



1. Features

The ULTAGE series spherical roller bearings with high-strength cage [EMA type] use dedicated machined brass cages. These bearings are suitable for mining machinery (vibrating screens, crushers, etc.), which experience eccentric rotation and impact loads.

2. Accuracy and clearance (specification for vibrating screens)

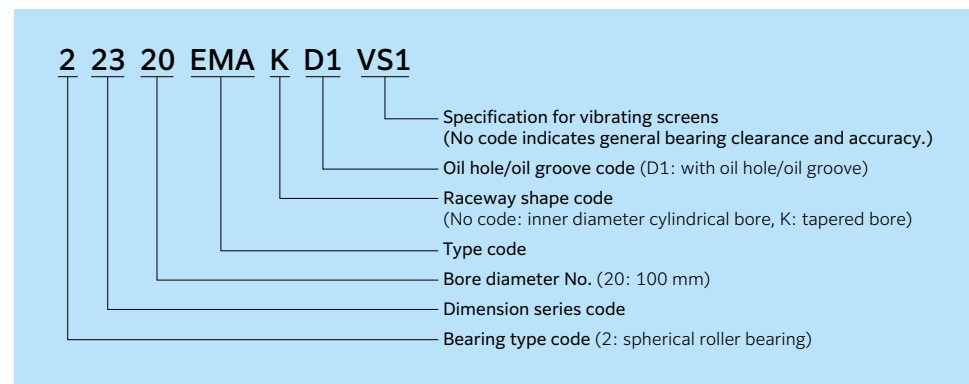
The inner and outer diameter tolerance and the radial internal clearance are set for vibrating screens to obtain the desired operating clearance. See the table below for the specifications of the ULTAGE series spherical roller bearings for the bearing specifications (accuracy, clearance, etc.) to be used with vibrating screens.

| | | |
|--------|----------------|---|
| Design | | |
| | Bearing series | 223 series inner diameter 70 to 200 mm |
| | Roller | Symmetrical |
| | Cage type | Special machined cage |

Unit: mm

| Dimensional tolerance of mean bore diameter within plane | | | | Dimensional tolerance of mean outside diameter within plane | | | | Radial internal clearance (cylindrical bore) | | | | | |
|--|-------|----------|--------|---|-------|----------|--------|--|-------|-------|-------|-------|-------|
| Nominal bearing bore diameter | | VS1, VS2 | | Nominal bearing outside diameter | | VS1, VS2 | | Nominal bearing bore diameter | | VS1 | | VS2 | |
| Over | Incl. | Upper | Lower | Over | Incl. | Upper | Lower | Over | Incl. | Min. | Max. | Min. | Max. |
| 80 | | 0 | -0.010 | 150 | | -0.005 | -0.013 | 65 | | 0.075 | 0.090 | 0.100 | 0.120 |
| 80 | 120 | 0 | -0.013 | 150 | 180 | -0.005 | -0.018 | 65 | 80 | 0.090 | 0.110 | 0.120 | 0.145 |
| 120 | 180 | 0 | -0.015 | 180 | 315 | -0.010 | -0.023 | 80 | 100 | 0.110 | 0.135 | 0.150 | 0.180 |
| 180 | 200 | 0 | -0.018 | 315 | 400 | -0.013 | -0.028 | 100 | 120 | 0.135 | 0.160 | 0.180 | 0.210 |
| | | | | 400 | 420 | -0.014 | -0.030 | 120 | 140 | 0.160 | 0.190 | 0.205 | 0.240 |
| | | | | | | | | 140 | 160 | 0.190 | 0.220 | 0.240 | 0.280 |
| | | | | | | | | 160 | 180 | 0.200 | 0.240 | 0.260 | 0.310 |
| | | | | | | | | 180 | 200 | 0.220 | 0.260 | 0.285 | 0.340 |

3. Part number



4. Allowable axial load

$$F_a / F_r \leq e$$

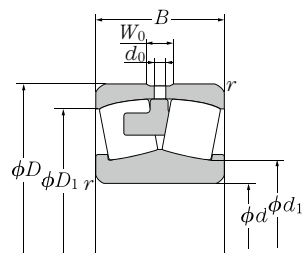
F_a : Axial load
 F_r : Radial load
 e : Constant (see dimension table)

If this bearing type is used under a large axial load, the load on the rollers of the row that is not subject to the axial load can become small. This small load on the rollers can result in skidding of the rollers, which can cause bearing damage. If the ratio of the radial load exceeds the factor e in the dimension table ($F_a / F_r > e$), consult NTN Engineering.

