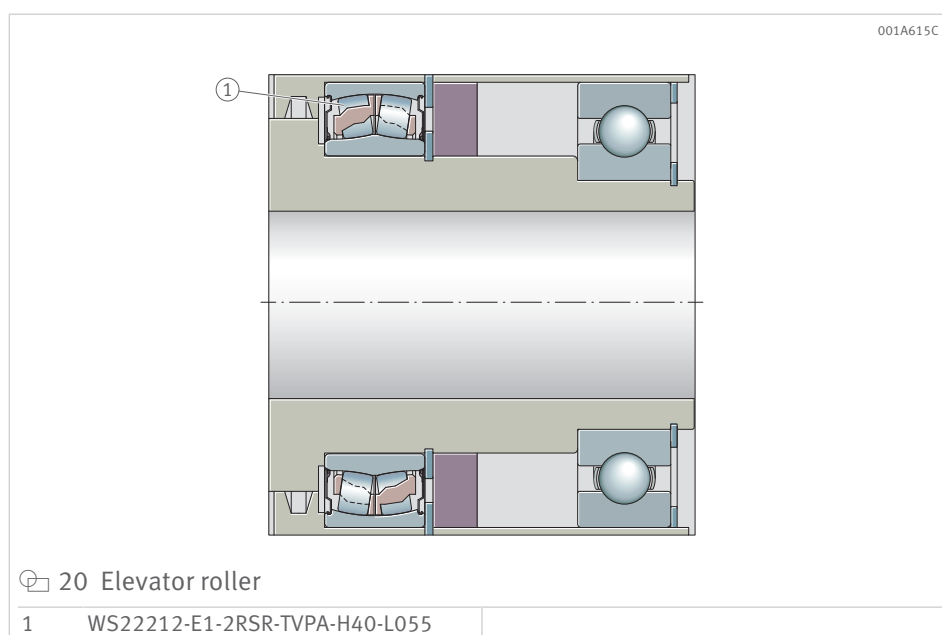
## Design solution

The reliable sealing arrangement using an elastomer already subjected to field tests extends the operating life and, as a result, is almost maintenance-free.

The consistently very high basic load ratings of the spherical roller bearings also permits downsizing of existing bearing arrangements or in new designs. We address the increasing requirements in the travel height and travel speed of elevators using our sealed spherical roller bearings with high basic load ratings and smooth running characteristics.

Furthermore, a particularly low noise level can be achieved by ordering specially developed low noise designs. For example, rollers with special surface and waviness requirements (suffix T45C) or a different grease such as L055 can be used for this purpose.

For the specific applications, the grease operating life as well as the relubrication quantity and the service life must be checked.



## 13 Further information

Further information can be found in the following publications:

HR 1, Rolling Bearings,  
<https://www.schaeffler.de/std/1F85>

GK 1, Bearing Housings,  
<https://www.schaeffler.de/std/1FC0>

TPI 168, Arcanol Rolling Bearing Greases,  
<https://www.schaeffler.de/std/1F66>

TPI 176, Lubrication of Rolling Bearings,  
<https://www.schaeffler.de/std/1F83>

TPI 196, Hydraulic Nut HYDNUT,  
<https://www.schaeffler.de/std/1FBE>

TPI 207, Repair and Reconditioning of Rolling Bearings,  
<https://www.schaeffler.de/std/1FBD>

