

NSK

CYLINDRICAL ROLLER BEARINGS WITH ALIGNING RINGS

LONG-LIFE SOLUTIONS FOR CONTINUOUS CASTING MACHINES



STAY IN MOTION. STAY IN CONTROL.



MADE WITH METTLE

BEARINGS FOR STEEL AND METALS MACHINERY

Massive loads. Intense heat. Ultra low speeds. Staggering shock loads, misalignment, and contamination from mill scale and water vapor.

From iron and steel making through rolling and forming mills, the operating conditions of the entire process are severe. The reliable, uninterrupted performance of rolling components is critical for accelerated production.

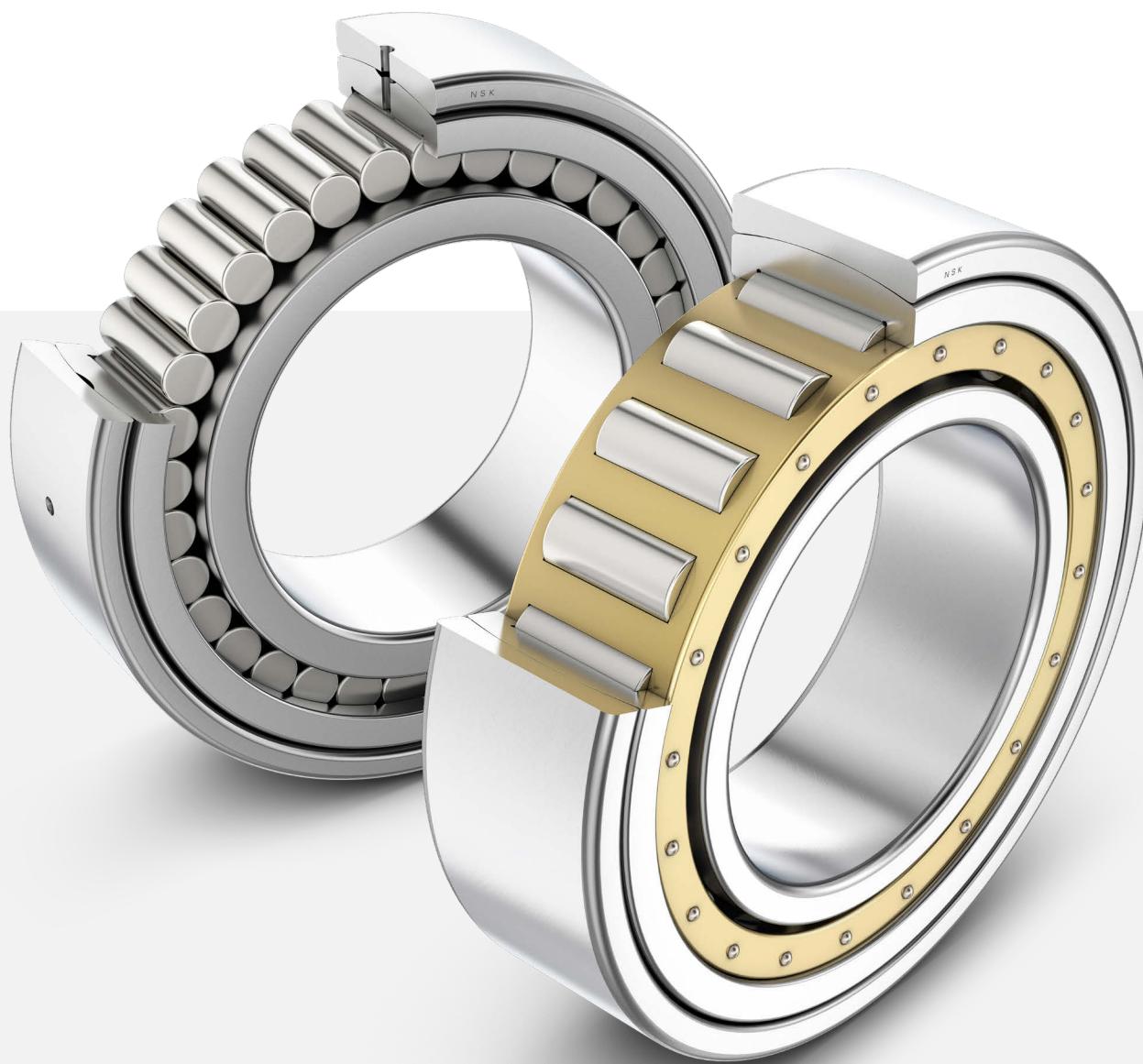
For NSK, our product development and design is focused squarely on withstanding the manifold operating stresses of these applications with:

