MOTION & CONTROL™
NSK

SOLUTIONS FOR THE STEEL AND METALS INDUSTRY

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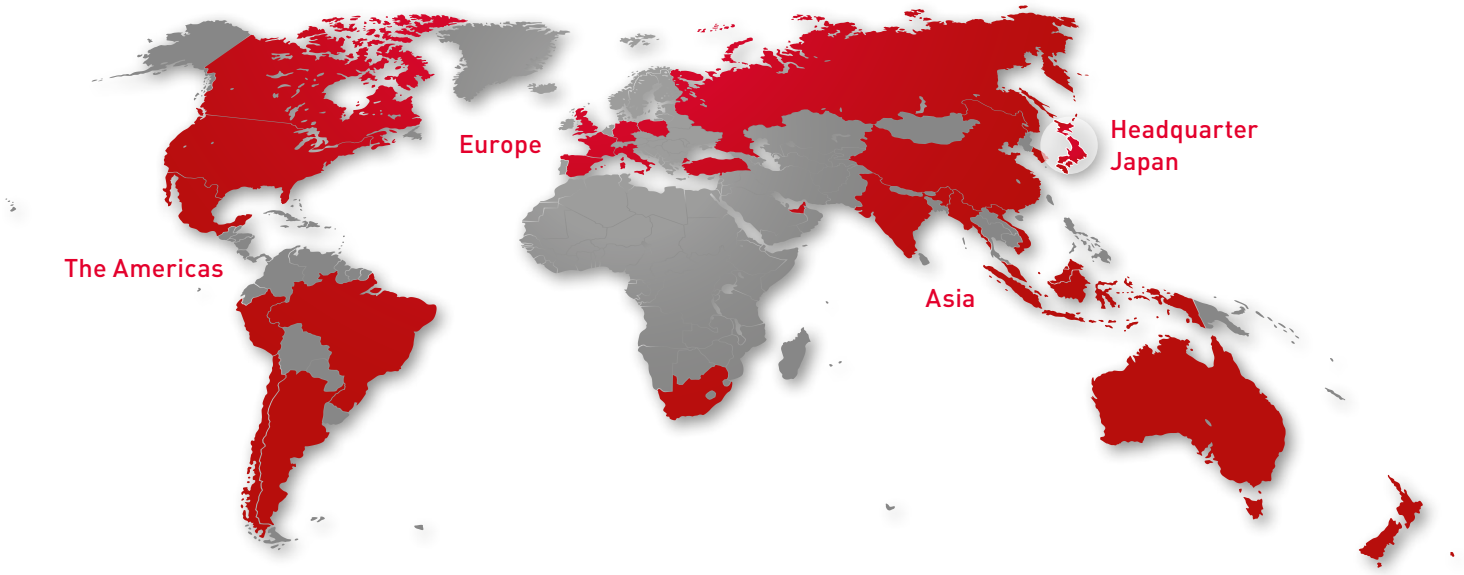
OUR MOST IMPORTANT PRODUCT: OUR CUSTOMERS' STATISFACTION

We are among the leading manufacturers for rolling bearings, linear technology components and steering systems worldwide. We can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



The NSK company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context our worlwide research and production facilities are linked together in a global network. Here we concentrate not only on the development of new technologies, but also on the continuous optimisation of quality – at every process stage. Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

More about NSK under: www.nskeurope.com

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ROBUST, WEAR-RESISTANT AND DURABLE – NSK´S ROLLING BEARINGS FOR THE STEEL AND METAL INDUSTRY

We offer bearings that have been specially developed for all the relevant conditions encountered throughout the entire process. That´s why, for example, we have developed sealed spherical roller bearings for continuous casting plants that prevent the ingress of contamination and offer optimal service life. Our cylindrical roller bearings with optimised profile (NUB series) are also perfectly suited for continuous casting plants.

Then there are our taper roller bearings which are available in various special materials for rolling mills such as Super-TF together with our Sealed-Clean technology. Beyond that, we offer various bearings for sinter machines, LD converters, chain conveyors, levellers and many more.

Sealed-Clean bearings for extreme conditions

Reducing downtime through increased reliability

The variants are many, but all our products have one thing in common: they are reliable, wear-resistant and durable – thereby ensuring profitable production.

Innovation made by NSK – Sealed-Clean

In 1980, NSK was the first company in the world to bring the sealed four row tapered rolling bearing (Sealed Clean) on to the market. Since then, we have continually improved the Sealed-Clean bearing. In this way, we have been able to measurably increase its load-carrying capacity through newly-developed internal construction and a new sealing system. Even grease consumption has been drastically reduced; which not only leads to lower costs but also makes it more environmentally friendly. Sealed-Clean bearings can be supplied in case-hardened and through-hardened steel. NSK's various steel specifications are particularly wear and shock resistant due to our special heat and surface treatment technology.

It´s a tough life in the steel and metal industry: variations in temperature, high levels of contamination, rolling speeds of more than 2000 metres a minute, rocking motions and impacts. NSK rolling bearings take all of this in their stride; from the preparation of the raw material, through the smelting process, right up to the final rolled product.

The best combination for new developments: research and practical experience

NSK rolling bearings for the steel and metal industry are the result of intense research and development, as well as a close working relationship with our clients. As a result of the demands of practical experience, we conduct a continuous improvement programme for our products, with as much regard to construction as materials and lubrication. In order to guarantee the highest standards of quality and reliability under the harshest of conditions, all NSK products undergo the most stringent testing on our test rigs.

Development of rolling bearings for the steel and metal industry

Design and materials
Development of new types of construction and the use of innovative materials for longer operational life under harsh operating conditions

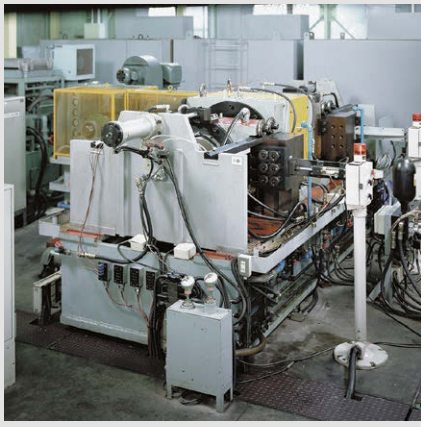
Simulation
Simulation techniques in various operational environments

Analysis and Diagnosis
- Bearing analysis techniques
- Fatigue damage analysis
- Diagnostic techniques

Test rig for the appraisal of performance and durability under realistic operating conditions

Test rig for bearings used in guide rolls of continuous casting machines

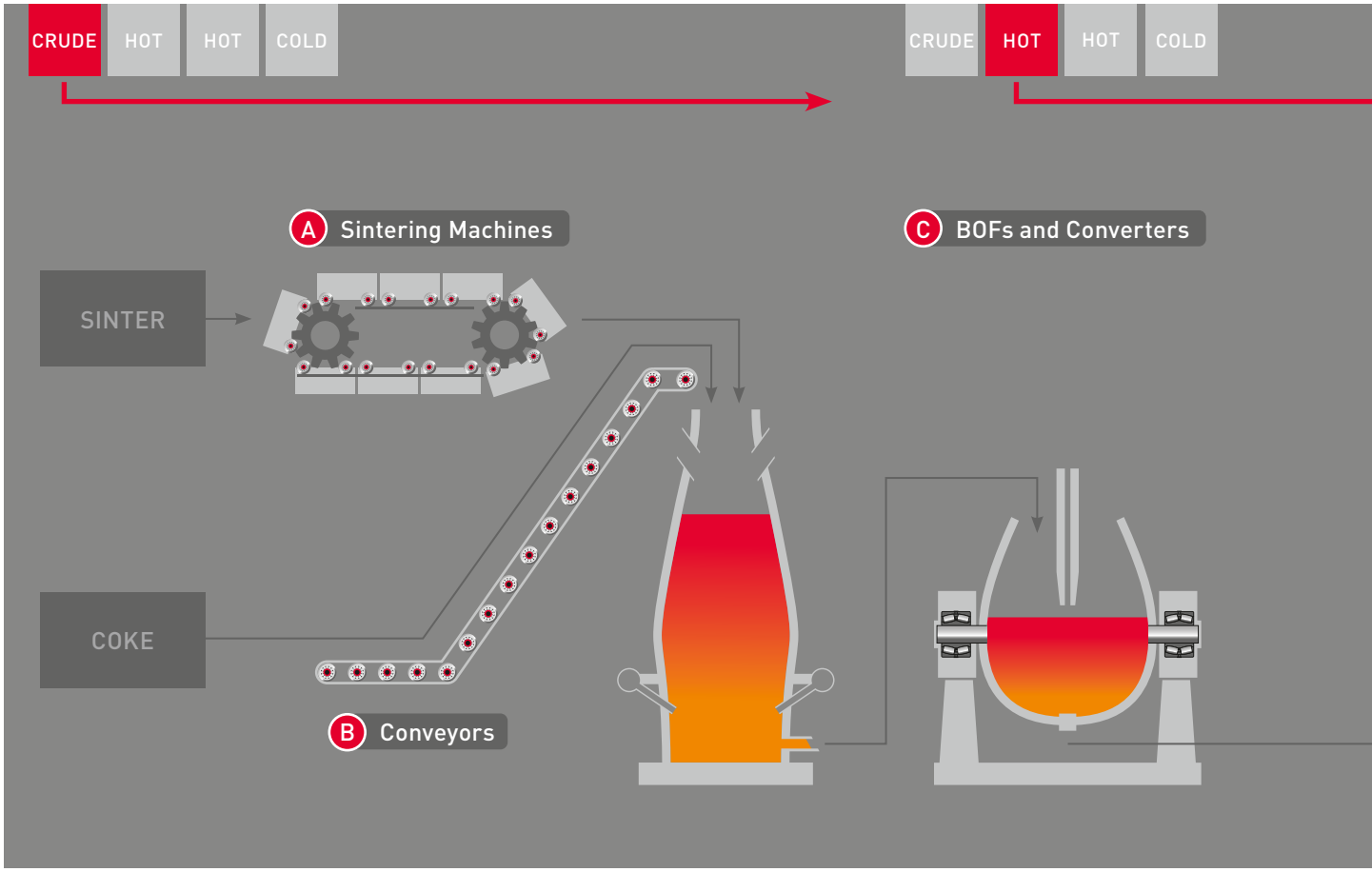
Test rig for bearings used in backup rolls of rolling mills



Test rig for bearings used in work rolls of rolling mills

PRODUCTS FOR THE ENTIRE STEEL AND METAL INDUSTRY PROCESS

Rolling bearings for steel and metal mills have to withstand varied and extreme operating conditions, amongst which high temperatures, high or low rotational speeds, as well as environments that are contaminated with water or dirt. We offer a whole range of products for all mill processes; products that deliver reliable and continuous operation under all conditions.