BA 04, Hydraulic nuts,  
<https://www.schaeffler.de/std/1FBF>

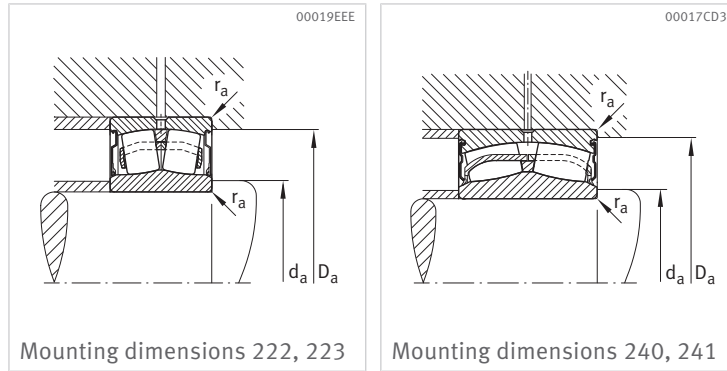


## 14 Product tables

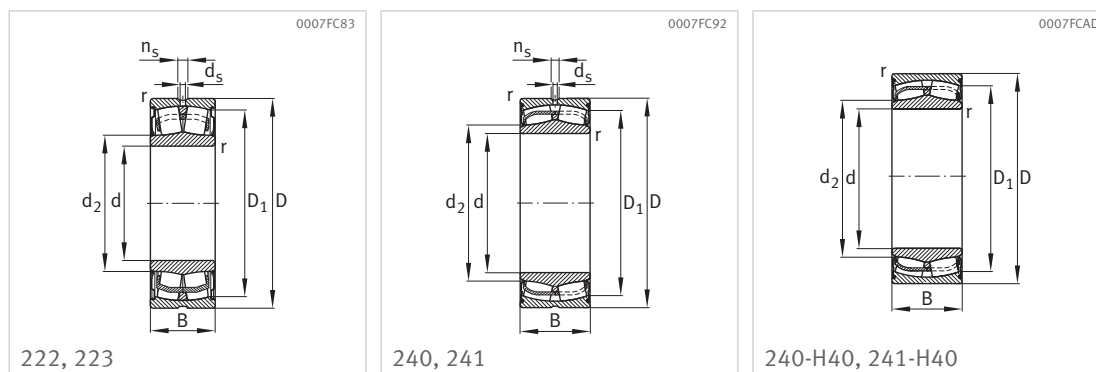
### 14.1 Explanation

B	mm	Width
$C_{0r}$	N	Basic static load rating, radial
$C_r$	N	Basic dynamic load rating, radial
$C_{ur}$	N	Fatigue limit load, radial
d	mm	Bearing bore diameter
D	mm	Bearing outside diameter
$D_1$	mm	Outer ring bore diameter
$d_2$	mm	Inner ring raceway diameter
$d_a$	mm	Abutment diameter, shaft shoulder
$D_a$	mm	Housing connection diameter
$d_s$	mm	Lubrication hole diameter
e	–	Calculation factor
m	kg	Mass
$n_G$	$\text{min}^{-1}$	Limiting speed
$n_s$	mm	Lubrication groove width
r	mm	Chamfer dimension
$r_a$	mm	Undercut radius
$Y_0$	–	Calculation factor
$Y_1$	–	Calculation factor
$Y_2$	–	Calculation factor

## 14.2 Sealed spherical roller bearings

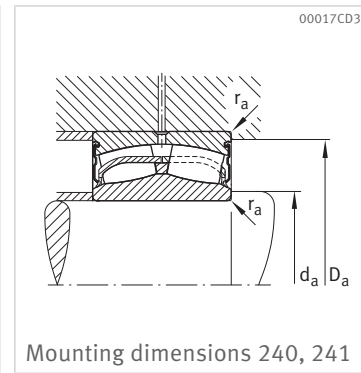
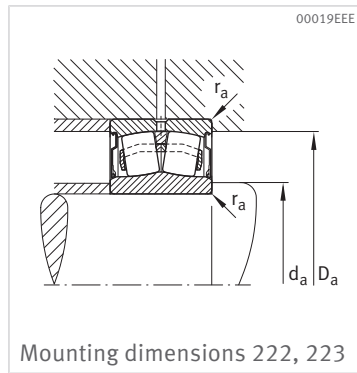