- › increasing capacities for high loads and high speeds
- › advanced materials for durability, wear resistance and longer life
- › lubrication and seal technology for smooth and clean running

Our product solutions are designed to optimize the performance of machinery and equipment, to assure predictable reliability and to deliver total cost-efficiency.

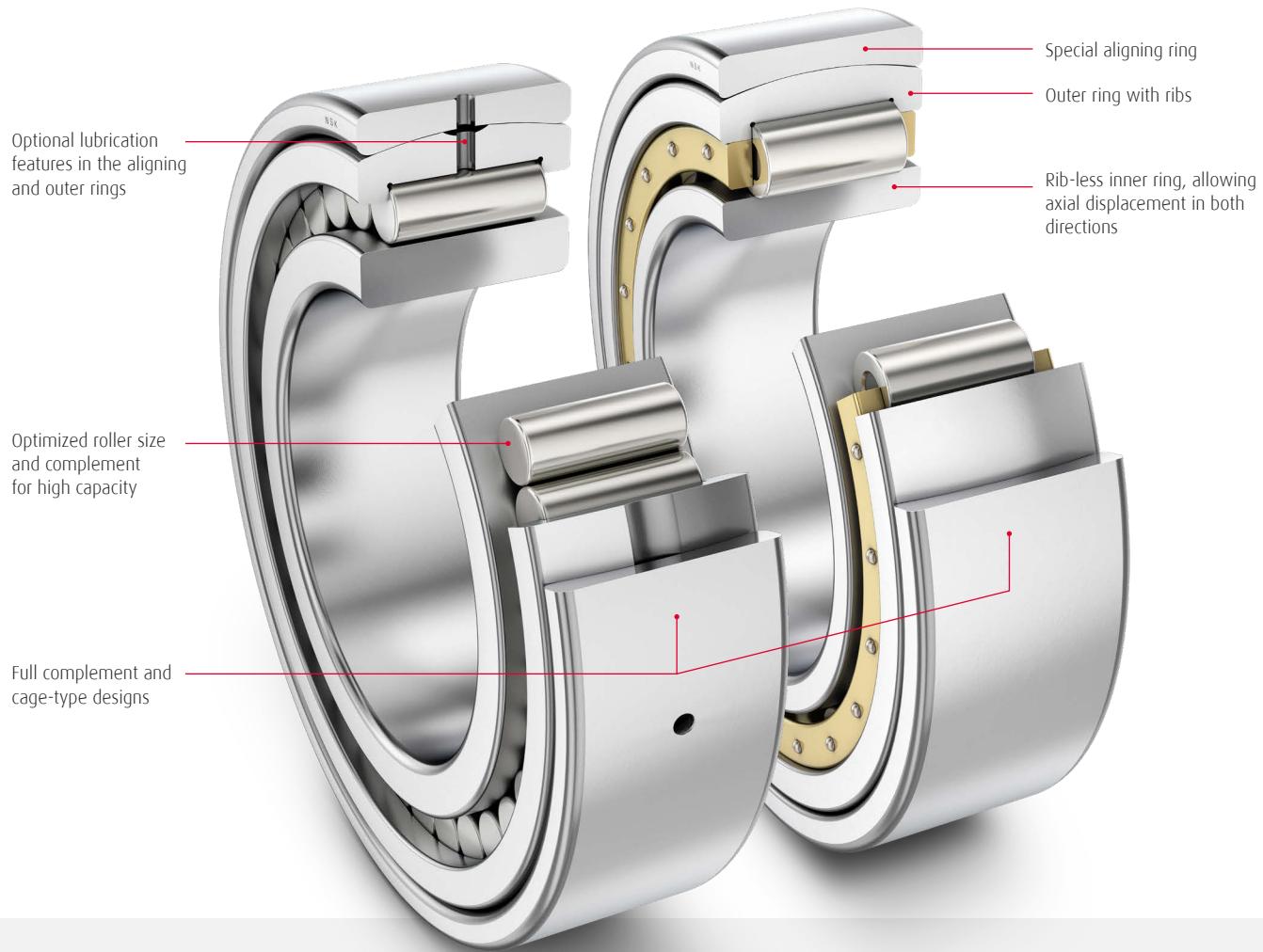
**OUTSTANDING PERFORMANCE.
ENGINEERED IN.**