A Sintering Machines

Sealed-Clean Bearings for Sintering Machine Pallets

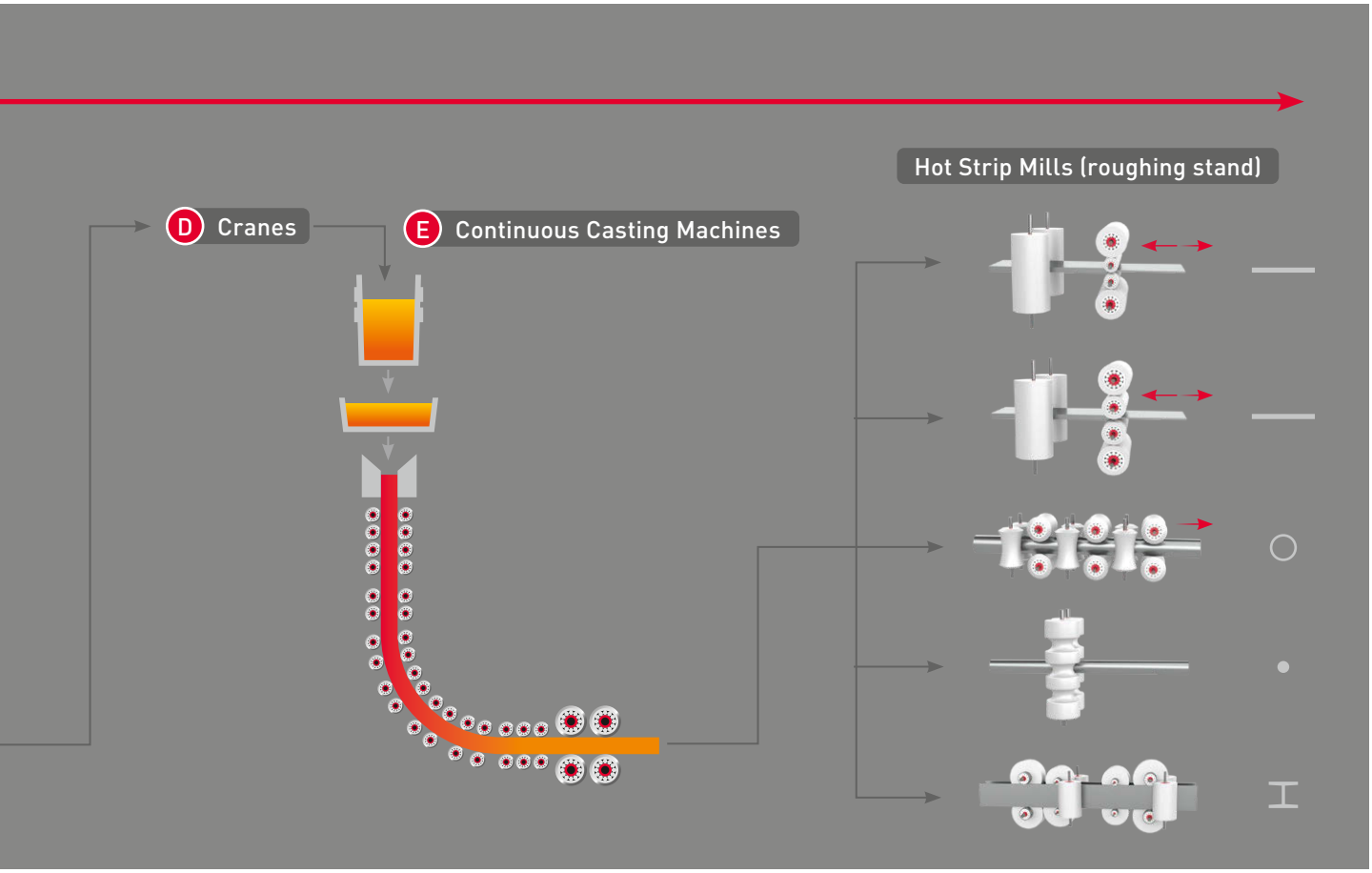
B Conveyors

Spherical Roller Bearings NSKHPS Series

Plummer Blocks

C BOFs and Converters

Ultra-Large Split Bearings for BOFs and Converter Trunnions



D Cranes

Full-Complement Cylindrical Roller Bearings for Crane Sheaves

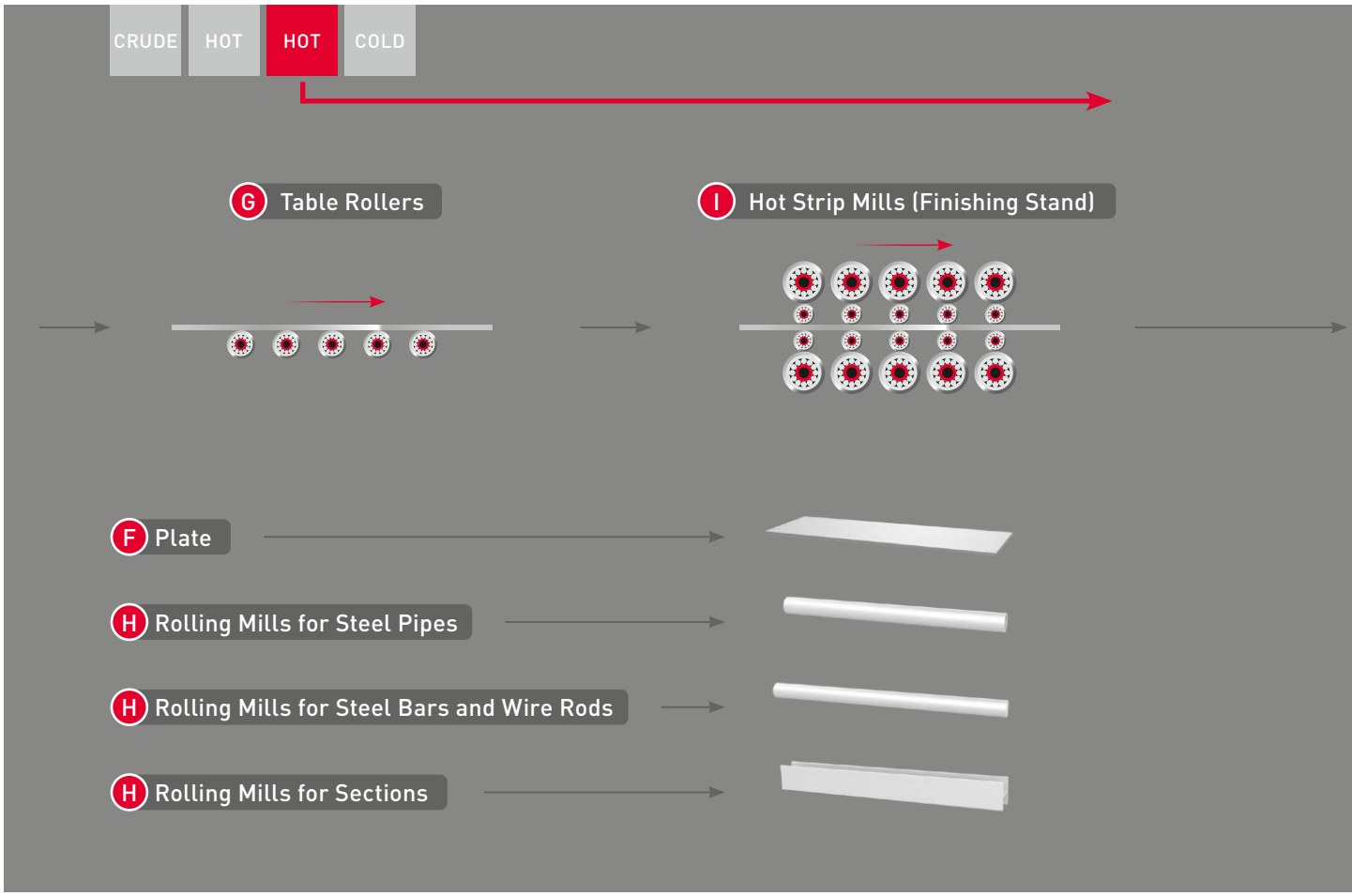
E Continuous Casting Machines

Cylindrical Roller Bearings – NUB Series

Split Roller Bearing Units for segmented rolls

Cylindrical Roller Bearings with Aligning Rings

SWR Bearings



G Table Rollers

Ball bearings for High-Temperature Environments

Sealed-Clean Spherical Roller Bearings

Plummer Blocks

Cylindrical Roller Bearings EW + EM Series

H Rolling Mills f. Steel Pipes, Steel Bars, Wire Rods and Sections

Cylindrical Roller Bearing and Tapered Roller Bearings, 4-Rows for horizontal rolls

Tapered Roller Bearings, 4-Rows for vertical rolls

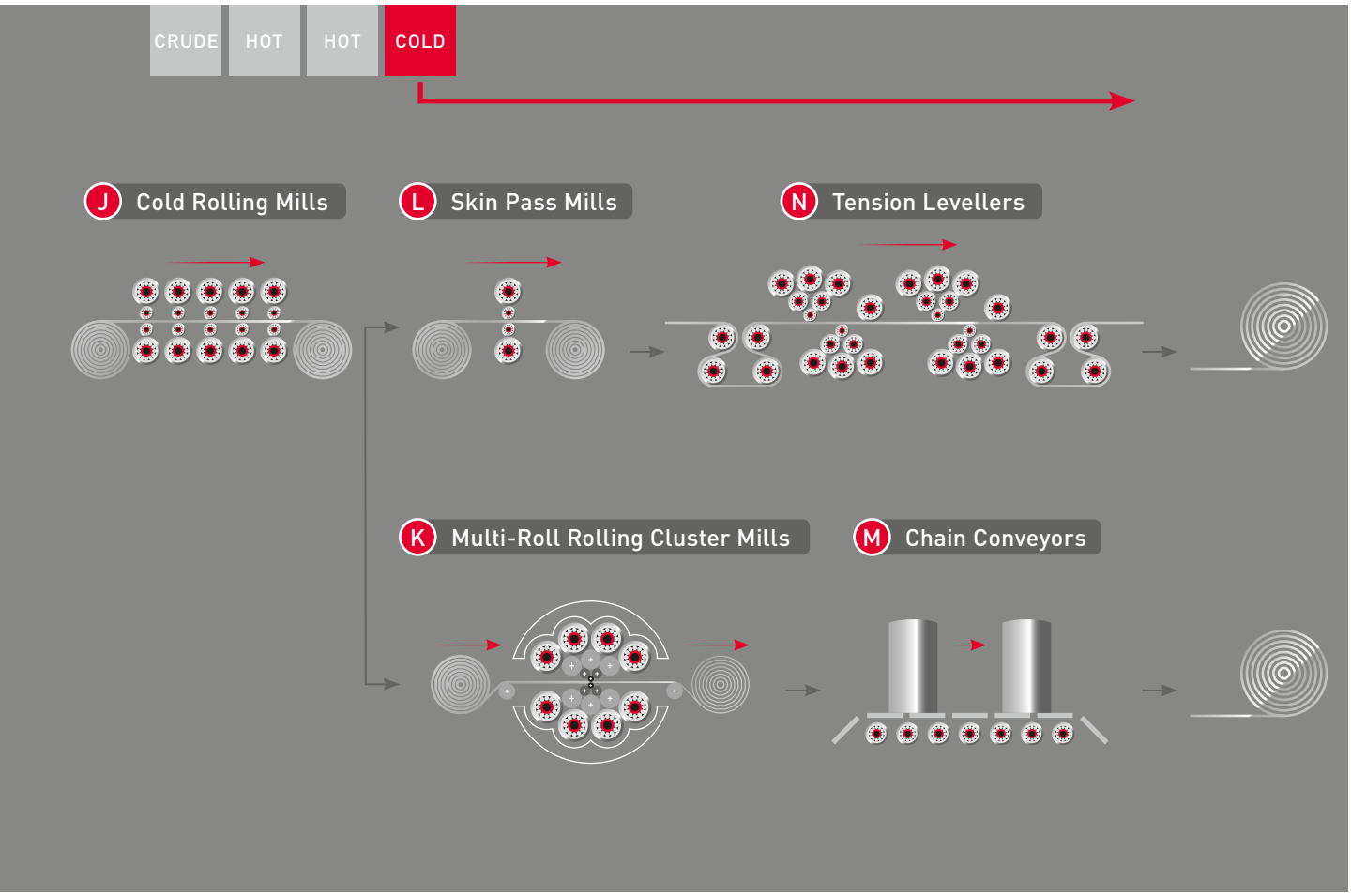
F Plate Mills

Cylindrical Roller Bearings, 4-Rows for backup rolls, Stud Type cage for super heavy loads

I Hot Strip Mills (Finishing Stand)

Cylindrical Roller Bearing and Tapered Roller Bearings, 4-Rows for Roll Necks

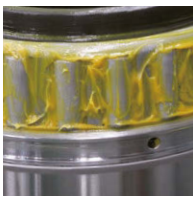
Tapered Roller Bearings for axial loads



J Cold Rolling Mills

Cylindrical Roller Bearing and Tapered Roller Bearings, 4-Rows for Roll Necks

Tapered Roller Bearings, 4-Rows, Sealed Clean, Extra Capacity



Water-resistant Grease for sealed Roll Neck Bearings

Tapered Roller Bearings, Double-Row for axial loads

K Multi-Roll Rolling Cluster Mills

Backing Bearings for Backup Rolls

L Skin Pass Mills

Tapered Roller Bearings, 4-Rows, Sealed Clean, Extra Capacity

Cylindrical Roller Bearings, 4-Rows for Backup Rolls

M Chain Conveyors

S-Type Sealed-Clean Bearings for Chain Conveyors

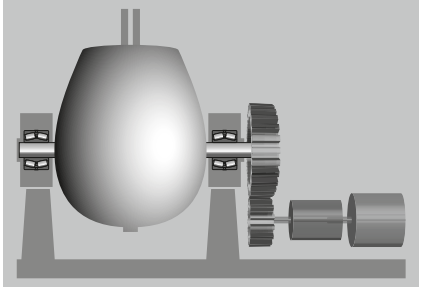
N Tension Levellers

Bearing Units for Tension Levellers

ULTRA-LARGE SPLIT BEARINGS FOR BOF'S AND CONVERTER TRUNNIONS

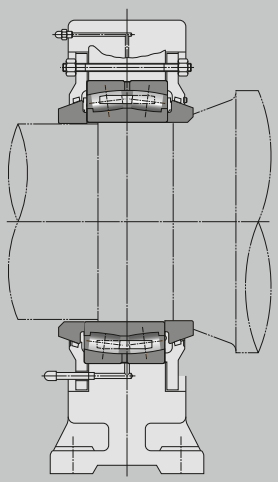
1. Operating conditions

- High temperature
- Heavy loads
- Ultra-low speed and oscillating



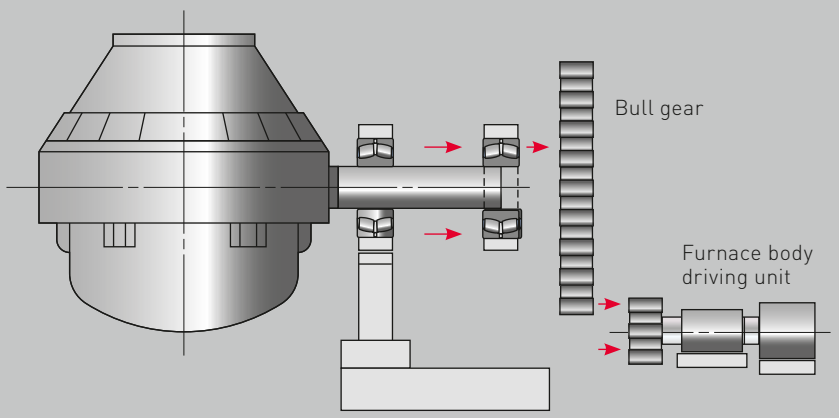
BOFs and converters

Conventional structure



2. Typical problems

Inboard bearings cannot be replaced without removing the bull gear



Bearing replacement work is time-consuming, requiring high maintenance costs

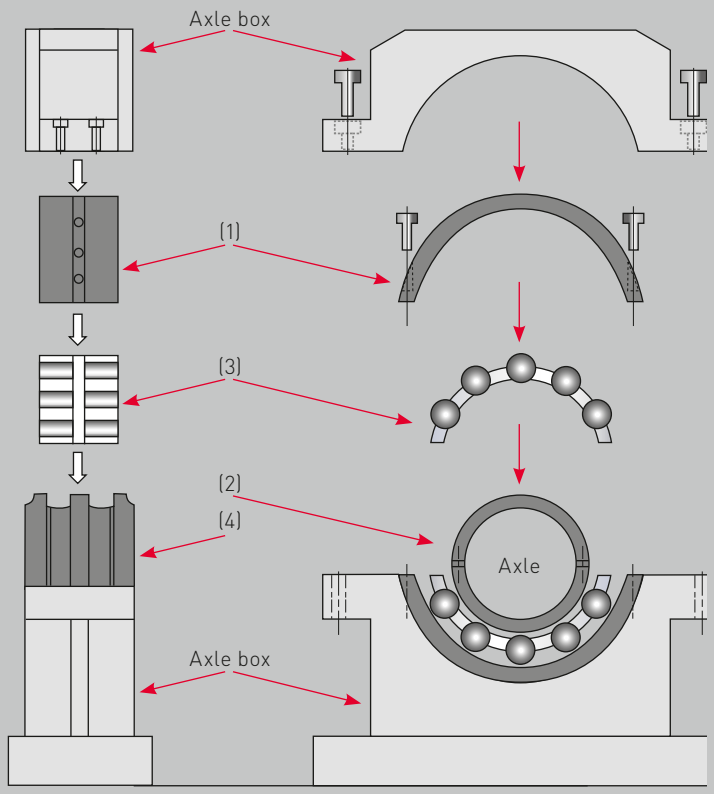
In addition, sudden bearing replacement due to an unexpected failure causes large production loss in the subsequent processes

3. Countermeasures

Ultra-Large Split Bearings for BOFs and Converter Trunnions

- A split design of ultra-large spherical roller bearings:
  (1) outer ring
  (2) inner ring
  (3) roller and cage assembly and
  (4) fastening ring
- Seal sliding surface integrated by a fastening ring

Design measures



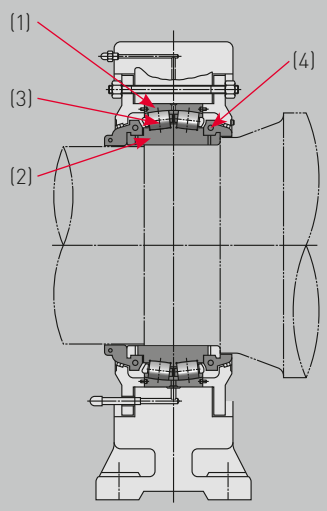
4. Benefits

- Bearings can be replaced without removing the bull gear, thus reducing maintenance costs
- Reduction of maintenance costs by shortening length of time for bearing replacement work
- Reduction of production loss, which would affect subsequent processes

Comparison of time required for bearing replacement work in field test

The bearing replacement period represents the actual result for bearings with bore diameter of 1200 mm to 1400 mm. In the case above, the bearing with the newly developed structure reduced the time needed for bearing replacement work by approximately 35 %, and thereby significantly reduced maintenance cost.