Designation	m	d	D	B	r min.	D <sub>1</sub>	d <sub>2</sub>	d <sub>5</sub>	n <sub>5</sub>	d <sub>a</sub> min.	D <sub>a</sub> max.
–	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
WS22205-E1-XL-2RSR	0,235	25	52	23	1	46,1	29,8	3,2	4,8	29,8	46,4
WS22205-E1-XL-K-2RSR	0,235	25	52	23	1	46,1	29,8	3,2	4,8	29,8	46,4
WS22206-E1-XL-2RSR	0,4	30	62	25	1	55,5	35	3,2	4,8	35	56,4
WS22206-E1-XL-K-2RSR	0,4	30	62	25	1	55,5	35	3,2	4,8	35	56,4
WS22207-E1-XL-2RSR	0,6	35	72	28	1,1	64,2	40,1	3,2	4,8	40,1	65
WS22207-E1-XL-K-2RSR	0,6	35	72	28	1,1	64,2	40,1	3,2	4,8	40,1	65
WS22208-E1-XL-2RSR	0,7	40	80	28	1,1	72,6	45,9	3,2	4,8	45,9	73
WS22208-E1-XL-K-2RSR	0,7	40	80	28	1,1	72,6	45,9	3,2	4,8	45,9	73
WS222308-E1-XL-2RSR	1,16	40	90	38	1,5	78,1	48,9	3,2	6,5	48,9	81
WS222308-E1-XL-K-2RSR	1,16	40	90	38	1,5	78,1	48,9	3,2	6,5	48,9	81
WS22209-E1-XL-2RSR	0,67	45	85	28	1,1	77,8	51,4	3,2	4,8	51,4	78
WS22209-E1-XL-K-2RSR	0,67	45	85	28	1,1	77,8	51,4	3,2	4,8	51,4	78
WS22309-E1-XL-K-2RSR	1,57	45	100	42	1,5	82	54,7	3,2	6,5	54	91
WS22210-E1-XL-2RSR	0,8	50	90	28	1,1	83,1	56	3,2	4,8	56	83,1
WS22210-E1-XL-K-2RSR	0,8	50	90	28	1,1	83,1	56	3,2	4,8	56	83,1
WS22211-E1-XL-2RSR	1,1	55	100	31	1,5	91,9	63,5	3,2	4,8	63,5	91,9
WS22211-E1-XL-K-2RSR	1,1	55	100	31	1,5	91,9	63,5	3,2	4,8	63,5	91,9
WS22311-E1-XL-2RSR	2,9	55	120	49	2	104,1	64,8	3,2	6,5	64,8	109
WS22311-E1-XL-K-2RSR	2,9	55	120	49	2	104,1	64,8	3,2	6,5	64,8	109
WS22212-E1-XL-2RSR	1,5	60	110	34	1,5	100,7	67,6	3,2	6,5	67,6	101
WS22212-E1-XL-K-2RSR	1,5	60	110	34	1,5	100,7	67,6	3,2	6,5	67,6	101
WS22312-E1-XL-2RSR	3,4	60	130	53	2,1	110,2	71,4	3,2	6,5	71,4	118
WS22312-E1-XL-K-2RSR	3,4	60	130	53	2,1	110,2	71,4	3,2	6,5	71,4	118
WS22213-E1-XL-2RSR	2	65	120	38	1,5	110,2	76,2	3,2	6,5	76,2	111
WS22213-E1-XL-K-2RSR	1,69	65	120	38	1,5	110,2	76,2	3,2	6,5	76,2	111
WS22214-E1-XL-2RSR	2,1	70	125	38	1,5	113,5	82,5	3,2	6,5	82,5	116
WS22214-E1-XL-K-2RSR	1,84	70	125	38	1,5	113,5	82,5	3,2	6,5	82,5	116
WS22314-E1-XL-2RSR	5,4	70	150	60	2,1	130,4	80,7	4,8	9,5	80,7	138
WS22314-E1-XL-K-2RSR	5,4	70	150	60	2,1	130,4	80,7	4,8	9,5	80,7	138
WS22215-E1-XL-2RSR	2,2	75	130	38	1,5	120,2	85,6	3,2	6,5	84	121
WS22215-E1-XL-K-2RSR	1,93	75	130	38	1,5	120,2	85,6	3,2	6,5	84	121
WS22315-E1-XL-K-2RSR	6,1	75	160	64	2,1	138,74	86,46	4,8	9,5	86,46	148
WS22216-E1-XL-2RSR	2,7	80	140	40	2	128,6	91,3	3,2	6,5	91	129
WS22216-E1-XL-K-2RSR	2,3	80	140	40	2	128,6	91,3	3,2	6,5	91	129
WS22217-E1-XL-2RSR	3,4	85	150	44	2	137,1	96,5	3,2	6,5	96	139
WS22217-E1-XL-K-2RSR	3	85	150	44	2	137,1	96,5	3,2	6,5	96	139
WS22218-E1-XL-2RSR	4,3	90	160	48	2	146,7	101,4	3,2	6,5	101	149
WS22218-E1-XL-K-2RSR	3,8	90	160	48	2	146,7	101,4	3,2	6,5	101	149
WS22220-E1-XL-2RSR	6,3	100	180	55	2,1	169,1	115	4,8	9,5	112	169,1
WS22220-E1-XL-K-2RSR	5,6	100	180	55	2,1	169,1	115	4,8	9,5	112	169,1