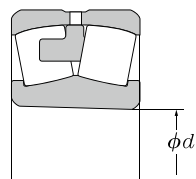
5. Allowable misalignment angle

Normal load or more 1/115 (mm/mm)
 Light load 1/30 (mm/mm)

*For a rough estimate of normal loads and light loads, see Note 1 in General Description A-81.



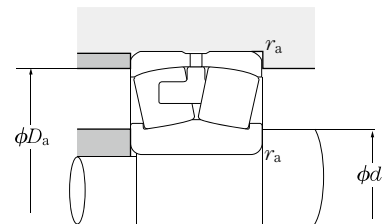
Cylindrical bore



Tapered bore

Number of oil holes on outer ring

| Nominal bearing outer diameter mm | | Number of oil holes Z_0 |
|--------------------------------------|-------|------------------------------|
| Incl. | Below | |
| - | 320 | 4 |
| 320 | - | 8 |



Dynamic equivalent radial load

$$P_r = X F_r + Y F_a$$

| $\frac{F_a}{F_r} \leq e$ | | $\frac{F_a}{F_r} > e$ | |
|--------------------------|-------|-----------------------|-------|
| X | Y | X | Y |
| 1 | Y_1 | 0.67 | Y_2 |

Static equivalent radial load

$$P_{0r} = F_r + Y_0 F_a$$

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

| d | Boundary dimensions mm | | | | d ₀ | Basic load rating dynamic kN | | Allowable speed min ⁻¹ Oil lubrication | Bearing number Cylindrical bore |
|-----|---------------------------|-----|----------------------------------|----------------|----------------|---------------------------------|-----------------|---|------------------------------------|
| | D | B | r _{s min} ¹⁾ | W ₀ | | C _r | C _{0r} | | |
| 70 | 150 | 51 | 2.1 | 10 | 5 | 397 | 368 | 4 700 | 22314EMAD1 |
| 75 | 160 | 55 | 2.1 | 10 | 5 | 464 | 434 | 4 400 | 22315EMAD1 |
| 80 | 170 | 58 | 2.1 | 10 | 5 | 512 | 485 | 4 100 | 22316EMAD1 |
| 85 | 180 | 60 | 3 | 11 | 5 | 538 | 524 | 3 900 | 22317EMAD1 |
| 90 | 190 | 64 | 3 | 12 | 5 | 632 | 605 | 3 700 | 22318EMAD1 |
| 95 | 200 | 67 | 3 | 12 | 6 | 658 | 650 | 3 500 | 22319EMAD1 |
| 100 | 215 | 73 | 3 | 13 | 6 | 743 | 731 | 3 300 | 22320EMAD1 |
| 110 | 240 | 80 | 3 | 16 | 7 | 869 | 833 | 3 000 | 22322EMAD1 |
| 120 | 260 | 86 | 3 | 18 | 8 | 1 060 | 1 120 | 2 700 | 22324EMAD1 |
| 130 | 280 | 93 | 4 | 19 | 9 | 1 260 | 1 310 | 2 500 | 22326EMAD1 |
| 140 | 300 | 102 | 4 | 19 | 9 | 1 400 | 1 500 | 2 400 | 22328EMAD1 |
| 150 | 320 | 108 | 4 | 20 | 9 | 1 570 | 1 640 | 2 200 | 22330EMAD1 |
| 160 | 340 | 114 | 4 | 20 | 10 | 1 760 | 1 940 | 2 100 | 22332EMAD1 |
| 170 | 360 | 120 | 4 | 20 | 10 | 2 010 | 2 320 | 1 900 | 22334EMAD1 |
| 180 | 380 | 126 | 4 | 21 | 10 | 2 190 | 2 460 | 1 800 | 22336EMAD1 |
| 190 | 400 | 132 | 5 | 21 | 10 | 2 370 | 2 750 | 1 700 | 22338EMAD1 |
| 200 | 420 | 138 | 5 | 21 | 10 | 2 590 | 3 140 | 1 600 | 22340EMAD1 |