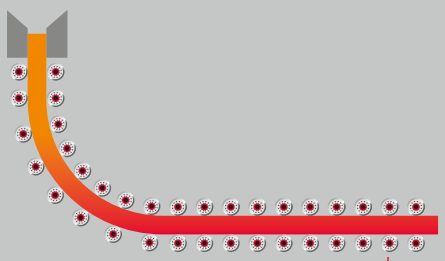
Newly developed structure



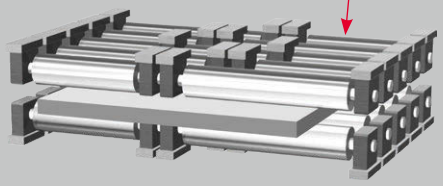
BEARINGS FOR GUIDE ROLLS

1. Operating conditions

- Heat
- Heavy loads
- Water vapor (water)
- Ultra-low speed
- Scale
- Deflection of a roll



Continuous casting machine



Roll segment unit

2. Typical problems

Differential sliding specific to spherical roller bearings

- Uneven wear

Wear

Outer ring raceway surface

- Flaking
- Crack

Flaking and crack

Outer ring raceway surface

- Expansion of roll gaps (failure of rolls)
- Defective-quality products
- Unexpected production line failure
- High bearing usage cost

3. Countermeasures

Material measures

Spherical Roller Bearings – SWR series*

- Improved wear resistance – three times compared to AISI 52100 bearing steel
- Improved flaking life property – five times compared to AISI 52100 bearing steel
- Improved toughness of material core (prevention of crack damage) – five times compared to AISI 52100 bearing steel

Design measures

Cylindrical Roller Bearings with optimised profile – NUB series*

- High capacity, full complement design
- Prevention of wear due to no differential sliding of spherical roller bearing combined with self-aligning capability due to optimised internal geometry
- Smooth floating capability between inner ring and rollers

Cylindrical Roller Bearings with Aligning Rings (for free end) – RUB Series*

- Prevention of wear due to no differential sliding of spherical roller bearing and additional function of self-aligning (see page 17 for further explantion)
- Smooth floating capability between inner ring and rollers
- Type: Easy handling cage type Full-complement type with higher load capacity

Split Cylindrical Roller Bearings (for segmented rolls) – RCPH/PHR Series*

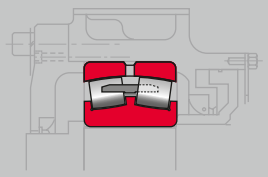
- Prevention of wear due to no differential sliding of spherical roller bearing (see page 17 for further explantion)
- Full-complement, higher load capacity design
- Multi-functional seal and high rigidity plummer block unit

4. Benefits

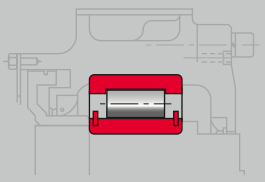
- Improved bearing durability prevents unexpected accidents
- Roll segment is replaced less frequently, thus reducing maintenance costs

NSK Total Quality Solutions

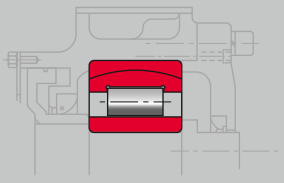
SWR



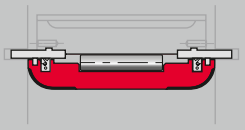
NUB



RUB



RCPH/PHR



Recommended bearing arrangements see next page

* Bearing tables see page 32 (SWR Series), page 34 (RUB Series), page 35 (NUB Series), page 36 (RCPH/PHR).

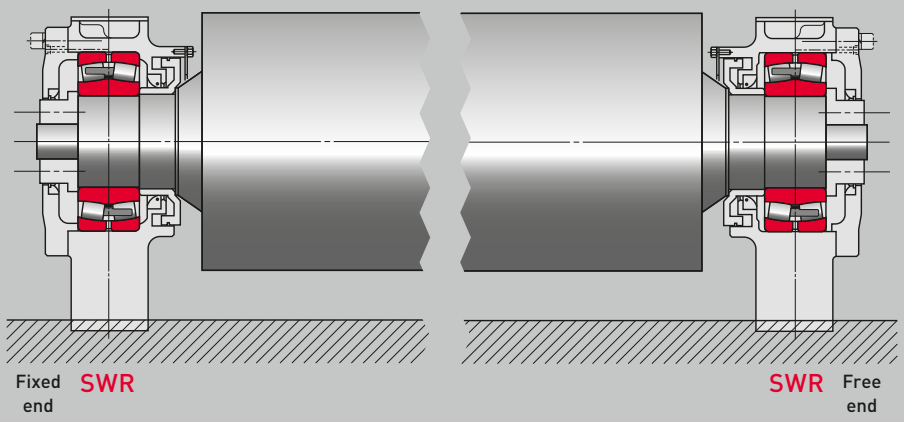
RECOMMENDED BEARING ARRANGEMENTS

NSK has prepared the following arrangements for bearings used in guide rolls of continuous casting machines including the recently developed NUB cylindrical roller bearings and SWR Bearings.

Bearing arrangement for single rolls

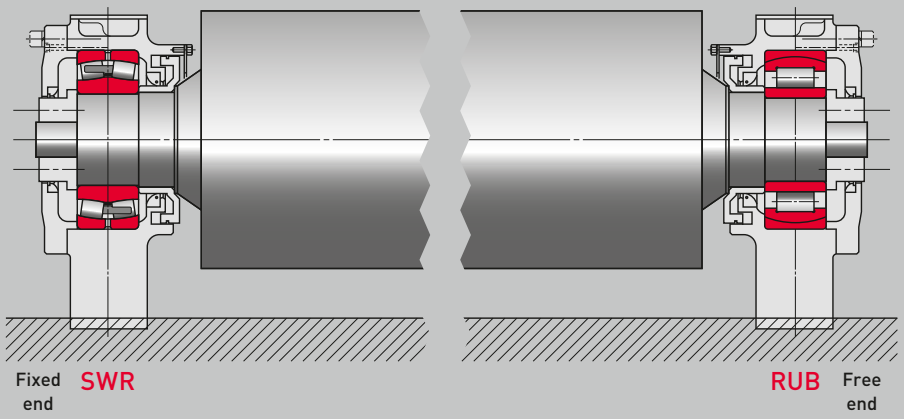
Case 1

Spherical roller bearings currently used can be replaced with SWR Bearings without modifying the axle boxes, thus easily enhancing performance.



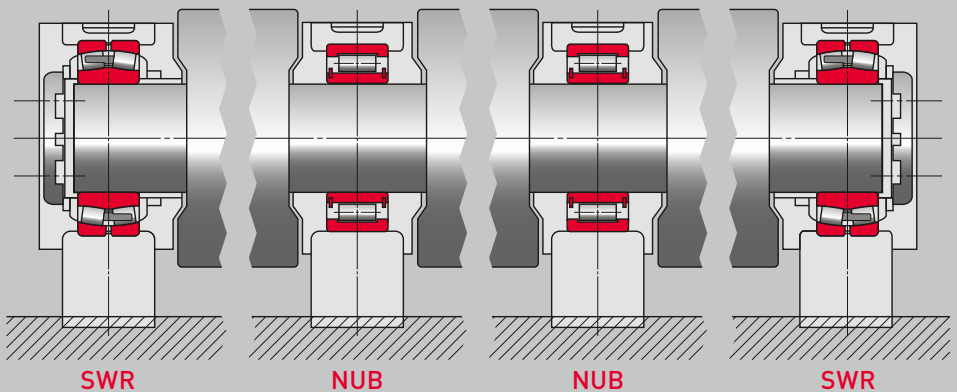
Case 2

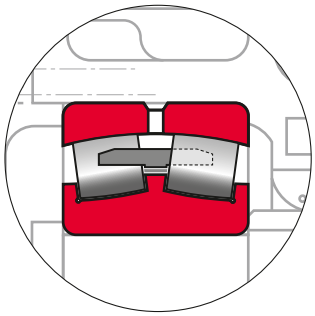
Optimal bearing arrangement to relieve roll expansion. Depending on machine design, minor modifications to axle boxes might be necessary to adopt RUB bearings in free end positions.



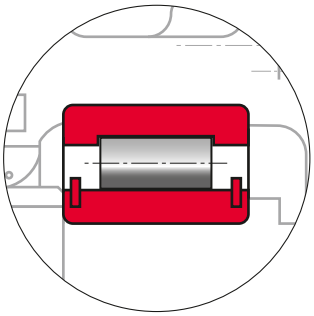
Bearing arrangement for sleeve type rolls

Toroidal bearings used on modern generation machines can be succesfully upgraded with NUB bearings, whilst spherical roller bearings can benefit from SWR technology, all being done without modifications to any of the axle boxes.

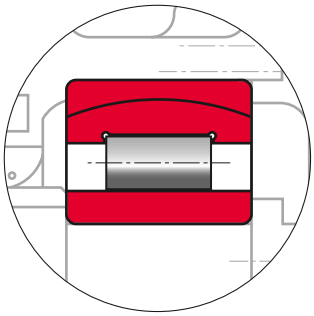




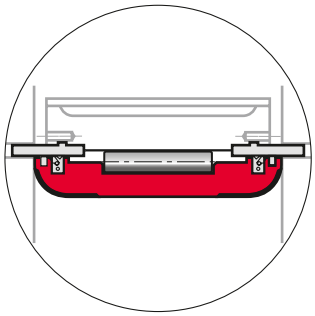
SWR



NUB



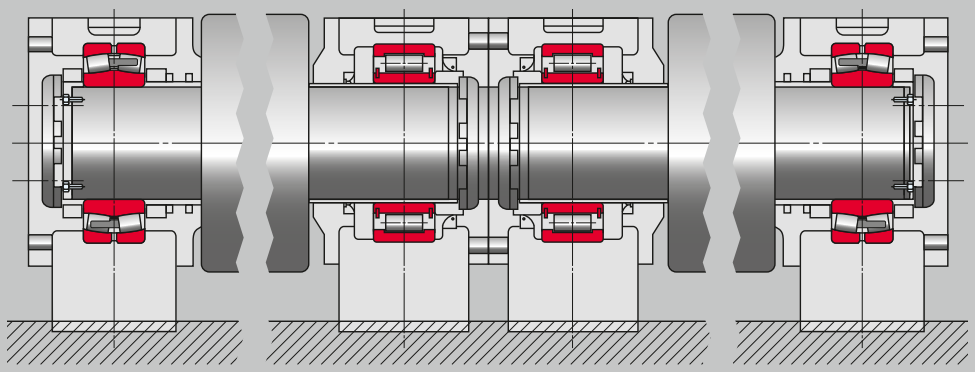
RUB



RCPH/PHR

Bearing arrangement for combination type rolls

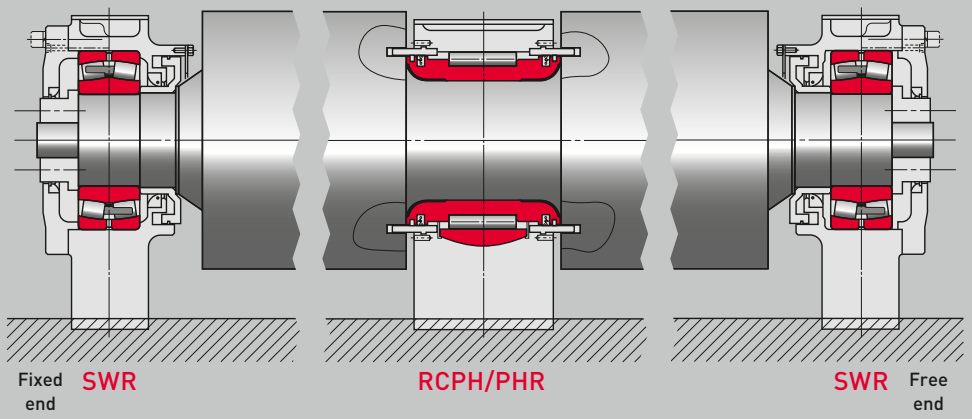
High load carrying capability through usage of NUB bearings in free-end positions for combination type rolls.
Depending on machine design, minor modifications to axle boxes might be necessary to adopt NUB bearing in free end positions.



Bearing arrangement for segmented drive rolls

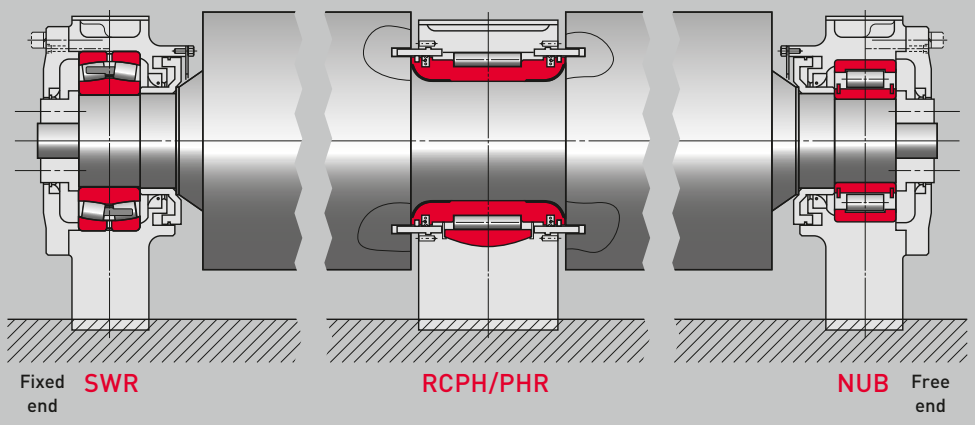
Case 1

Spherical roller bearings currently used can be replaced with SWR Bearings without modifying the axle boxes, thus easily enhancing performance.

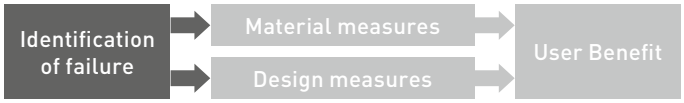


Case 2

Optimal bearing arrangement to relieve roll expansion and increase load carrying capability.
Depending on machine design, minor modifications to axle boxes might be necessary to adopt NUB bearings in free end positions.