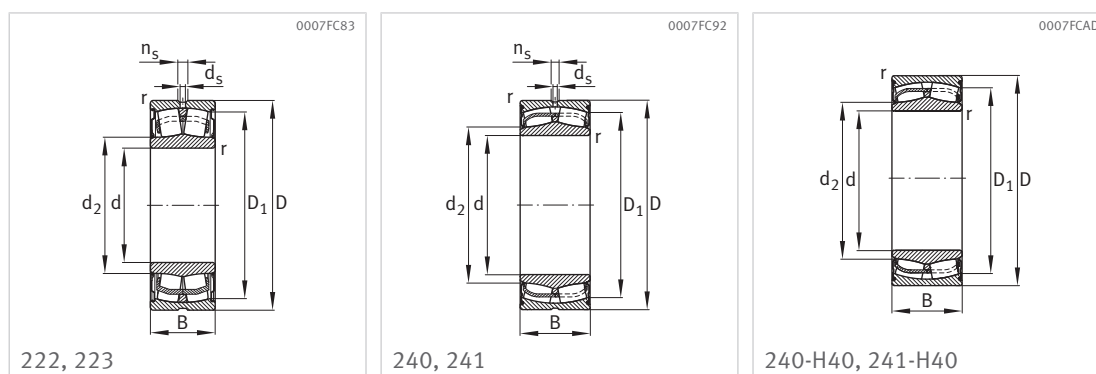


$r_a$ max.	$C_r$	$C_{or}$	e	Y1	Y2	Y0	$C_{ur}$	$n_G$	Adapter sleeve	Withdrawal sleeve
mm	N	N	-	-	-	-	N	min <sup>-1</sup>	-	-
1	48500	42500	0,33	2,07	3,09	2,03	4900	3600	-	-
1	48500	42500	0,33	2,07	3,09	2,03	4900	3600	H2205-T-WS	AH2205-WS
1	64000	57000	0,3	2,26	3,37	2,21	7000	3150	-	-
1	64000	57000	0,3	2,26	3,37	2,21	7000	3150	H2206-T-WS	AH2206-WS
1	89000	81000	0,31	2,21	3,29	2,16	9700	2700	-	-
1	89000	81000	0,31	2,21	3,29	2,16	9700	2700	H2207-T-WS	AH2207-WS
1	101000	91000	0,27	2,49	3,71	2,43	12100	2600	-	-
1	101000	91000	0,27	2,49	3,71	2,43	12100	2600	H2208-T-WS	AH2208-WS
1,5	156000	149000	0,36	1,86	2,77	1,82	13500	1890	-	-
1,5	156000	149000	0,36	1,86	2,77	1,82	13500	1890	H3308-T-WS	AH3308
1	104000	99000	0,25	2,74	4,08	2,68	13000	2550	-	-
1	104000	99000	0,25	2,74	4,08	2,68	13000	2550	H2209-T-WS	AH2209-WS
1,5	187000	183000	0,36	1,9	2,83	1,86	16500	6800	H3309-T-WS	AH3309
1	109000	107000	0,23	2,95	4,4	2,89	14600	2440	-	-
1	109000	107000	0,23	2,95	4,4	2,89	14600	2440	H2210-T-WS	AH2210-WS
1,5	129000	130000	0,21	3,17	4,72	3,1	17700	2250	-	-
1,5	129000	130000	0,21	3,17	4,72	3,1	17700	2250	H2211-T-WS	AH2211-WS
2	265000	260000	0,36	1,89	2,81	1,84	24600	1460	-	-
2	265000	260000	0,36	1,89	2,81	1,84	24600	1460	H3311-T-WS	AH3311
1,5	160000	155000	0,23	2,98	4,44	2,92	20700	2030	-	-
1,5	160000	155000	0,23	2,98	4,44	2,92	20700	2030	H2212-T-WS	AH2212-WS
2,1	310000	310000	0,35	1,91	2,85	1,87	29000	1350	-	-
2,1	310000	310000	0,35	1,91	2,85	1,87	29000	1350	H3312-T-WS	AH3312
1,5	202000	210000	0,24	2,81	4,19	2,75	26500	1740	-	-
1,5	202000	210000	0,24	2,81	4,19	2,75	26500	1740	H2213-T-WS	AH2213-WS
1,5	211000	226000	0,23	2,95	4,4	2,89	28500	1670	-	-
1,5	211000	226000	0,23	2,95	4,4	2,89	28500	1670	H2214-T-WS	AH2214-WS
2,1	390000	390000	0,34	2	2,98	1,96	37500	1210	-	-
2,1	390000	390000	0,34	2	2,98	1,96	37500	1210	H3314-T-WS	AH3314
1,5	216000	237000	0,22	3,1	4,62	3,03	30500	1630	-	-
1,5	216000	237000	0,22	3,1	4,62	3,03	30500	1630	H2215-T-WS	AH2215-WS
2,1	44500	45000	0,34	1,99	2,96	1,94	40500	4500	H3315-T-WS	AH3315
2	250000	270000	0,22	3,14	4,67	3,07	34500	1540	-	-
2	250000	270000	0,22	3,14	4,67	3,07	34500	1540	H2216-T-WS	AH2216-WS
2	305000	325000	0,22	3,04	4,53	2,97	39000	1420	-	-
2	305000	325000	0,22	3,04	4,53	2,97	39000	1420	H2217-T-WS	AH2217-WS
2	345000	375000	0,23	2,9	4,31	2,83	43500	1300	-	-
2	345000	375000	0,23	2,9	4,31	2,83	43500	1300	H2218-T-WS	AH2218-WS
2,1	430000	475000	0,24	2,84	4,23	2,78	53000	1140	-	-
2,1	430000	475000	0,24	2,84	4,23	2,78	53000	1140	H2220-T-WS	AH2220-WS