Engineered to withstand the heavy loads and low speeds in continuous casting machines, NSK's RUB series are designed to offer a particularly effective solution for the float end of single and split segment guide rolls. RUB bearings accommodate roll extension with smooth axial displacement, and their self-aligning design tolerates misalignment and shaft deflection without impacting performance. They run with reduced sliding friction and wear compared to conventional bearing solutions for a longer, more reliable operating life.



DESIGN AND OPERATING ADVANTAGES

NSK's RUB series cylindrical roller bearings with aligning rings are designed specifically to deliver low wear and long-life performance under the prevailing heavy loads, low speeds, roll expansion and misalignment in continuous casting guide roll applications.



DESIGN FEATURES

- › Single-row cylindrical roller bearing with aligning ring
- › With pin-type brass cage or full complement design options
- › High capacity internal design parameters, with optimal size and number of rollers
- › Optimized roller crowning reduces internal sliding friction and wear while absorbing roll bending
- › Available with / without lubrication holes in the aligning ring, lubrication groove and holes in the outer ring
- › Corrosion resistant phosphate coating option
- › Available with radial internal clearance C-normal, C3 and C4



Smooth axial displacement accommodates free thermal expansion of the roll



Aligning ring tolerates misalignment and shaft deflection

PROVEN ADVANTAGES

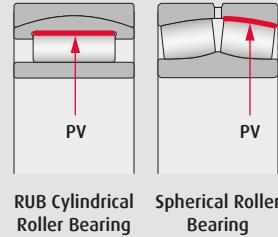
- › Extended operating life – preventing wear problems related to differential sliding
- › Smoothly absorbs axial thermal expansion of the roll, eliminating wear to the chock bore surface
- › Self-aligning capability accommodates misalignment and shaft deflection, minimizing the effects of edge loading
- › Full-complement design option for extremely high loads

COMPARISON OF PV VALUE PROPERTIES

RUB Bearing v. Spherical Roller Bearing

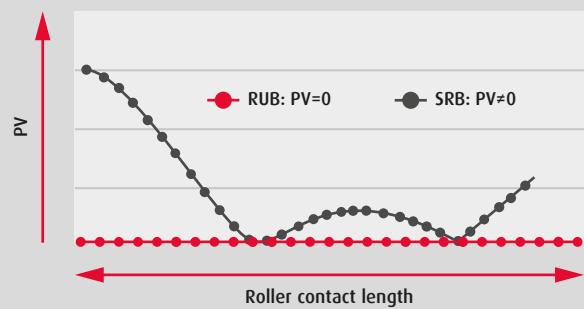
Factors that affect wear within the bearing:

- › Surface pressure (**P**)
- › Sliding (**V**)
- › Wear property parameter ($P_x V = PV$)



RUB Cylindrical Roller Bearing Spherical Roller Bearing

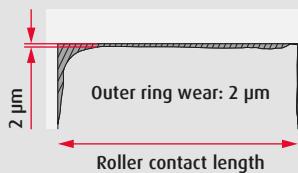
PV value between the outer ring and roller raceway surface



Field Endurance / Wear Evaluation

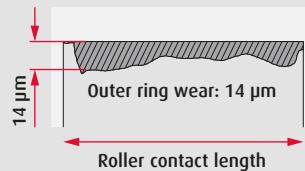
Inspection of an abrasion level on the outer ring raceway surface