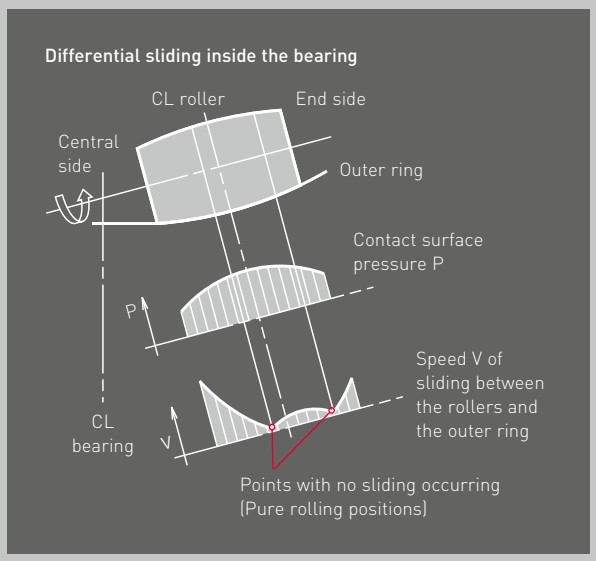


IDENTIFICATION OF THE FAILURE MECHANISM OF SPHERICAL ROLLER BEARINGS

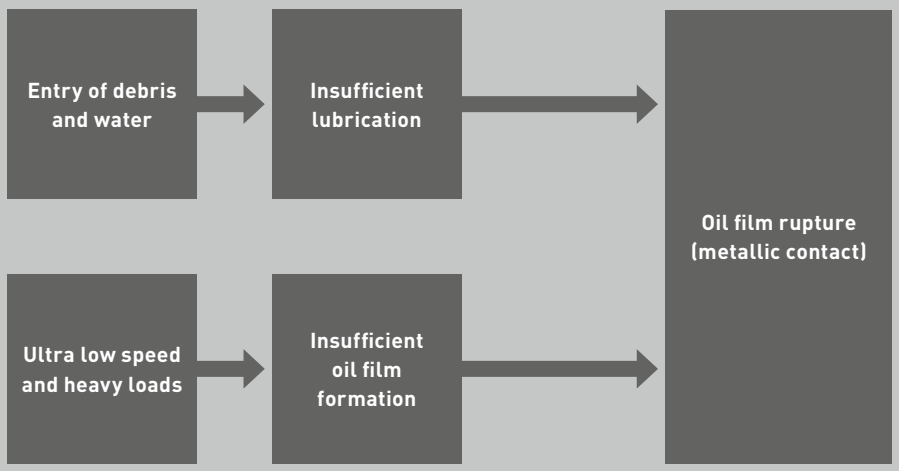


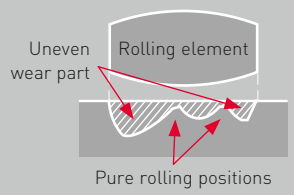
Bearing

Spherical Roller Bearings



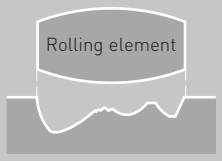
Operating conditions





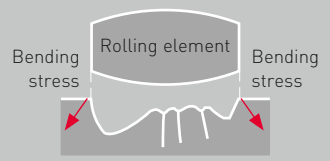
(1) Uneven wear
Wear caused by improper lubrication and differential sliding

Counter-measure (1)



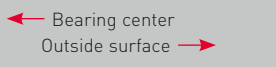
(2) Flaking
Flaking of the pure rolling section resulting from stress concentration

Counter-measure (2)



(3) Progress of cracks
Progression of flaking and development and progress of vertical cracks caused by bending stress

Counter-measure (3)



(3) Crack damage

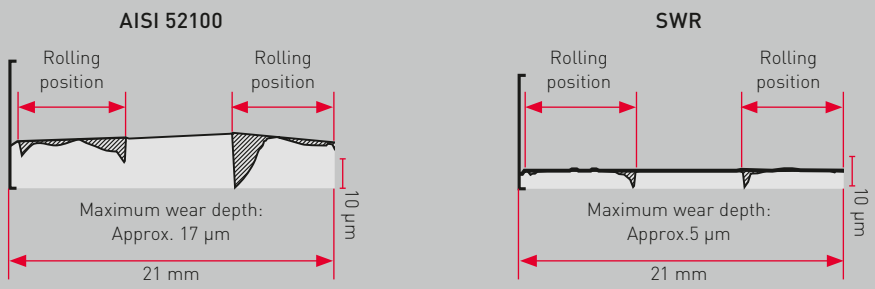
DEVELOPMENT OF SWR BEARINGS

Identification of failure → Material measures / Design measures → User Benefit

Basic performance

Profile of wear on the outer ring raceway surface of Spherical Roller Bearings

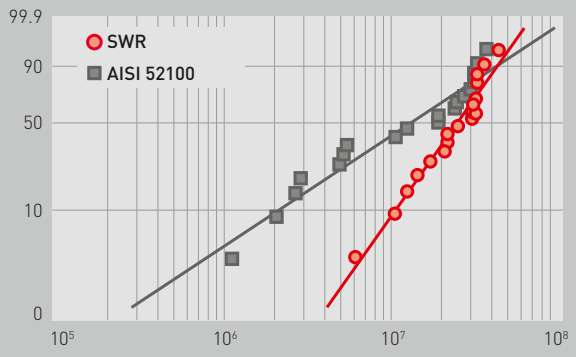
Countermeasure (1): Wear resistance



Evaluation of an endurance test using 22210CD bearings

Wear resistance approx. 3 times

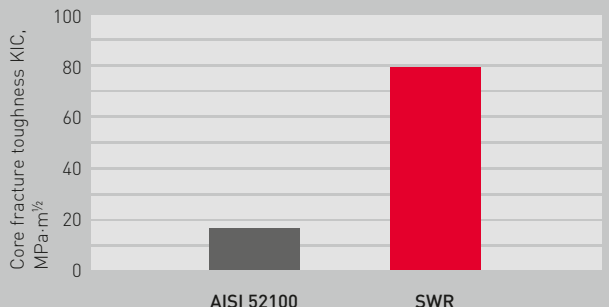
Countermeasure (2): Improved flaking life (inhibition of flaking)



Evaluation of operating life by thrust-type life test

Bearing life approx. 5 times

Countermeasure (3): Improved outer ring strength



Evaluation of outer ring strength

Core toughness approx. 5 times

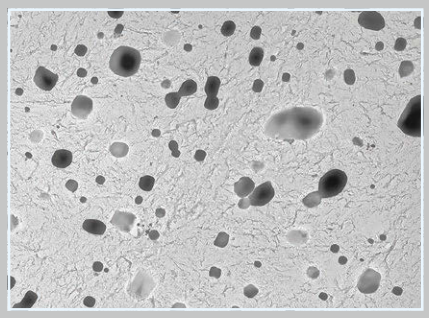
Development of wear-resistant materials

- Selection of steel chemical composition
- Applied special heat treatment technology
- Controlled optimum level for retained austenite

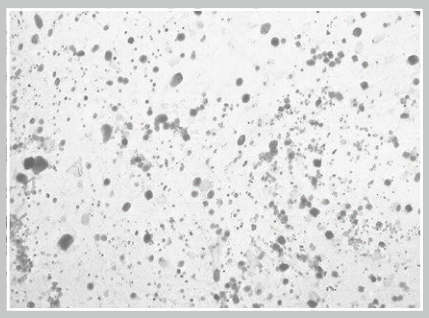
Microstructure:

Result P-extraction replica work using transmission electron microscopy (TEM)

AISI 52100



SWR



Field endurance evaluation

Longer bearing life results in extended segment replacement cycles

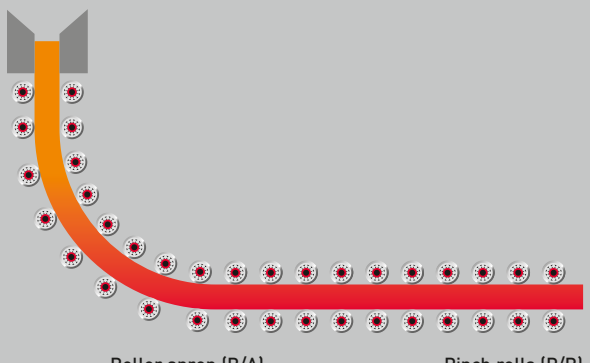
SWR Bearings allow users, who have been forced to replace segments at frequent cycles due to the bearing life of standard spherical roller bearings, to attain maximum effect in reducing maintenance, by decreasing unexpected accidents and using rolls to the full extent of their operating life.

Standard Spherical Roller Bearings

Ø Average segment replacement cycles: 1

SWR Bearings

Ø Average segment replacement cycles: 1.6 | Maximum: 2



CYLINDRICAL ROLLER BEARINGS WITH OPTIMISED PROFILE AND ALIGNING RINGS

Identification of failure → Material measures / Design measures → User Benefit

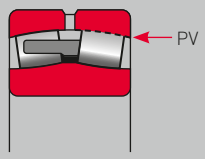
Development of new type bearings

Comparison of PV value properties affecting the wear within the bearing

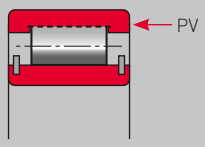
Surface pressure (P), Sliding (V), Wear property parameter: PV (PxV)

PV value between the outer ring raceway surface and roller raceway surface

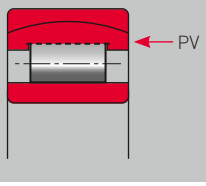
(1) Spherical Roller Bearing



(2) Cylindrical Roller Bearing with optimised profile

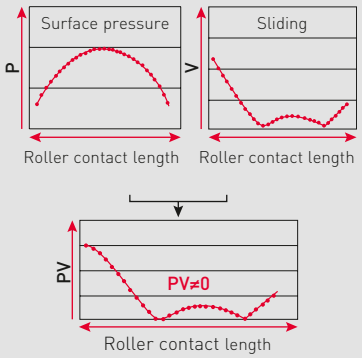


(3) Cylindrical Roller Bearing with aligning ring

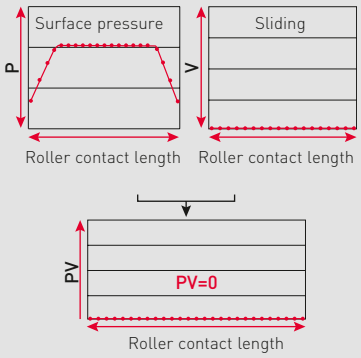


PV value properties of

Spherical Roller Bearing (1)



Cylindrical Roller Bearing (2) (3)



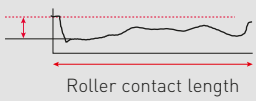
Field endurance evaluation

Wear evaluation

Example of inspection of an abrasion level on the outer ring raceway surface

Standard Spherical Roller Bearing

Amount of wear:
14 µm



Service period: 12 months

Outer ring raceway surface abrasion was significant: large uneven wear

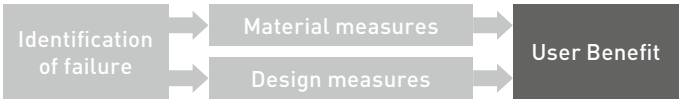
Cylindrical Roller Bearing

Amount of wear:
2 µm

Service period: 21 months

Wear on the outer ring raceway surface was infinitesimal

USER BENEFIT



Estimated effect of maintenance cost reduction

Maintenance cost includes expenses for repairing of rolls, replacement of bearings, seal and fittings, as well as labor cost required on every segment replacement.

Standard bearings

Example: 24 months

Frequency of segment maintenance	First	Second	Third
Maintenance cost	Maintenance cost	Maintenance cost	Maintenance cost
Segment replacement cycles	1 (8 months)	1 (8 months)	1 (8 months)

SWR Bearings

Example: 26 months

Frequency of segment maintenance	First		Second	
Maintenance cost	Maintenance cost	Reduced cost	Maintenance cost	Reduced cost
Segment replacement cycles	1.6 (13 months)		1.6 (13 months)	

If SWR Bearings are used on 1-8 segments out of 15 segments of a 2-strand continuous casting machine, then segment life is extended on average 1.6 times. The estimated reduction effect is 20 %-30 % of total maintenance cost.

Success Story

Find out how NSK can help you to save costs by improving the productivity of your machinery and reducing costs caused by any failures during the production process.

https://www.nskeurope.com/en/industries/industrial/steel-and-metals/continuous-casting-machine---production-of-shaped-sections.html

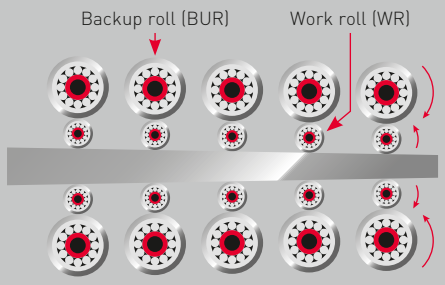
TAPERED ROLLER BEARINGS (4-ROWS) FOR WORK ROLLS

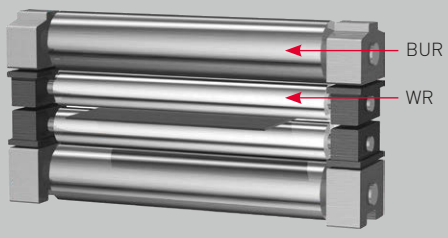
1. Operating conditions

- High speed/low speed
- Heavy loads
- Vibration and impact
- High temperature
- Scale
- Water infiltration

Major target mills:

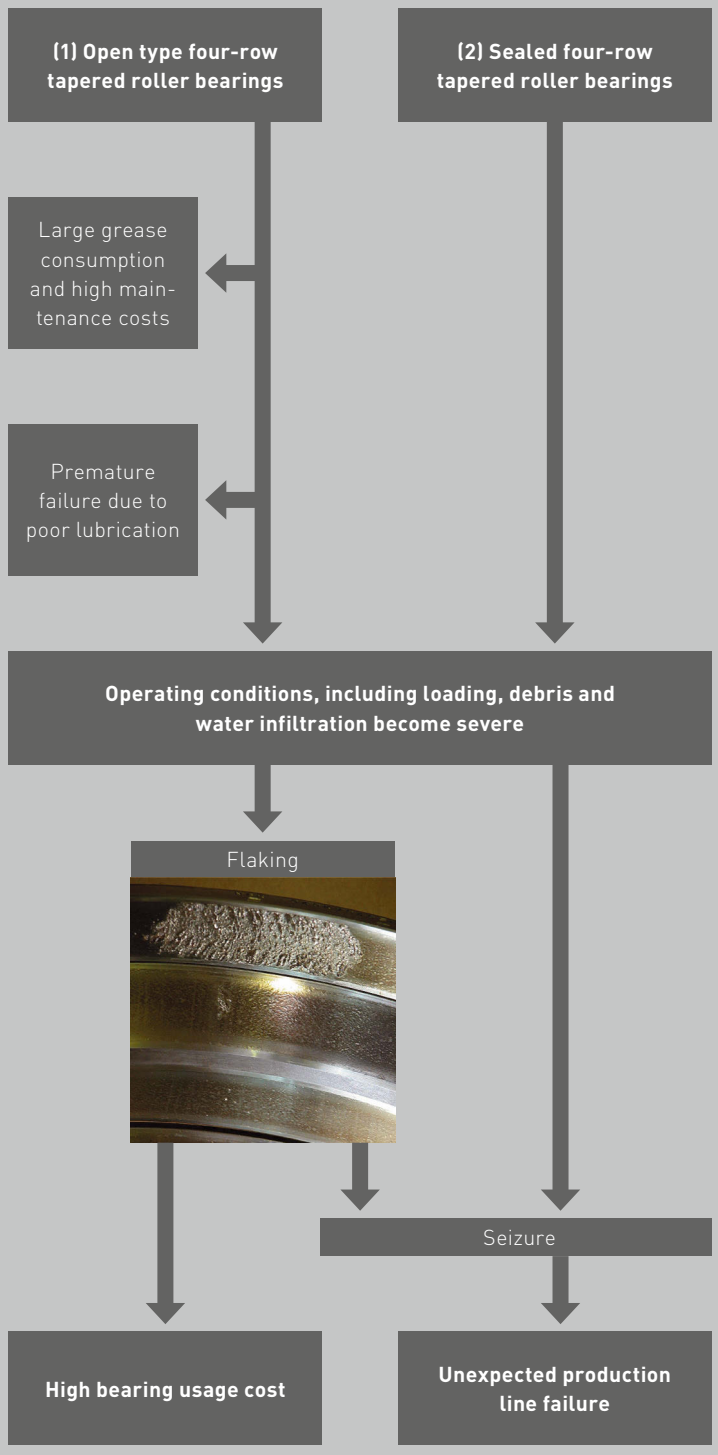
- Hot strip mills
- Skin pass mills
- Cold rolling mills
- Temper rolling mills





Tandem cold rolling mill

2. Typical problems



3. Countermeasures

Optimum construction

Tapered Roller Bearings (4-Rows) Extra capacity, Sealed-Clean Concept, KVS Series*

- Higher load capacity: increased by 15 %-35 % compared to conventional sealed bearings
- Super-TF steel: resistant to foreign contamination, used as standard
- Controlled negative pressure during rolling to prevent water infiltration
- Improved sealing through usage of heat- and water-resistant sealing materials
- Easier handling of seals

Water-resistant grease for sealed roll neck bearings – AQGRD R1

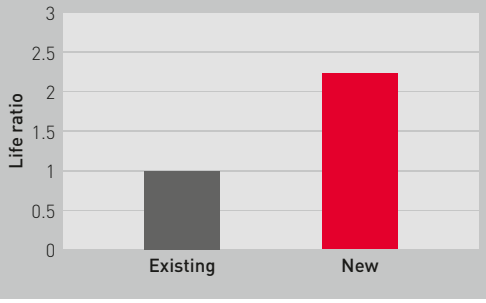
- Inhibits water entry to rolling surface
- Minimises premature flaking and rust
- More than doubled life with new grease

Flaking life test – AQGRD R1

Scenario of cold rolling work roll at following conditions

- Bearing: HR32017XJ (open single-row tapered roller bearing)
- Room temperature while bearing temperature at 60-70 °C
- Radial force: 35.8kN
  Axial force: 15.7kN, P/C: 0.25
- Speed: 1500 r/min

Test Result



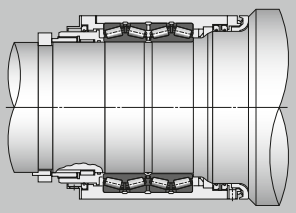
4. Benefits

- Higher reliability and longer operating life prevent unexpected accidents
- Bearing seal requires less cleaning of work environment and reduces grease consumption
- Reduced maintenance costs

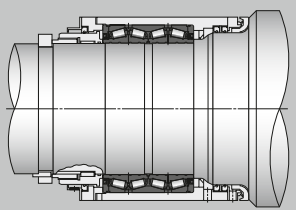
User Benefit page 31

Conventional structure

(1) Open type four-row tapered roller bearing



(2) Sealed four-row tapered roller bearing



*Bearing tables see page 38.