## 14.2 Sealed spherical roller bearings

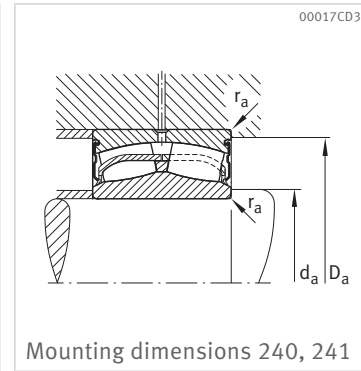
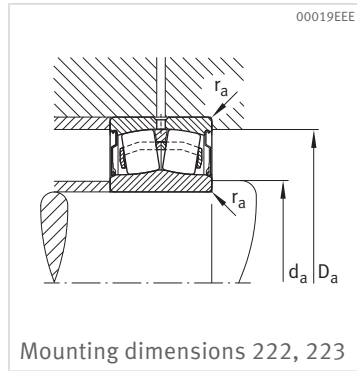


Designation	m	d	D	B	r min.	D <sub>1</sub>	d <sub>2</sub>	d <sub>5</sub>	n <sub>5</sub>	d <sub>a</sub> min.	D <sub>a</sub> max.
–	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
24122-BE-XL-2VSR	6,7	110	180	69	2	167,1	120,8	3,2	6,5	121	169
WS22222-E1-XL-2RSR	9	110	200	63	2,1	182,6	124,9	4,8	9,5	122	188
WS22222-E1-XL-K-2RSR	9	110	200	63	2,1	182,6	124,9	4,8	9,5	122	188
24024-BE-XL-2VSR	5,3	120	180	60	2	170,5	131	3,2	6,5	128,8	171,2
24124-BE-XL-2VSR	10,3	120	200	80	2	184,5	131,1	3,2	6,5	131	189
WS22224-E1-XL-2RSR	11,3	120	215	69	2,1	203,4	136,8	6,3	12,2	132	203,4
WS22224-E1-XL-K-2RSR	11,3	120	215	69	2,1	203,4	136,8	6,3	12,2	132	203,4
24026-BE-XL-2VSR	7,8	130	200	69	2	187,2	142,1	3,2	6,5	138,8	191,2
24126-BE-XL-2VSR	11	130	210	80	2	196,1	143,1	3,2	6,5	141	199
WS22226-E1-XL-2RSR	12,8	130	230	75	3	217,5	146,6	6,3	12,2	144	217,5
WS22226-E1-XL-K-2RSR	12,8	130	230	75	3	217,5	146,6	6,3	12,2	144	217,5
24028-BE-XL-2VSR	8,4	140	210	69	2	198,5	153,3	3,2	6,5	148,8	201,2
24128-BE-XL-2VSR	13,8	140	225	85	2,1	209,9	153,5	4,8	9,5	152	213
22228-E1A-XL-2RSR-M	14,1	140	250	68	3	–	–	6,3	12,2	154	236
22228-E1A-XL-K-2RSR-M	13,7	140	250	68	3	223,3	–	6,3	12,2	154	236
24030-BE-XL-2VSR	11,1	150	225	75	2,1	213,2	164	3,2	6,5	160,2	214,8
24130-BE-XL-2VSR	20,6	150	250	100	2,1	228,9	163,1	4,8	9,5	162	238