RUB Cylindrical Roller Bearing



- › Service period: 21 months
- › Raceway surface wear was infinitesimal

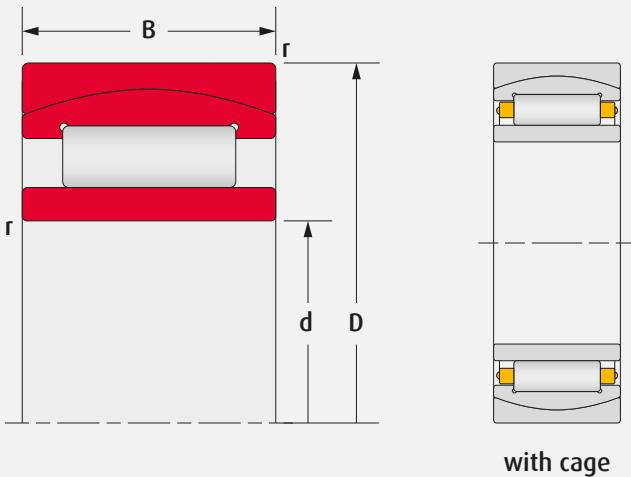
Standard Spherical Roller Bearing



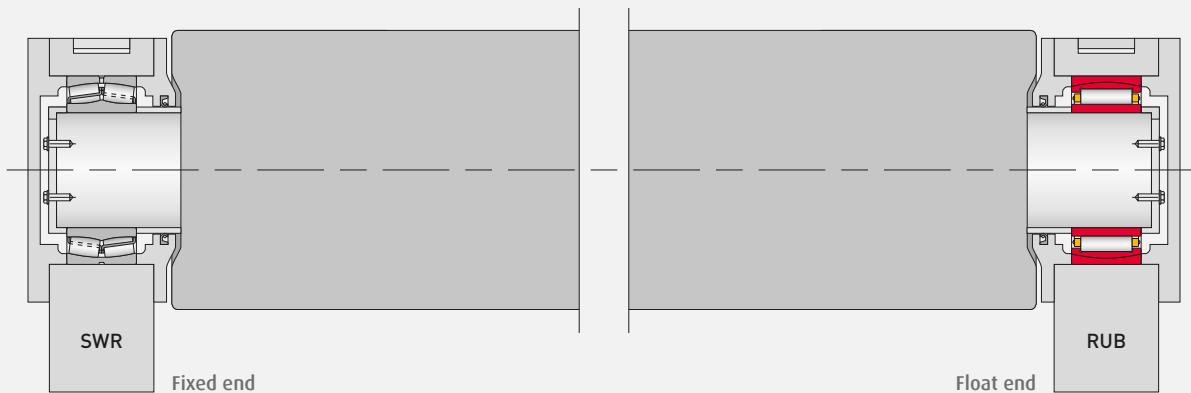
- › Service period: 12 months
- › Raceway surface abrasion significant: large uneven wear

BEARING DIMENSIONS AND OPERATING VALUES

RUB SERIES WITH CAGE



| BASIC BEARING NO. | BOUNDARY DIMENSIONS | | | | BASIC LOAD RATINGS | |
|-------------------|---------------------|----------|----------|----------------|--------------------|--------|
| | mm | | | | kN | |
| | d | D | B | r (min) | Dynamic | Static |
| 100RUB31 | 100 | 165 | 52 | 2.0 | 221 | 385 |
| 100RUB22 | | 180 | 46 | 2.1 | 251 | 375 |
| 100RUB23 | | 215 | 73 | 3.0 | 435 | 595 |
| 110RUB41 | 110 | 180 | 69 | 2.0 | 271 | 490 |
| 120RUB30 | 120 | 180 | 46 | 2.5 | 215 | 415 |
| 120RUB40 | | 180 | 60 | 2.0 | 247 | 495 |
| 120RUB41 | | 200 | 80 | 2.0 | 370 | 680 |
| 120RUB32 | | 215 | 76 | 2.1 | 435 | 735 |
| 130RUB41 | 130 | 210 | 80 | 2.0 | 380 | 715 |
| 130RUB32 | | 230 | 80 | 3.0 | 490 | 825 |
| 140RUB40 | 140 | 210 | 69 | 2.0 | 330 | 670 |
| 140RUB41 | | 225 | 85 | 2.1 | 435 | 830 |
| 140RUB22 | | 250 | 68 | 3.0 | 480 | 740 |
| 150RUB40 | 150 | 225 | 75 | 2.1 | 375 | 755 |
| 150RUB41 | | 250 | 100 | 2.1 | 540 | 1 040 |
| 150RUB32 | | 270 | 96 | 3.0 | 690 | 1 210 |