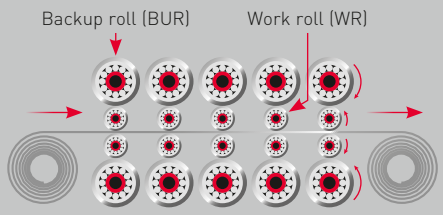
CYLINDRICAL ROLLER BEARINGS (4-ROWS) FOR BACKUP ROLLS

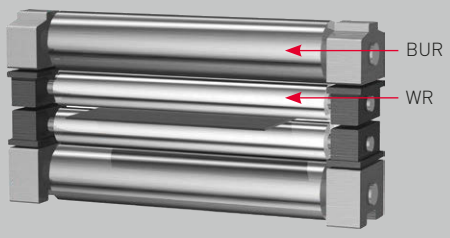
1. Operating conditions

- Vibration and impact
- Heavy loads
- High temperature
- High speed/low speed

Major target mills:

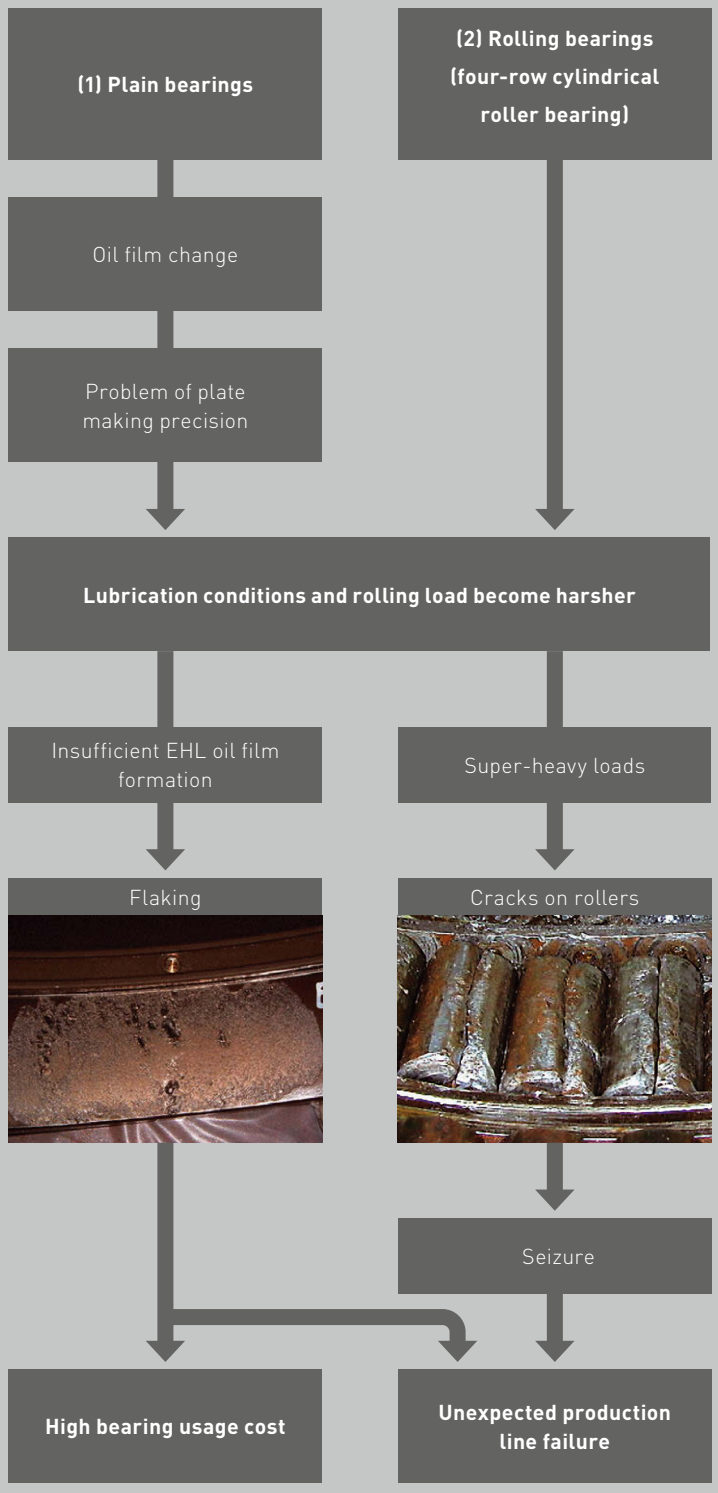
- Plate mills
- Skin pass mills
- Hot strip mills
- Temper rolling mills
- Cold rolling mills





Tandem cold rolling mill

2. Typical problems



3. Countermeasures

Design

Cylindrical Roller Bearings (4-Rows) STF-RV Series, Pin Type Cage*

- Long life Super-TF steel, resulting in longer durability, even under boundary-lubrication with insufficient EHL oil film formation
- Higher load capacity by using pin type cage
- Higher rotational accuracy

Bearing usage cost reduced by 50 %

Cylindrical Roller Bearings (4-Rows), STF-RV Series, Stud Type Cage*

- Adoption of solid type rollers associated with the development of a stud-type cage
- Higher load capacity
- Adoption of long life Super-TF steel
- Higher rotational accuracy

Elimination of unexpected accidents caused by cracks on rollers

4. Benefits

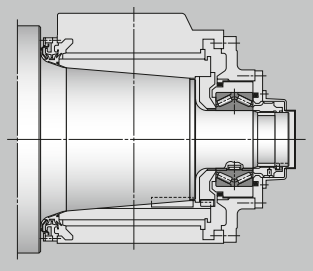
- Higher reliability and longer operating life prevent unexpected accidents
- Reduced maintenance costs
- Smoother rolling of bearings for backup rolls improves plate making precision

Comparison of actual life extension in field test

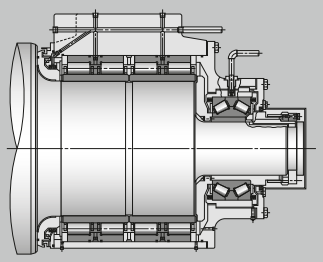
- Conventional steel = 1
- Super TF steel = 2

Conventional structure

(1) Plain bearing



(2) Rolling bearing

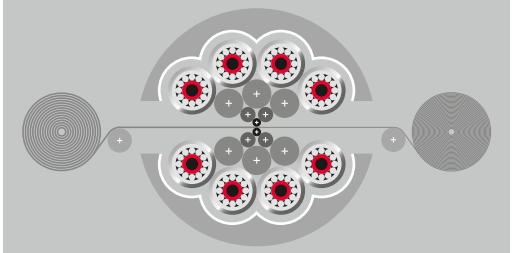


* Bearing tables see page 40.

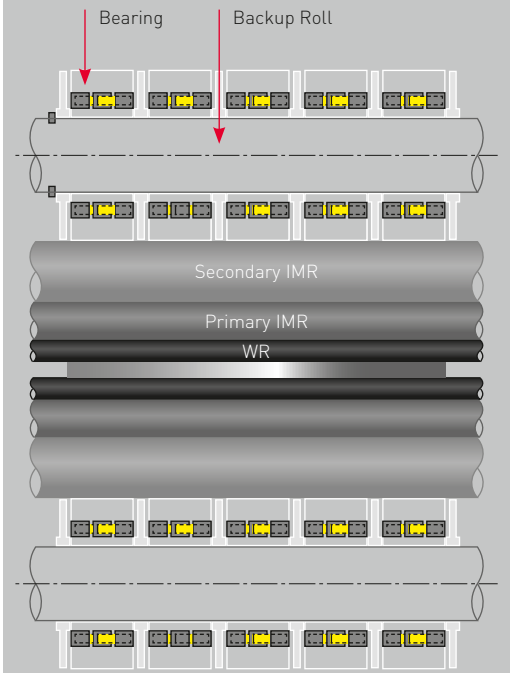
SENDZIMIR BACKUP ROLL BEARINGS

1. Operating conditions

- High speed
- Heavy loads
- Vibration and impact
- Entry of rolling solution



Backup roll
Secondary intermediate roll (drive roll)
Primary intermediate roll
Work roll



2. Typical problems

Open two or three row cylindrical roller bearing (2U and 3PL type)

Sealed double row cylindrical bearing (2U type)

Premature failure due to improper lubricant (rolling fluid)

Lubrication conditions, debris infiltration and rolling speed become harsher

Discharging oil mist through seal vent

Insufficient lubrication at seal lip

Wear of seal lip

Intrusion of rolling solution

Flaking

High bearing usage cost

Unexpected production line failure

3. Countermeasures

Material

Super-TF Sendzimir Backup Roll Bearings

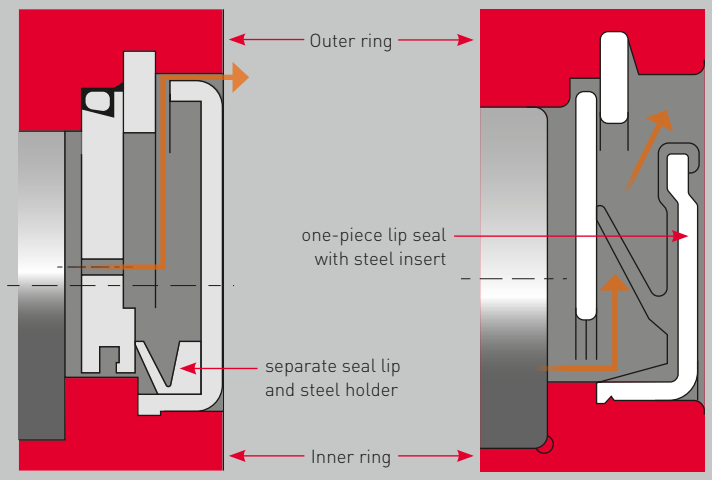
- Improved inner ring durability under heavy loads and severe lubrication conditions
- Almost twice the fatigue life time under contaminated environment when compared to conventional bearing steel
- Optionally available with EP (extra-pure) steel for up to 5 times longer life time than conventional bearing steel

Design

Sealed Sendzimir Backup Roll Bearings

- Optimised sealed design allowing oil-air mist to be discharged through the seal lip
- Lower seal contact force allows for higher speed operation, increasing productivity
- Simplified seal construction with reduced number of components for easier and quicker maintenance

Oil-air flow – Conventional vs NSK seal design

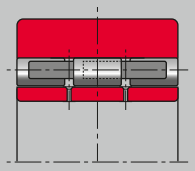


4. Benefits

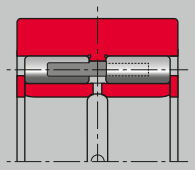
- Reduced seal wear translates into lower maintenance costs and higher bearing reliability
- Higher reliability and longer operating life prevent unexpected line stops and production losses
- Reduced total bearing usage cost through longer life time

Conventional Structure

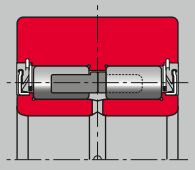
3PL type



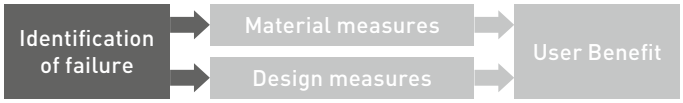
2U type



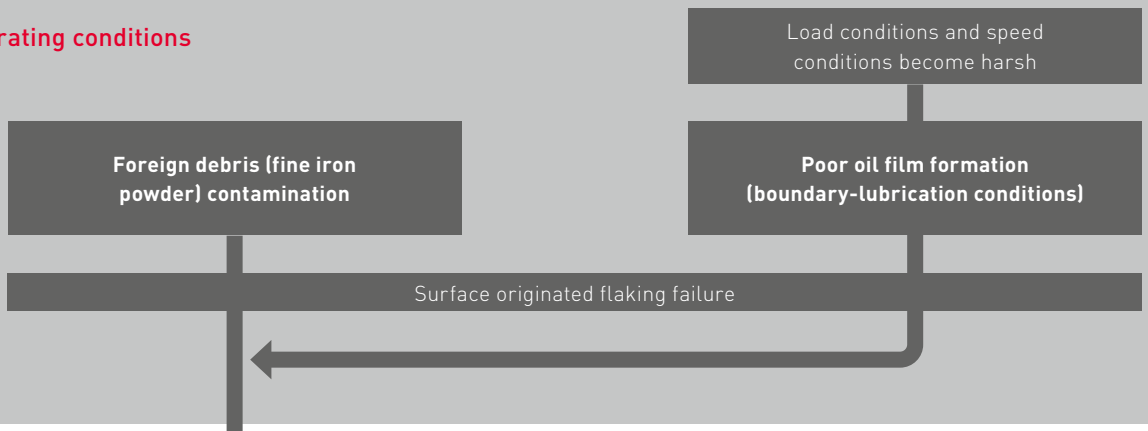
Sealed 2U type



IDENTIFICATION OF THE FAILURE MECHANISM OF BEARINGS FOR ROLLING MILLS

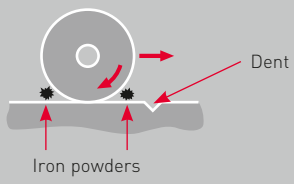


Operating conditions

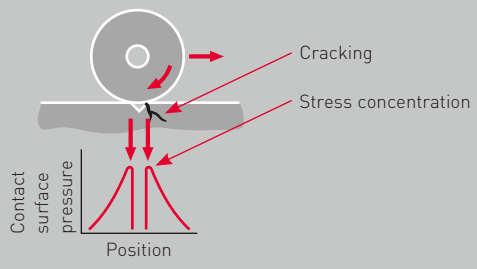


Failure mechanism

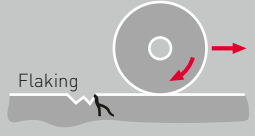
Step 1: Dents by foreign debris contamination