24032-BE-XL-2VSR	12,7	160	240	80	2,1	226,9	174,8	4,8	9,5	170,2	229,8
24132-BE-XL-2VSR	25,4	160	270	109	2,1	245,6	175,5	4,8	9,5	172	258
22232-E1A-XL-2RSR-M	23,3	160	290	80	3	–	–	8	15	174	276
22232-E1A-XL-K-2RSR-M	22,4	160	290	80	3	258,3	–	8	15	174	276
24034-BE-XL-2VSR	16,9	170	260	90	2,1	243,3	184,8	4,8	9,5	180,2	249,8
24134-BE-XL-2VSR	26,4	170	280	109	2,1	257,3	186,7	4,8	9,5	182	268
24036-BE-XL-2VSR	22,7	180	280	100	2,1	259,6	195,6	4,8	9,5	190,2	269,8
24136-BE-XL-2VSR	33,2	180	300	118	3	276,3	196,2	6,3	12,2	194	286
24038-BE-XL-2VSR	23,7	190	290	100	2,1	271,1	206,2	4,8	9,5	200,2	279,8
24138-BE-XL-2VSR	41,5	190	320	128	3	292,6	208	6,3	12,2	204	306
24040-BE-XL-2VSR	30,1	200	310	109	2,1	287,8	217	6,3	12,2	210,2	299,8
23140-BE-XL-2RSR	41,5	200	340	112	3	319	224,6	9,5	17,7	214	326
23140-BE-XL-K-2RSR	40,9	200	340	112	3	319	224,6	9,5	17,7	214	326
24140-BE-XL-2VSR	49,5	200	340	140	3	309,5	216,2	6,3	12,2	214	326
23144-BE-XL-2RSR	52,2	220	370	120	4	345	249	9,5	17,7	237	353
23144-BE-XL-K-2RSR	50,5	220	370	120	4	345	249	9,5	17,7	237	353
24144-BE-XL-2VSR	64	220	370	150	4	338,5	236,2	6,3	12,2	237	353
23148-BE-XL-2RSR	64	240	400	128	4	374	269	9,5	17,7	257	383
23148-BE-XL-K-2RSR	62	240	400	128	4	374	269	9,5	17,7	257	383
23152-BE-XL-2RSR	90	260	440	144	4	412	295	9,5	17,7	277	423
23152-BE-XL-K-2RSR	87,2	260	440	144	4	412	295	9,5	17,7	277	423
23156-BE-XL-2RSR	96,3	280	460	146	5	431	315	9,5	17,7	300	440
23156-BE-XL-K-2RSR	93,1	280	460	146	5	431	315	9,5	17,7	300	440