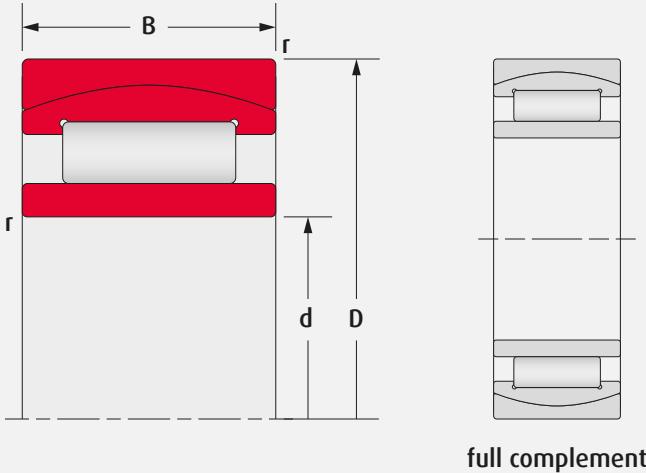
Illustrated: Bearing arrangement for a single drive roll with RUB Cylindrical Roller Bearings used in conjunction with NSK's SWR Spherical Roller Bearings.

| BASIC BEARING NO. | BOUNDARY DIMENSIONS | | | | BASIC LOAD RATINGS | |
|-------------------|---------------------|-----|-----|---------|--------------------|--------|
| | mm | | | | kN | |
| | d | D | B | r (min) | Dynamic | Static |
| 160RUB41 | 160 | 270 | 109 | 2.1 | 690 | 1 260 |
| 160RUB32 | | 290 | 104 | 3.0 | 795 | 1 370 |
| 170RUB41 | 170 | 280 | 109 | 2.1 | 710 | 1 330 |
| 170RUB32 | | 310 | 110 | 4.0 | 915 | 1 590 |
| 180RUB40 | 180 | 280 | 100 | 2.1 | 635 | 1 300 |
| 180RUB41 | 180 | 300 | 118 | 3.0 | 755 | 1 460 |
| 190RUB41 | 190 | 290 | 100 | 2.1 | 650 | 1 360 |
| 190RUB32 | 190 | 340 | 120 | 4.0 | 1 050 | 1 870 |
| 200RUB30 | 200 | 310 | 82 | 2.5 | 635 | 1 210 |
| 200RUB40 | | 310 | 109 | 2.1 | 770 | 1 540 |
| 200RUB41 | | 340 | 140 | 3.0 | 1 080 | 2 200 |

Additional bearing sizes are available. Please contact NSK for additional information.