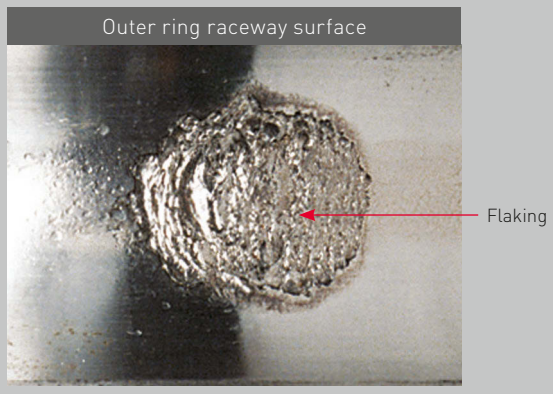
Step 2: Stress concentration around debris dents develop into cracks



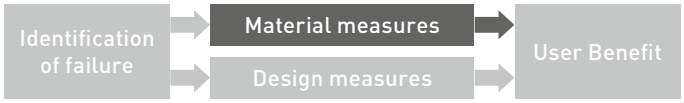
Step 3: Cracks propagate under the load of each passing roller and develop into flaking



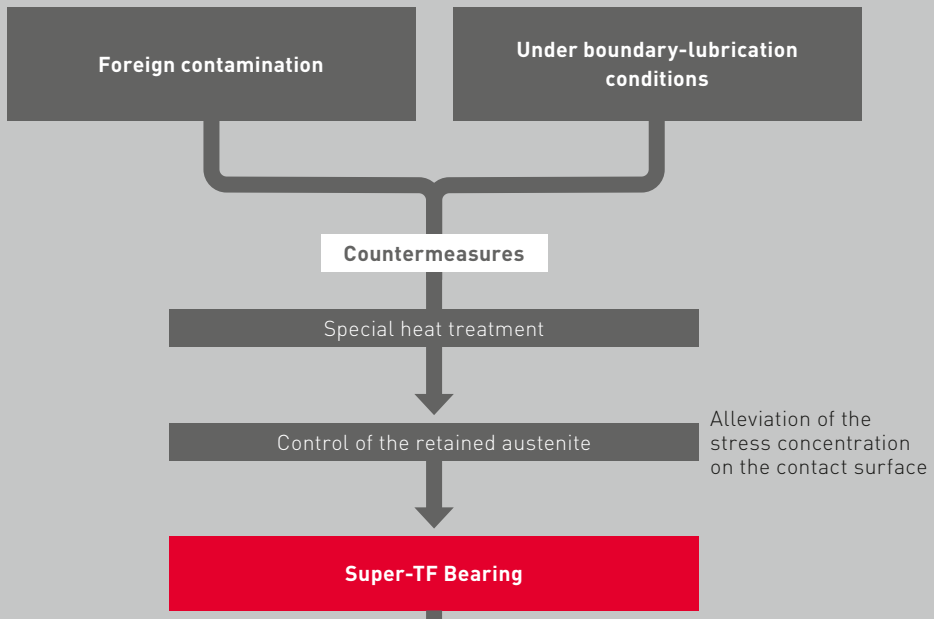
Example of early stage of flaking generated by foreign debris contamination



DEVELOPMENT OF SUPER-TF BEARING



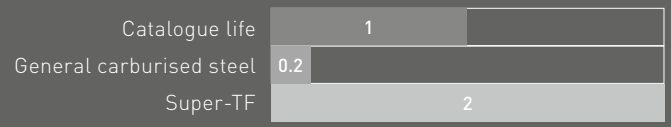
Enhances reliability and reduces maintenance cost of rolling mills



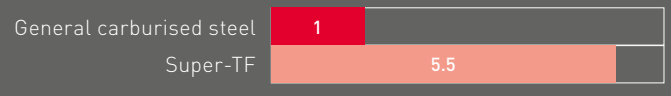
Basic performance

Life of Super-TF Bearings under lubrication with foreign contamination and under boundary-lubrication

1. Life test result under foreign contamination (tapered roller bearings)



2. Life test result under boundary-lubrication (Δ=0.3) (ball-rod rolling contact fatigue test)



TAPERED ROLLER BEARINGS (4-ROWS) EXTRA-CAPACITY, SEALED CLEAN, KVS SERIES

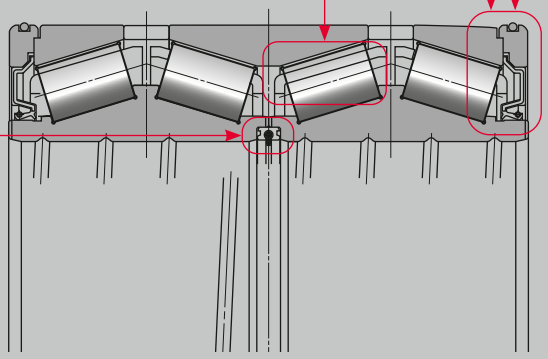
Identification of failure → Material measures / Design measures → User Benefit

Design measures

High-load capacity design
New internal structure specifications, combined with a new type of seal, increase bearing capacity

New seal and holder
The new seal and its holder make handling easier and minimise seal damage

New bore seal
The new bore seal prevents negative pressure that causes water entry and provides for easier mounting and dismounting

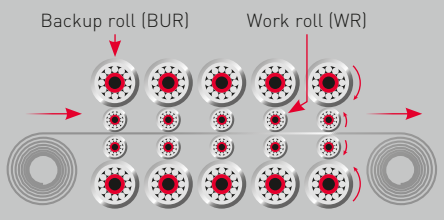


KVS Series

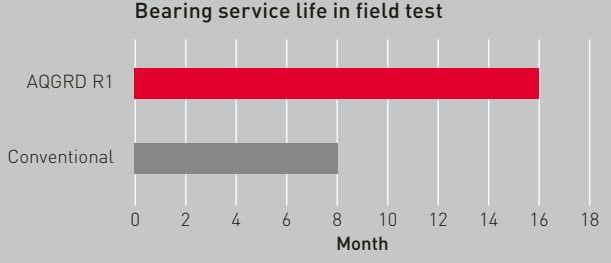
- **Basic load rating (C_r):**
  15-35 % increase
- **Estimated life (L_{10}):**
  1.6 to 2.7 times of estimated life extension
- **Performance of the bearing seal (Control of negative pressure inside the bearing):**
  Negative pressure and water infiltration were reduced to less than 1/3

Field performance results of KVS sealed roll neck bearings lubricated with AQGRD grease

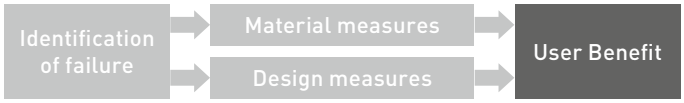
- Type of mill: tandem cold rolling mill (4 high)
- Position: work roll bearings
- Bearing type: sealed roll neck bearings KVS
- Bearing reference: STF360KVS4801



NSK bearings lubricated with AQGRD grease demonstrated at least two times the life span of conventional sealed roll neck bearings facing water infiltration issues, which resulted in over 1 Million ton of reliable steel output.



USER BENEFIT



Estimated effect of maintenance cost reduction

Bearing specifications	Grease	Bearing usage cost and seal repair cost	Maintenance work cost for bearings
Open type bearings (without seal) Maintenance cycle: 3 months			
Conventional sealed bearings Maintenance cycle: 6 months	90 % reduction		50 % reduction
KVS series lubricated with AQGRD grease Maintenance cycle: 6 months	90 % reduction	50 % reduction	50 % reduction

Success Story

Find out how NSK can help you to save costs by improving the productivity of your machinery and reducing costs caused by any failures during the production process.

https://www.nskeurope.com/en/industries/industrial/steel-and-metals/tandem-cold-mill.html

SPHERICAL ROLLER BEARINGS – SWR SERIES

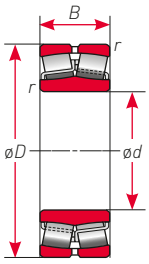


Fig. 1 (EA)

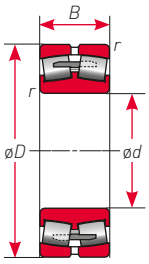


Fig. 2 (CAM)

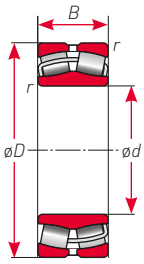
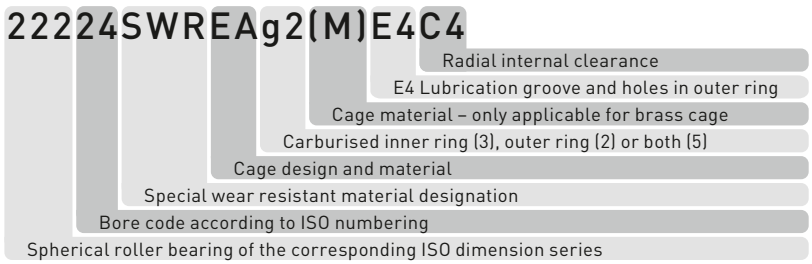


Fig. 3 (CD)

Bearing Numbers	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fig.
	d	*D*	*B*	*r* (min)	C_r	C_{0r}	
22208SWREAg2E4	40	80	23	1.1	113	99.5	1
22210SWREAg2E4	50	90	23	1.1	124	119	1
23012SWRCgE4	60	95	26	1.1	98.5	141	3
22212SWREAg2E4	60	110	28	1.5	178	174	1
22214SWREAg2E4	70	125	31	1.5	225	232	1
22216SWREAg2E4	80	140	33	2.0	264	275	1
22218SWREAg2E4	90	160	40	2.0	360	395	1
23020SWRCDg2E4	100	150	37	1.5	212	335	3
24020SWRCg2E4	100	150	50	1.5	276	470	3
24120SWRCAg2ME4	100	165	65	2.0	345	535	2
22220SWREAg2E4	100	180	46	2.1	455	490	1
23022SWRCDg2E4	110	170	45	2.0	293	465	3
24022SWRCg2E4	110	170	60	2.0	380	645	3
24122SWRCg2E4	110	180	69	2.0	460	750	3
22222SWREAg2E4	110	200	53	2.1	605	645	1
23024SWRCDg2E4	120	180	46	2.0	315	525	3
24024SWRCg2E4	120	180	60	2.0	395	705	3
24124SWRCg2E4	120	200	80	2.0	575	950	3
22224SWREAg2E4	120	215	58	2.1	685	765	1
23026SWRCDg2E4	130	200	52	2.0	400	655	3
24026SWRCg2E4	130	200	69	2.0	495	865	3
24126SWRCgE4	130	210	80	2.0	590	1 010	3
22226SWREAg2E4	130	230	64	3.0	820	940	1
23028SWRCDg2E4	140	210	53	2.0	420	715	3
24028SWRCg2E4	140	210	69	2.0	525	945	3
24128SWRCg2E4	140	225	85	2.1	670	1 160	3
22228SWRCDg2E4	140	250	68	3.0	645	930	3

Bearing Nomenclature

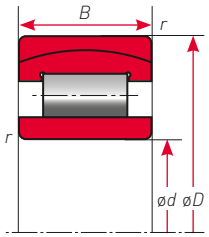


Bearing Numbers	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fig.
	d	*D*	*B*	*r* (min)	C_r	C_{0r}	
23030SWRCDg2E4	150	225	56	2.1	470	815	3
24030SWRCg2E4	150	225	75	2.1	590	1 090	3
24130SWRCgwE4	150	250	100	2.1	890	1 530	3
22230SWRCg2E4	150	270	73	3.0	765	1 120	3
23032SWRCDg2E4	160	240	60	2.1	540	955	3
24032SWRCg2E4	160	240	80	2.1	680	1 260	3
24132SWRCg2E4	160	270	109	2.1	1 040	1 760	3
22232SWRCDg2E4	160	290	80	3.0	910	1 320	3
23034SWRCDg2E4	170	260	67	2.1	640	1 090	3
24034SWRCg2E4	170	260	90	2.1	825	1 520	3
24134SWRCg2E4	170	280	109	2.1	1 080	1 860	3
22234SWRCDg2E4	170	310	86	4.0	990	1 500	3
23036SWRCDg2E4	180	280	74	2.1	750	1 270	3
24036SWRCg2E4	180	280	100	2.1	965	1 750	3
24136SWRCg2E4	180	300	118	3.0	1 190	2 040	3
22236SWRCDg2E4	180	320	86	4.0	1 020	1 540	3
23038SWRCAg2ME4	190	290	75	2.1	775	1 350	2
24038SWRCg2E4	190	290	100	2.1	975	1 840	3
24138SWRCg2E4	190	320	128	3.0	1 370	2 330	3
22238SWRCAg2ME4	190	340	92	4.0	1 140	1 730	2
23040SWRCAg2Me4	200	310	82	2.1	940	1 700	2
24040SWRCg2E4	200	310	109	2.1	1 140	2 120	3
24140SWRCg2E4	200	340	140	3.0	1 570	2 670	3
22240SWRCAg2ME4	200	360	98	4.0	1 300	2 010	2
23044SWRCAg2ME4	220	340	90	3.0	1 090	1 980	2
24044SWRCgE4	220	340	118	3.0	1 360	2 600	3
24144SWRCg2E4	220	370	150	4.0	1 800	3 200	3
22244SWRCAg2ME4	220	400	108	4.0	1 570	2 430	2

Remarks: Other bearings are available. Please contact NSK for additional information.

Dimensions of Bearings for Continuous Casting Machines

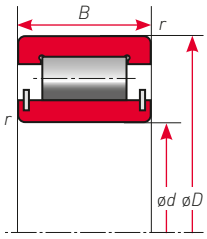
CYLINDRICAL ROLLER BEARINGS – RUB-SERIES



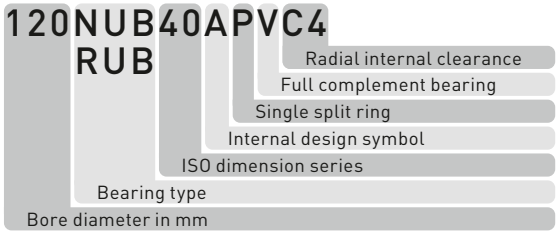
Bearing Numbers	Boundary Dimensions (mm)				Basic Load Ratings (kN)	
	d	*D*	*B*	*r* (min)	C_r	C_{0r}
110RUB41APV	110	180	69	2.0	375	805
120RUB40APV	120	180	60	2.0	305	715
120RUB41APV	120	200	80	2.0	450	958
120RUB32APV	120	215	76	2.1	510	990
130RUB40APV	130	200	69	2.0	405	935
130RUB41APV	130	210	80	2.0	480	1 050
130RUB32APV	130	230	80	3.0	585	1 090
140RUB40APV	140	210	69	2.0	420	990
140RUB41APV	140	225	85	2.1	545	1 230
140RUB32APV	140	250	88	3.0	715	1 390
150RUB40APV	150	225	75	2.1	435	1 070
150RUB41APV	150	250	100	2.1	710	1 620
15R0UB32APV	150	270	96	3.0	815	1 640
160RUB40APV	160	240	80	2.1	490	1 200
160RUB41APV	160	270	109	2.1	855	1 830
160RUB32APV	160	290	104	3.0	960	1 890
170RUB40APV	170	260	90	2.1	640	1 520
170RUB41APV	170	280	109	2.1	875	1 900
170RUB32APV	170	310	110	4.0	1 060	2 090
180RUB40APV	180	280	100	2.1	785	1 870
180RUB41APV	180	300	118	3.0	940	2 120
180RUB32APV	180	320	112	4.0	1 090	2 190
190RUB40APV	190	290	100	2.1	810	1 980
190RUB41APV	190	320	128	3.0	1 120	2 480
190RUB32APV	190	340	120	4.0	1 210	2 430
200RUB40APV	200	310	109	2.4	960	2 250
200RUB41APV	200	340	140	3.0	1 300	2 930

Remarks: Other bearings are available. Please contact NSK for additional information.