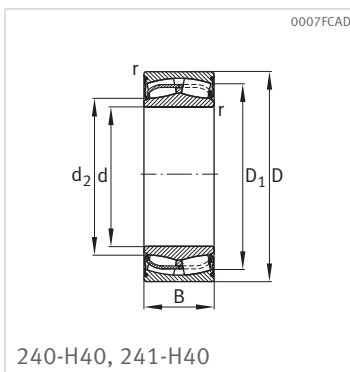
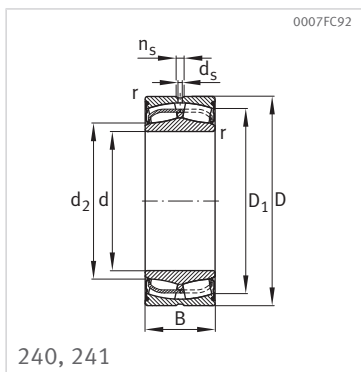
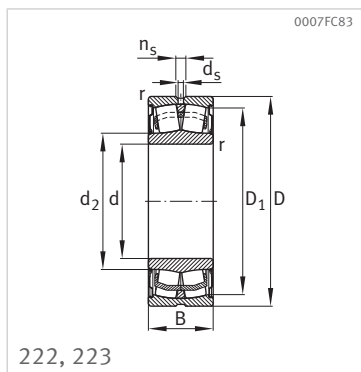


$r_a$ max.	$C_r$	$C_{or}$	e	Y1	Y2	Y0	$C_{ur}$	$n_G$	Adapter sleeve	Withdrawal sleeve
mm	N	N	–	–	–	–	N	$\text{min}^{-1}$	–	–
2	530000	750000	0,34	1,96	2,92	1,92	86000	830	–	–
2,1	550000	600000	0,25	2,71	4,04	2,65	64000	1020	–	–
2,1	550000	600000	0,25	2,71	4,04	2,65	64000	1020	H2222-T-WS	AH2222-WS
2	450000	690000	0,29	2,33	3,47	2,28	86000	860	–	–
2	680000	950000	0,37	1,84	2,74	1,8	103000	740	–	–
2,1	640000	740000	0,25	2,71	4,04	2,65	73000	920	–	–
2,1	640000	740000	0,25	2,71	4,04	2,65	73000	920	H2224-T-WS	AH2224-WS
2	570000	860000	0,31	2,21	3,29	2,16	103000	780	–	–
2	710000	1050000	0,34	1,98	2,94	1,93	112000	700	–	–
2,5	760000	890000	0,26	2,62	3,9	2,56	81000	840	–	–
2,5	760000	890000	0,26	2,62	3,9	2,56	81000	840	H2226-T-WS	AH2226-WS
2	590000	930000	0,28	2,37	3,53	2,32	111000	740	–	–
2,1	800000	1190000	0,34	1,99	2,96	1,94	127000	660	–	–
2,5	830000	970000	0,24	2,81	4,19	2,75	100000	820	–	–
2,5	830000	970000	0,24	2,81	4,19	2,75	100000	820	H3128	AHX3128
2,1	680000	1090000	0,29	2,32	3,45	2,26	125000	690	–	–
2,1	1050000	1520000	0,37	1,83	2,72	1,79	153000	590	–	–
2,1	770000	1240000	0,29	2,32	3,45	2,26	140000	640	–	–
2,1	1220000	1800000	0,37	1,8	2,69	1,76	173000	540	–	–
2,5	1080000	1300000	0,24	2,79	4,15	2,73	128000	700	–	–
2,5	1080000	1300000	0,24	2,79	4,15	2,73	128000	700	H3132	AH3132A
2,1	940000	1480000	0,31	2,2	3,27	2,15	162000	600	–	–
2,1	1260000	1900000	0,36	1,9	2,83	1,86	184000	530	–	–
2,1	1130000	1770000	0,32	2,1	3,13	2,06	185000	550	–	–
2,5	1460000	2170000	0,36	1,86	2,77	1,82	208000	500	–	–
2,1	1160000	1860000	0,31	2,2	3,27	2,15	197000	540	–	–
2,5	1680000	2550000	0,37	1,82	2,7	1,78	232000	460	–	–
2,1	1350000	2150000	0,32	2,13	3,17	2,08	221000	500	–	–
2,5	1620000	2270000	0,3	2,25	3,34	2,2	194000	510	–	–
2,5	1620000	2270000	0,3	2,25	3,34	2,2	194000	510	H3140-HG	AH3140
2,5	1880000	2800000	0,39	1,71	2,54	1,67	260000	445	–	–
3	1860000	2700000	0,29	2,3	3,45	2,25	224000	465	–	–
3	1860000	2700000	0,29	2,3	3,42	2,25	224000	465	H3144-HG-T	AH3144
3	2190000	3250000	0,39	1,74	2,59	1,7	300000	410	–	–
3	2140000	3150000	0,29	2,35	3,5	2,3	255000	425	–	–
3	2140000	3150000	0,29	2,35	3,5	2,3	255000	425	H3148-HG-T	AH3148
3	2600000	3900000	0,3	2,26	3,37	2,21	300000	375	–	–
3	2600000	3900000	0,3	2,26	3,37	2,21	300000	375	H3152-HG-T	AH3152G
4	2750000	4200000	0,28	2,37	3,53	2,32	325000	355	–	–
4	2750000	4200000	0,28	2,37	3,53	2,32	325000	355	H3156-HG-T	AH3156G