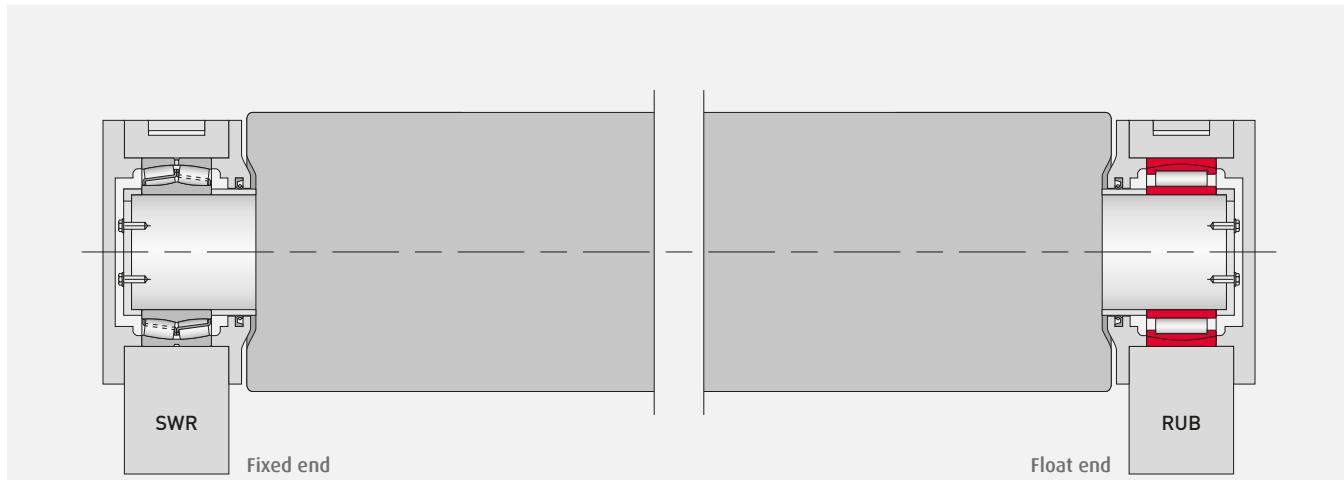
BEARING DIMENSIONS AND OPERATING VALUES

RUB SERIES - FULL COMPLEMENT



full complement

| BASIC BEARING NO. | BOUNDARY DIMENSIONS | | | | BASIC LOAD RATINGS | |
|-------------------|---------------------|-----|------|---------|--------------------|--------|
| | mm | | | | kN | |
| | d | D | B | r (min) | Dynamic | Static |
| 100RUB40APV | 100 | 150 | 50 | 2.0 | 230 | 530 |
| 100RUB31APV | | 165 | 52 | 2.0 | 272 | 550 |
| 100RUB22APV | | 180 | 46 | 2.1 | 277 | 545 |
| 100RUB32APV | | 180 | 60.3 | 2.1 | 360 | 650 |
| 110RUB30APV | 110 | 170 | 45 | 2.0 | 246 | 565 |
| 110RUB40APV | | 170 | 60 | 2.0 | 300 | 735 |
| 110RUB31APV | | 180 | 56 | 2.5 | 345 | 670 |
| 110RUB41APV | | 180 | 69 | 2.0 | 385 | 835 |
| 110RUB22APV | | 200 | 53 | 2.5 | 380 | 625 |
| 120RUB30APV | 120 | 180 | 46 | 2.0 | 275 | 625 |
| 120RUB40APV | | 180 | 60 | 2.0 | 330 | 790 |
| 120RUB41APV | | 200 | 80 | 2.5 | 470 | 1 040 |
| 120RUB32APV | | 215 | 76 | 2.1 | 510 | 990 |
| 130RUB40APV | 130 | 200 | 69 | 2.0 | 410 | 955 |
| 130RUB31APV | | 210 | 64 | 2.0 | 415 | 865 |
| 130RUB41APV | | 210 | 80 | 2.0 | 480 | 1 050 |
| 130RUB22APV | | 230 | 64 | 3.0 | 495 | 840 |
| 130RUB32APV | | 230 | 80 | 3.0 | 585 | 1 090 |
| 140RUB30APV | 140 | 210 | 53 | 2.0 | 365 | 885 |
| 140RUB40APV | | 210 | 69 | 2.0 | 420 | 990 |
| 140RUB31APV | | 225 | 68 | 2.1 | 485 | 100 |
| 140RUB41APV | | 225 | 85 | 2.1 | 575 | 1 310 |
| 140RUB22APV | | 250 | 68 | 3.0 | 510 | 1 110 |
| 140RUB32APV | | 250 | 88 | 3.0 | 670 | 1 500 |



Illustrated: Bearing arrangement for a single drive roll with RUB Cylindrical Roller Bearings used in conjunction with NSK's SWR Spherical Roller Bearings.