1) Smallest allowable dimension for chamfer dimension r.

| Bearing number | Installation-related dimensions mm | | | | | Constant e | Axial load factors | | | Mass (approx.) kg | |
|----------------------------|---------------------------------------|--------------------|--------------------|----------------|---------------------|---------------|--------------------|----------------|----------------|----------------------|--------------|
| | d ₁ | d _{a min} | D _{a max} | D ₁ | r _{as max} | | Y ₁ | Y ₂ | Y ₀ | Cylindrical bore | Tapered bore |
| Tapered bore ²⁾ | | | | | | | | | | | |
| 22314EMAKD1 | 85 | 82 | 138 | 131 | 2.1 | 0.34 | 2.00 | 2.98 | 1.96 | 4.34 | 4.25 |
| 22315EMAKD1 | 91 | 87 | 148 | 139 | 2.1 | 0.34 | 2.00 | 2.98 | 1.96 | 5.30 | 5.19 |
| 22316EMAKD1 | 98 | 92 | 158 | 148 | 2.1 | 0.34 | 2.00 | 2.98 | 1.96 | 6.32 | 6.19 |
| 22317EMAKD1 | 107 | 99 | 166 | 157 | 3 | 0.32 | 2.09 | 3.11 | 2.04 | 7.19 | 7.05 |
| 22318EMAKD1 | 110 | 104 | 176 | 166 | 3 | 0.33 | 2.06 | 3.06 | 2.01 | 8.58 | 8.41 |
| 22319EMAKD1 | 120 | 109 | 186 | 174 | 3 | 0.32 | 2.09 | 3.11 | 2.04 | 9.80 | 9.60 |
| 22320EMAKD1 | 127 | 114 | 201 | 187 | 3 | 0.34 | 1.98 | 2.94 | 1.93 | 12.8 | 12.5 |
| 22322EMAKD1 | 139 | 124 | 226 | 209 | 3 | 0.32 | 2.09 | 3.11 | 2.04 | 17.3 | 16.9 |
| 22324EMAKD1 | 156 | 134 | 246 | 225 | 3 | 0.32 | 2.09 | 3.11 | 2.04 | 22.5 | 22.0 |
| 22326EMAKD1 | 164 | 147 | 263 | 243 | 4 | 0.33 | 2.06 | 3.06 | 2.01 | 28.4 | 27.8 |
| 22328EMAKD1 | 181 | 157 | 283 | 261 | 4 | 0.33 | 2.03 | 3.02 | 1.98 | 34.6 | 33.8 |
| 22330EMAKD1 | 188 | 167 | 303 | 279 | 4 | 0.34 | 2.00 | 2.98 | 1.96 | 41.9 | 41.0 |
| 22332EMAKD1 | 205 | 177 | 323 | 296 | 4 | 0.33 | 2.03 | 3.02 | 1.98 | 50.1 | 49.1 |
| 22334EMAKD1 | 223 | 187 | 343 | 313 | 4 | 0.32 | 2.09 | 3.11 | 2.04 | 59.7 | 58.5 |
| 22336EMAKD1 | 229 | 197 | 363 | 329 | 4 | 0.32 | 2.09 | 3.11 | 2.04 | 69.3 | 67.9 |
| 22338EMAKD1 | 247 | 210 | 380 | 346 | 5 | 0.32 | 2.12 | 3.15 | 2.07 | 81.0 | 79.4 |
| 22340EMAKD1 | 265 | 220 | 400 | 364 | 5 | 0.31 | 2.15 | 3.20 | 2.10 | 94.1 | 92.2 |

2) Bearings having a tapered bore with a taper ratio of 1:12.