## 14.2 Sealed spherical roller bearings



Designation	m	d	D	B	r min.	D <sub>1</sub>	d <sub>2</sub>	d <sub>5</sub>	n <sub>5</sub>	d <sub>a</sub> min.	D <sub>a</sub> max.
-	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
23160-BEA-XL-2RSR-MB1	130	<b>300</b>	500	160	5	436,8	-	9,5	17,7	320	480
23160-BEA-XL-K-2RSR-MB1	126	<b>300</b>	500	160	5	436,8	-	9,5	17,7	320	480
23164-BEA-XL-2RSR-MB1	165	<b>320</b>	540	176	5	470,5	-	12,5	23,5	340	520
23164-BEA-XL-K-2RSR-MB1	161	<b>320</b>	540	176	5	470,5	-	12,5	23,5	340	520
23168-BEA-XL-2RSR-MB1	210	<b>340</b>	580	190	5	503,9	-	12,5	23,5	360	560
23168-BEA-XL-K-2RSR-MB1	204	<b>340</b>	580	190	5	503,9	-	12,5	23,5	360	560
23172-BEA-XL-2RSR-MB1	222	<b>360</b>	600	192	5	524,5	-	12,5	23,5	380	580
23172-BEA-XL-K-2RSR-MB1	215	<b>360</b>	600	192	5	524,5	-	12,5	23,5	380	580
23176-BEA-XL-2RSR-MB1	234	<b>380</b>	620	194	5	544,9	-	12,5	23,5	400	600
23176-BEA-XL-K-2RSR-MB1	227	<b>380</b>	620	194	5	544,9	-	12,5	23,5	400	600
23180-BEA-XL-2RSR-MB1	255	<b>400</b>	650	200	6	573,3	-	12,5	23,5	426	624
23180-BEA-XL-K-2RSR-MB1	246	<b>400</b>	650	200	6	573,3	-	12,5	23,5	426	624



$r_a$ max.	$C_r$	$C_{0r}$	e	Y1	Y2	Y0	$C_{ur}$	$n_G$	Adapter sleeve	Withdrawal sleeve
mm	N	N	–	–	–	–	N	min <sup>-1</sup>	–	–
4	3250000	4950000	0,29	2,3	3,42	2,25	375000	325	–	–
4	3250000	4950000	0,29	2,3	3,42	2,25	375000	325	H3160-HG	AH3160G
4	3800000	5900000	0,3	2,26	3,37	2,21	425000	290	–	–
4	3800000	5900000	0,3	2,26	3,37	2,21	425000	290	H3164-HG	AH3164G-H
4	4400000	6600000	0,3	2,23	3,32	2,18	480000	270	–	–
4	4400000	6600000	0,3	2,23	3,32	2,18	480000	270	H3168-HG	AH3168G-H
4	4550000	7100000	0,29	2,3	3,42	2,25	510000	260	–	–
4	4550000	7100000	0,29	2,3	3,42	2,25	510000	260	H3172-HG	AH3172G-H
4	4750000	7600000	0,28	2,37	3,53	2,32	540000	248	–	–
4	4750000	7600000	0,28	2,37	3,53	2,32	540000	248	H3176-HG	AH3176G-H
5	5100000	8100000	0,28	2,41	3,59	2,35	590000	236	–	–
5	5100000	8100000	0,28	2,41	3,59	2,35	590000	236	H3180-HG	AH3180G-H

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