| BASIC BEARING NO. | BOUNDARY DIMENSIONS | | | | BASIC LOAD RATINGS | |
|-------------------|---------------------|-----|-----|---------|--------------------|--------|
| | mm | | | | kN | |
| | d | D | B | r (min) | Dynamic | Static |
| 150RUB30APV | 150 | 225 | 56 | 2.5 | 390 | 840 |
| 150RUB40APV | | 225 | 75 | 2.1 | 485 | 1 210 |
| 150RUB31APV | | 250 | 80 | 2.1 | 595 | 1 290 |
| 150RUB41APV | | 250 | 100 | 2.1 | 710 | 1 620 |
| 150RUB32APV | | 270 | 96 | 3.0 | 815 | 1 640 |
| 160RUB40APV | 160 | 240 | 80 | 2.1 | 530 | 1 330 |
| 160RUB41APV | | 270 | 109 | 2.1 | 855 | 1 830 |
| 160RUB32APV | | 290 | 104 | 3.0 | 960 | 1 890 |
| 170RUB30APV | 170 | 260 | 67 | 2.1 | 555 | 1 130 |
| 170RUB40APV | | 260 | 90 | 2.1 | 655 | 1 580 |
| 170RUB41APV | | 280 | 109 | 2.1 | 875 | 1 900 |
| 170RUB32APV | | 310 | 110 | 4.0 | 1 060 | 2 090 |
| 180RUB40APV | 180 | 280 | 100 | 2.5 | 785 | 1 870 |
| 180RUB41APV | | 300 | 118 | 3.0 | 940 | 2 120 |
| 180RUB32APV | | 320 | 112 | 4.0 | 1 090 | 2 190 |
| 190RUB40APV | 190 | 290 | 100 | 2.1 | 850 | 2 100 |
| 190RUB31APV | | 320 | 104 | 3.0 | 1 050 | 2 240 |
| 190RUB41APV | | 320 | 128 | 3.0 | 1 120 | 2 480 |
| 190RUB32APV | | 340 | 120 | 4.0 | 1 210 | 2 430 |
| 200RUB40APV | 200 | 310 | 109 | 2.1 | 1 030 | 2 550 |
| 200RUB31APV | | 340 | 112 | 3.0 | 1 160 | 2 470 |
| 200RUB41APV | | 340 | 140 | 3.0 | 1 340 | 3 100 |

Additional bearing sizes are available. Please contact NSK for additional information.

DESIGNATION SYSTEM

CYLINDRICAL ROLLER BEARINGS WITH ALIGNING RINGS

| Bore Diameter | Series | Internal Design Symbol | Split Ring Feature | Full Complement Design |
|---------------|--------|------------------------|-----------------------------|---------------------------|
| 150 | RUB | 40 | A | E2 |
| | | | P | S8 |
| | | | V | C4 |
| Bearing Type | | Lubrication Feature | Corrosion Resistant Coating | Radial Internal Clearance |

| DESIGNATION | ATTRIBUTE |
|------------------------|-----------------------------------------------------------------------|
| Bore Diameter | expressed in millimeters; available from 110 to 200 mm bore diameters |
| Bearing Type | single row cylindrical roller bearing with aligning ring |
| Dimensional Series | 32 40 41 |
| Internal Design Symbol | A |
| Lubrication Features | E1 E2 |

| DESIGNATION | ATTRIBUTE |
|-----------------------------|-------------------|
| Split Ring Feature | blank P |
| Coating | S8 |
| Full Complement Designation | blank V |
| Radial Internal Clearance | blank C3 C4 |



IMPROVEMENT PAYS

END-TO-END SERVICE DELIVERS CUSTOMER SUCCESS

Improvement never ends. And we never stop looking for better ways to support our customers in a complete, collaborative and continuous way. The focus of NSK isn't simply on a quick fix for immediate gain – it's about incremental and sustainable improvement to deliver long-term benefits.

When NSK is on-site, we're there to understand our customers' challenges and identify problems contributing to frequent bearing replacement, breakdowns caused by poor specification, high energy costs from inefficient product selection and lost production because of downtime. We collaborate with our customers to institute an **Asset Improvement Program (AIP)** that encompasses process and maintenance management, diagnostic and educational support to deliver measurable gains in output and cost-efficiency.

With NSK, our customers embark on a critical path to realizing improvements in equipment, productivity, people and financial performance.





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