CYLINDRICAL ROLLER BEARINGS – NUB-SERIES



Bearing Nomenclature



Bearing Numbers	Boundary Dimensions (mm)				Basic Load Ratings (kN)	
	d	*D*	*B*	*r* (min)	C_r	C_{or}
120NUB40V	120	180	60	2	450	740
130NUB40V	130	200	69	2	570	950
140NUB40V	140	210	69	2	560	960
150NUB40V	150	225	75	2.1	665	1 160
160NUB40V	160	240	80	2.1	765	1 360

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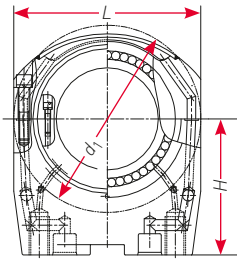
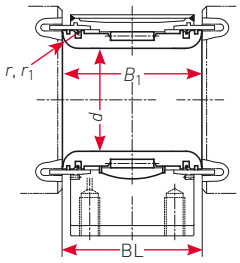
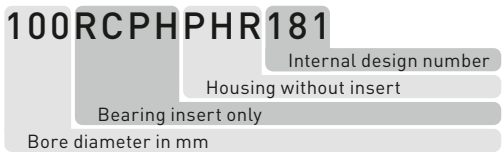
SPLIT CYLINDRICAL ROLLER BEARINGS (FOR SEGMENTED ROLLS) – RCPH/PHR SERIES





Bearing Numbers		Boundary Dimensions (mm)					Roll diameter d_1	Basic Load Ratings (kN)		Guide Roll		perm. ax. movem. (mm)
Bearing	Housing	d	B_1	r	L	H		C_r	C_{0r}	roll length BL	Radius r_1	
100RCPH171	100PHR211	100	154	18	200	145	210	405	950	155	18	± 10.0
100RCPH201	100PHR231	100	169	15	235	132	225	605	1 390	170	15	± 8.0
110RCPH181	110PHR221	110	139	15	220	225	220	450	1 090	140	15	± 9.0
110RCPH191	110PHR231	110	137	15	230	160	230	480	1 120	138	15	± 8.0
110RCPH192	110PHR232	110	154	20	230	150	230	525	1 280	155	20	± 8.0
110RCPH193	110PHR233	110	154	20	230	180	225	500	1 200	155	20	± 10.0
110RCPH201	110PHR234	110	154	20	230	180	230	540	1 270	155	20	± 10.0
115RCPH201	115PHR241	115	173	20	240	220	240	600	1 400	174	15	± 6.0
120RCPH181	120PHR221	120	163	20	220	145	220	360	965	164	20	± 10.5
120RCPH182	120PHR222	120	164	20	220	160	220	360	965	165	20	± 10.5
120RCPH201	120PHR231	120	157	15	234	165	235	540	1 340	158	20	± 8.0
120RCPH211	120PHR251	120	151	20	250	180	250	610	1 430	152	20	± 6.0
120RCPH212	120PHR252	120	151	20	250	190	250	525	1 310	152	20	± 10.0
120RCPH213	120PHR253	120	153	20	250	145	250	560	1 340	154	20	± 9.0
120RCPH214	120PHR254	120	154	20	250	180	250	565	1 380	155	20	± 8.0
120RCPH215	120PHR255	120	154	20	250	190	250	570	1 400	155	20	± 10.0
120RCPH216	120PHR256	120	179	20	255	230	255	630	1 580	180	20	± 8.0
130RCPH201	130PHR241	130	184	20	240	175	240	455	1 320	185	20	± 10.5
130RCPH221	130PHR261	130	157	20	270	180	260	615	1 520	158	20	± 6.0
130RCPH221	130PHR271	130	154	20	270	190	270	545	1 420	155	20	± 10.0
130RCPH222	130PHR272	130	154	20	270	190	270	585	1 480	155	20	± 9.0
130RCPH223	130PHR262	130	145	18	265	145	250	545	1 270	146	18	± 7.5
130RCPH224	130PHR263	130	157	20	265	180	265	625	1 530	158	20	± 6.0
130RCPH231	130PHR273	130	143	20	270	197	250	555	1 270	144	20	± 6.0
130RCPH232	130PHR281	130	174	20	280	160	280	760	1 890	175	20	± 9.0

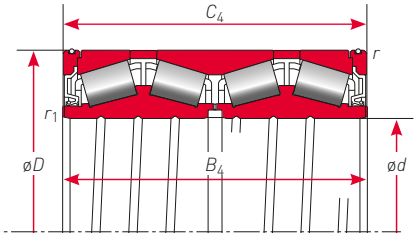
Bearing Nomenclature



Bearing Numbers		Boundary Dimensions (mm)					Roll diameter d_1	Basic Load Ratings (kN)		Guide Roll		perm. ax. movem. (mm)
Bearing	Housing	d	B_1	r	L	H		C_r	C_{0r}	roll length BL	Radius r_1	
135RCPH211	135PHR251	135	183	20	250	160	250	515	1 350	184	20	± 10.0
140RCPH221	140PHR261	140	184	20	260	185	260	565	1 410	185	20	± 10.5
140RCPH222	140PHR262	140	174	20	265	242.5	265	620	1 590	175	20	± 9.0
140RCPH223	140PHR263	140	191	20	265	250	265	615	1 570	192	20	± 6.0
140RCPH231	140PHR271	140	179	20	270	245	270	665	1 750	180	20	± 6.0
140RCPH232	130PHR281	140	159	25	270	180	280	615	1 590	160	25	± 8.0
140RCPH233	140PHR282	140	163	20	280	180	280	665	1 610	164	20	± 6.0
140RCPH261	140PHR311	140	184	20	310	175	310	840	1 970	185	20	± 9.0
145RCPH231	145PHR281	145	179	20	280	250	280	680	1 860	180	20	± 8.0
145RCPH232	145PHR282	145	196	20	280	260	280	675	1 800	197	20	± 6.0
145RCPH233	145PHR283	145	196	20	280	250	280	675	1 800	197	20	± 10.0
145RCPH251	145PHR291	145	208	20	295	270	295	880	2 230	209	20	± 6.0
150RCPH251	150PHR291	150	208	20	295	310	295	754	1 870	209	20	± 6.0
150RCPH252	150PHR301	150	169	20	295	180	300	715	1 880	170	20	± 9.0
150RCPH271	150PHR321	150	187	20	320	220	320	955	2 320	188	20	± 9.0
155RCPH251	155PHR301	155	199	20	300	260	300	770	1 970	200	20	± 8.0
160RCPH261	160PHR311	160	199	20	310	270	320	845	2 270	200	20	± 9.0
160RCPH281	160PHR331	160	200	20	330	225	320	1 070	2 650	201	20	± 7.0
160RCPH271	160PHR321	165	228	25	320	280	320	925	2 440	229	25	± 6.0
170RCPH271	170PHR321	170	214	20	320	255	330	855	2 330	215	20	± 10.0
170RCPH281	170PHR331	170	235	25	330	280	330	1 100	2 870	236	25	± 6.0
180RCPH281	180PHR341	180	235	25	340	280	340	980	2 490	236	25	± 6.0
180RCPH291	180PHR331	180	169	20	335	217.5	335	780	1 800	170	20	± 8.0
190RCPH331	190PHR391	190	233	20	390	280	370	1 510	3 850	234	20	± 6.0

Remarks: Other bearings are available. Please contact NSK for additional information.

TAPERED ROLLER BEARINGS – EXTRA CAPACITY SEALED-CLEAN 4-ROWS – KVS-SERIES



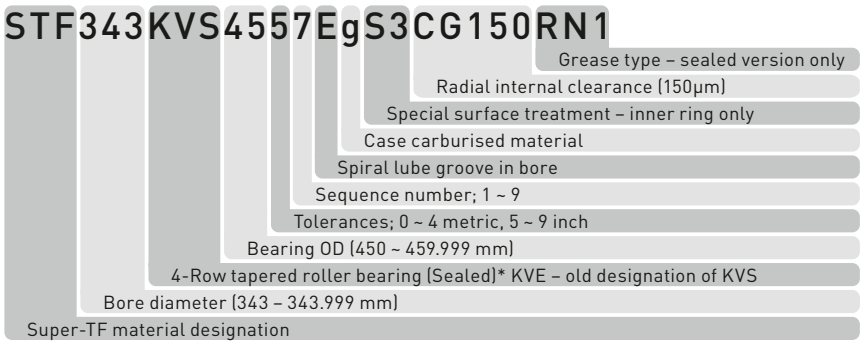
Dynamic Equivalent Load
$P = XF_r + YF_a$

Static Equivalent Load
$P_0 = F_r + Y_0F_a$
Where $Y_0 = Y_3$
The values of e, Y_2 and Y_3 are given in the table below.

$F_a / F_r \leq e$		$F_a / F_r > e$	
X	Y	X	Y
1	Y3	0.67	Y2

Bearing Numbers	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Constant	Axial Load Factors	
	d	*D*	B_4	C_4	*r* (min)	r_1 (min)	C_r	C_{0r}	e	Y_2	Y_3
STF170KVS2401Eg	170	240	175	175	2.5	2.5	1 020	2 010	0.32	3.2	2.1
*STF215KVS2851Eg	215.900	288.925	177.800	177.800	3.3	0.8	1 070	2 350	0.49	2.1	1.4
*STF216KVS3351Eg	216.103	330.200	263.525	269.875	3.3	1.5	2 290	4 550	0.46	2.2	1.5
STF220KVS3301Eg	220	330	260	260	3.0	4.0	2 330	4 800	0.40	2.5	1.7
*STF220KVS3151Eg	220.662	314.325	239.712	239.712	3.3	1.5	1 960	4 350	0.33	3.0	2.0
*STF228KVS3151Eg	228.600	311.150	200.025	200.025	3.3	1.5	1 560	3 500	0.33	3.0	2.0
*STF234KVS3251Eg	234.950	327.025	196.850	196.850	3.3	1.5	1 550	3 200	0.46	2.2	1.5
*STF241KVS3451Eg	241.478	349.148	228.600	228.600	3.3	1.5	2 020	4 150	0.35	2.9	1.9
*STF244KVS3251Eg	244.475	327.025	193.680	193.680	3.0	1.5	1 370	3 050	0.40	2.5	1.7
STF245KVS3402Eg	245	345	310	310	3.0	2.0	2 700	6 650	0.40	2.5	1.7
*STF254KVS3552Eg	254	358.775	269.875	269.875	3.3	1.5	2 420	5 500	0.40	2.5	1.7
STF260KVS3601Eg	260	365	340	340	4.0	2.7	2 960	7 350	0.40	2.5	1.7
*STF260KVS3651Eg	260	365	340	340	4.0	2.5	2 960	7 350	0.40	2.5	1.7
*STF260KVS4251Eg	260.350	422.275	314.325	317.500	3.3	6.4	3 600	7 050	0.33	3.0	2.0
*STF266KVS3551Eg	266.700	355.600	230.188	228.600	3.3	1.5	1 960	4 600	0.35	2.9	1.9
STF275KVS3801Eg	275	380	340	340	3	3	3 100	7 750	0.32	3.2	2.1
*STF276KVS3952Eg	276.225	393.700	269.875	269.875	3.3	1.5	2 720	6 100	0.45	2.2	1.5
*STF279KVS3952Eg	279.400	393.700	269.875	269.875	6.4	1.5	2 720	6 100	0.45	2.2	1.5
*STF279KVS3954Eg	279.400	393.700	320	320	6.4	1.5	3 100	7 350	0.40	2.5	1.7
STF280KVS3801Eg	280	380	290	290	3	3	2 690	6 500	0.33	3.0	2.0
STF280KVS3804Eg	280	380	340	340	4	1.5	2 870	7 650	0.33	3.0	2.0
STF280KVS4301Eg	280	430	350	350	3.5	2	4 100	8 558	0.40	2.5	1.7
STF290KVS4001Eg	290	400	346	346	4.0	3.0	3 250	8 400	0.40	2.5	1.7
*STF304KVS4351Eg	304.648	438.048	280.990	279.400	3.3	3.3	3 100	6 750	0.45	2.2	1.5
*STF304KVS4155Eg	304.800	419.100	269.875	269.875	6.4	1.5	2 850	6 550	0.33	3.0	2.0

Bearing Nomenclature



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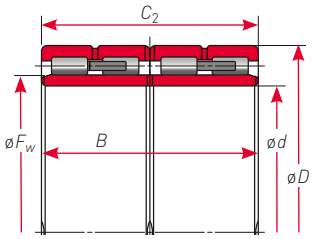
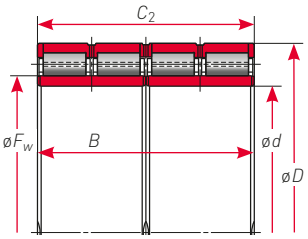
Bearing Numbers	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Constant	Axial Load Factors	
	d	D	B_4	C_4	r (min)	r_1 (min)	C_r	C_{0r}	e	Y_2	Y_3
*STF304KVS4152Eg	304.902	412.648	266.700	266.700	3.3	1.5	2 760	6 500	0.33	3.0	2.0
STF310KVS4301Eg	310	430	310	310	3.0	3.0	3 350	8 200	0.46	2.2	1.5
STF310KVS4302Eg	310	430	350	350	3.0	2.7	3 700	9 550	0.46	2.2	1.5
*STF317KVS4251Eg	317.500	422.275	269.875	269.875	3.3	1.5	2 740	6 750	0.34	3.0	2.0
*STF317KVS4451Eg	317.500	447.675	367	367	3	3.6	3 850	9 500	0.33	3.0	2.0
*STF343KVS4551Eg	340.052	457.098	254	254	3.3	1.5	2 830	6 700	0.45	2.2	1.5
*STF355KVS4551Eg	355.600	457.200	252.412	252.412	3.3	1.5	2 650	6 750	0.32	3.2	2.1
*STF355KVS4851Eg	355.600	482.600	265.112	269.875	3.3	1.5	3 100	7 200	0.47	2.1	1.4
*STF374KVS5051Eg	374.650	501.650	250.825	260.350	3.3	1	2 970	7 150	0.47	2.1	1.4
*STF384KVS5451Eg	384.175	546.100	400.050	400.050	6.4	3.3	5 250	12 400	0.33	3.1	2.1
*STF385KVS5151Eg	385.762	514.350	317.500	317.500	3.3	3.3	4 150	10 400	0.33	3.0	2.0
STF390KVS5101Eg	390	510	350	350	3	1.5	3 900	10 800	0.35	2.9	1.9
*STF406KVS5451Eg	406.400	546.100	288.925	288.925	6.4	1.5	3 950	9 450	0.48	2.1	1.4
*STF406KVS5452Eg	406.400	546.100	330	330	6.4	1	4 350	11 000	0.48	2.1	1.4
*STF406KVS5651Eg	406.400	562	381	381	6.4	3.3	4 950	11 900	0.33	3.0	2.0
*STF409KVS5451Eg	409.575	546.100	334.962	334.962	6.4	1.5	4 500	11 700	0.40	2.5	1.7
STF450KVS5901Eg	450	595	368	368	5.0	4.0	5 550	15 000	0.33	3.0	2.0
*STF457KVS5951Eg	457.200	596.900	276.225	279.400	3.3	1.5	4 000	9 850	0.47	2.2	1.4
*STF482KVS6151Eg	482.600	615.950	330.200	330.200	6.4	4.3	4 900	13 500	0.33	3.1	2.1
*STF489KVS6351Eg	489.026	634.873	320.675	320.675	3.3	3.3	4 850	12 500	0.38	2.7	1.8
STF490KVS6201Eg	490	625	385	385	3	3	5 650	16 600	0.32	3.2	2.1
*STF558KVS7353Eg	558.800	736.600	455.600	457.200	6.4	3.3	8 300	23 000	0.35	2.9	2.0
*STF585KVS7751Eg	585.788	711.525	479.425	479.425	6.4	3	8 250	22 700	0.33	3.0	2.0
*STF660KVS8151Eg	660.400	812.800	365.125	365.125	6.4	3.3	6 050	17 700	0.33	3.0	2.0
*STF708KVS9351Eg	708.025	930.275	565.150	565.150	6.4	3.3	12 000	34 000	0.33	3.0	2.0

Remarks: 1. Extra-Capacity Sealed-Clean Four-Row Tapered Roller Bearings are made of NSK Super-TF material as the standard specification.
2. Bearings marked * are inch design.
3. Other bearings are available. Please contact NSK for additional information.

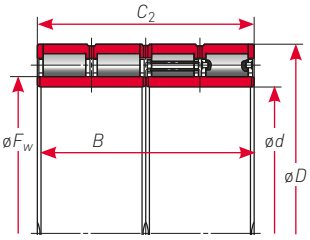
CYLINDRICAL ROLLER BEARINGS (4-ROWS) – STF-RV SERIES



Machined brass or steel cage



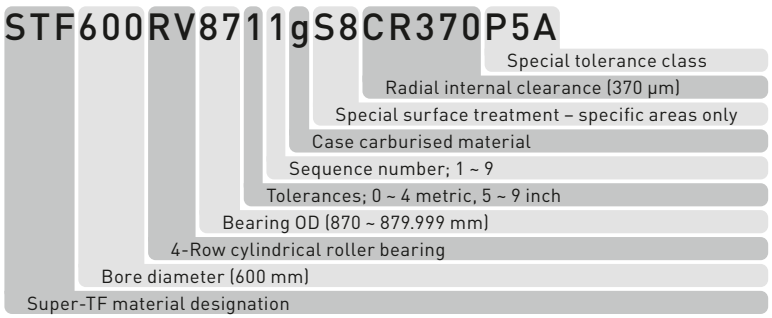
Pin type cage



Stud type cage

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)	
	d	*D*	*B*	C_2	F_w	C_r	C_{0r}
STF127RV1722g	127	174.625	150.812	150.812	139.500	735	1 580
STF145RV2101g	145	210	155	155	165.930	770	1 850
STF145RV2201g	145	225	156	156	169	975	1 820
STF160RV2302g	160	230	168	168	180	895	2 200
STF160RV2306g	160	230	130	130	180	785	1 460
STF160RV2403g	160	240	145	145	180.073	920	1 600
STF165RV2221g	165.100	225.450	168.300	168.300	180.975	1 010	2 220
STF170RV2321g	170	230	160	160	185.500	1 150	2 060
STF170RV2405g	170	240	130	130	190	895	1 760
STF180RV2601g	180	260	168	168	202	1 150	2 300
STF180RV2802g	180	280	180	180	205.085	1 410	2 490
STF190RV2701g	190	270	200	200	212	1 470	3 100
STF190RV2801g	190	280	200	200	214	1 480	2 920
STF200RV2702g	200	270	170	170	222	1 120	2 590
STF200RV2804g	200	280	170	170	222	1 370	2 960
STF200RV2802g	200	280	200	200	222	1 410	3 200
STF200RV2901g	200	290	192	192	226	1 420	3 000
STF210RV2901g	210	290	192	192	236	1 400	3 350
STF220RV3101g	220	310	192	192	247	1 540	3 450
STF230RV3301g	230	330	206	206	260	1 760	3 900
STF240RV3603g	240	360	218	218	270.085	2 110	4 000
STF260RV3701g	260	370	220	220	292	2 050	4 450
STF280RV3901g	280	390	220	220	312	2 120	4 800
STF280RV3907g	280	390	220	220	312	2 280	5 100
STF320RV4621g	320	460	240	240	364	2 820	6 100
STF400RV5611g	400	560	410	410	445	6 550	16 500
STF440RV6215g	440	620	450	450	487	8 100	19 700

Bearing Nomenclature



Success Story

Find out how NSK can help you to save costs by improving the productivity of your machinery and reducing costs caused by any failures during the production process.

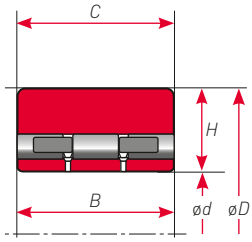
https://www.nskeurope.com/en/industries/industrial/steel-and-metals/hot-strip-mill.html

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)	
	d	*D*	*B*	C_2	F_w	C_r	C_{0r}
STF460RV6513g	460	650	470	470	509	8 600	21 200
STF480RV6815g	480	680	500	500	532	9 400	23 500
STF500RV6713g	500	670	450	450	540	7 750	20 000
STF500RV7011g	500	700	500	500	554	9 650	24 600
STF530RV7811g	530	780	570	570	601	11 800	29 200
STF550RV7413g	550	740	510	510	600	10 100	27 600
STF560RV8211g	560	820	600	600	625	14 100	34 000
STF570RV8113g	570	815	594	594	628	13 200	32 000
STF600RV8212g	600	820	575	575	660	12 900	35 500
STF650RV9212g	650	920	670	670	723	16 200	44 000
STF660RV9311g	660	930	660	660	728	17 000	44 000
STF690RV9813g	690	980	750	750	766	19 200	53 000
STF730RV1011g	730	1 030	750	750	809	20 700	56 500
STF761RV1012g	761.425	1 079.6	787.4	787.4	846	23 900	65 500
STF770RV1011g	770	1 075	770	770	847	23 100	63 500
STF800RV1013g	800	1 080	700	700	878	19 100	56 000
STF800RV1014g	800	1 080	700	700	878	19 200	55 000
STF800RV1012g	800	1 080	750	750	880	19 300	57 000
STF820RV1119g	820	1 100	745	720	892	20 100	59 000
STF820RV11112g	820	1 130	650	650	891	20 300	53 000
STF820RV11110g	820	1 130	800	800	903	22 900	66 500
STF840RV1111g	840	1 160	840	840	920	24 900	71 500
STF850RV1115g	850	1 150	840	840	928	25 600	77 500
STF850RV1111g	850	1 180	850	850	940	24 700	72 500
STF900RV1216g	900	1 220	810	800	981	25 900	74 500
STF900RV1212g	900	1 220	840	840	989	26 800	80 000
STF950RV1314g	950	1 330	950	950	1 053	33 500	97 000

Remarks: The specification of oil mist fitting and O-rings on outer rings are available when requested.
Other bearings are available. Please contact NSK for additional information.

Dimensions of Bearings for Rolling Mills

SENDZIMIR BACKUP ROLL BEARINGS

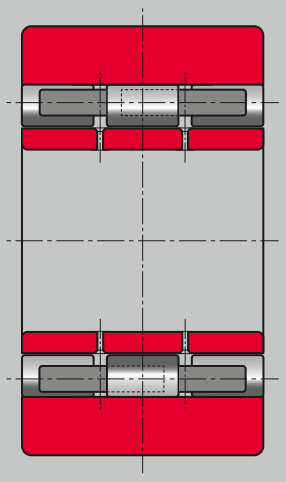


Bearing Numbers	Boundary Dimensions (mm)					Design	Basic Load Ratings (kN)
	d	*D*	*B*	*C*	*H*		C_r
2U55-1	55.004	120.016	64	63.200	-	4	182
2U55-3	55	119.100	52.200	52	32.050	2	151
3PL70-1	70	160	90	90	45	1	410
2U80-5	80	220	130	120	69.968	6	625
2U90-14	90	220	94	94	65	3	630
2U90-11	90	220	120	119	65	4	680
2U90-13	90	220.020	96	94	65	4	520
2PL100-3	100	225	80	80	62.470	3	535
2U100-16	100	225	100	100	62.480	5	575
2U100-17	100	225	120	119	62.500	2	550
3PL100-1	100	225	120	120	62.470	1	715
2U110-12	110	260	98	98	75	4	625
2U130-32	130	300	132	129	85	4	1 000
3PL130-2	130	300	160	159.500	84.950	1	1 470
3PL130-7	130	300	172.640	172.640	84.950	1	1 540
2U130-37	130	300	172.750	169	85	4	1 170
2U130-34	130	300.020	150	149	85.010	2	1 100
2U130-23	130	300.020	160	158	85.010	4	1 290
2U130-17	130	300.020	172.650	171.600	85.010	4	1 370
2U180-2	180	406.420	171.040	170	113.200	2	1 850
2U180-5	180	406.420	171.040	170	113.200	4	1 650
3PL180-3	180	406.420	171.040	171.040	113.155	1	2 000
2U180-7	180	406.420	171.040	171.040	113.155	6	1 520
3PL180-2	180	406.420	224	224	113.155	1	2 610
2U180-4	180	406.420	224	224	113.160	2	2 360
2U190-5	190	380	112	110	94.950	6	875
2U190-4	190	380	142	140	94.950	6	1 210

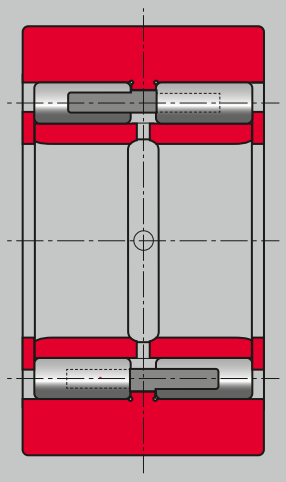
Bearing Nomenclature

EP3-3PL180-2AgCCG93UPBDR7

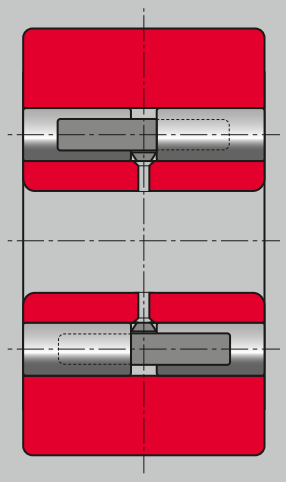
- Bearing supplied in matched sets of 7 bearings
- Special accuracy class
- Matched radial internal clearance (93µm)
- Case carburised material
- Design number and modification
- Bore diameter in mm
- Bearing type
- Special (Extra Pure) Material



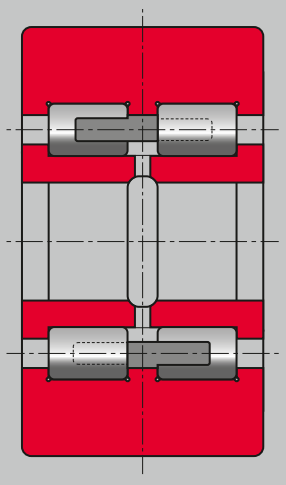
Design 1



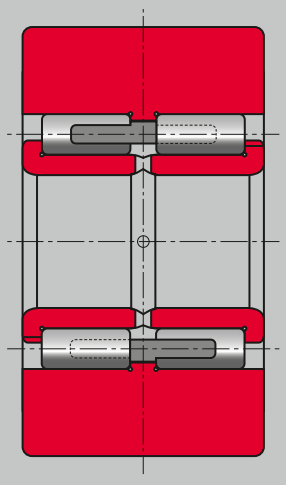
Design 2



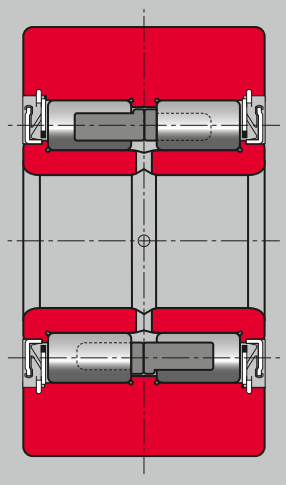
Design 3



Design 4



Design 5



Design 6

MOTION & CONTROL™
NSK

NSK Sales Offices – Europe, Middle East and Africa

UK
NSK UK Ltd.
Northern Road, Newark
Nottinghamshire NG24 2JF
Tel. +44 (0) 1636 605123
Fax +44 (0) 1636 643276
info-uk@nsk.com

France
NSK France S.A.S.
Quartier de l'Europe
2, rue Georges Guynemer
78283 Guyancourt Cedex
Tel. +33 (0) 1 30573939
Fax +33 (0) 1 30570001
info-fr@nsk.com

Middle East
NSK Bearings Gulf Trading Co.
JAFZA View 19, Floor 24 Office 2/3
Jebel Ali Downtown,
PO Box 262163
Dubai, UAE
Tel. +971 (0) 4 804 8205
Fax +971 (0) 4 884 7227
info-me@nsk.com

South Africa
NSK South Africa (Pty) Ltd.
25 Galaxy Avenue
Linbro Business Park
Sandton 2146
Tel. +27 (011) 458 3600
Fax +27 (011) 458 3608
nsk-sa@nsk.com

Germany, Austria, Benelux, Switzerland, Nordic
NSK Deutschland GmbH
Harkortstraße 15
40880 Ratingen
Tel. +49 (0) 2102 4810
Fax +49 (0) 2102 4812290
info-de@nsk.com

Poland & CEE
NSK Polska Sp. z o.o.
Warsaw Branch
Ul. Migdałowa 4/73
02-796 Warszawa
Tel. +48 22 645 15 25
Fax +48 22 645 15 29
info-pl@nsk.com

Spain
NSK Spain, S.A.
C/ Tarragona, 161 Cuerpo Bajo
2ª Planta, 08014 Barcelona
Tel. +34 93 2892763
Fax +34 93 4335776
info-es@nsk.com

Italy
NSK Italia S.p.A.
Via Garibaldi, 215
20024 Garbagnate
Milanese (MI)
Tel. +39 02 995 191
Fax +39 02 990 25 778
info-it@nsk.com

Russia
NSK Polska Sp. z o.o.
Russian Branch
Office I 703, Bldg 29,
18th Line of Vasilievskiy Ostrov,
Saint-Petersburg, 199178
Tel. +7 812 3325071
Fax +7 812 3325072
info-ru@nsk.com

Turkey
NSK Rulmanları Orta Doğu Tic. Ltd. Şti.
Cevizli Mah. D-100 Güney Yan Yol
Kuriş Kule İş Merkezi No:2 Kat:4
Kartal – Istanbul
Tel. +90 216 5000 675
Fax +90 216 5000 676
turkey@nsk.com

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