

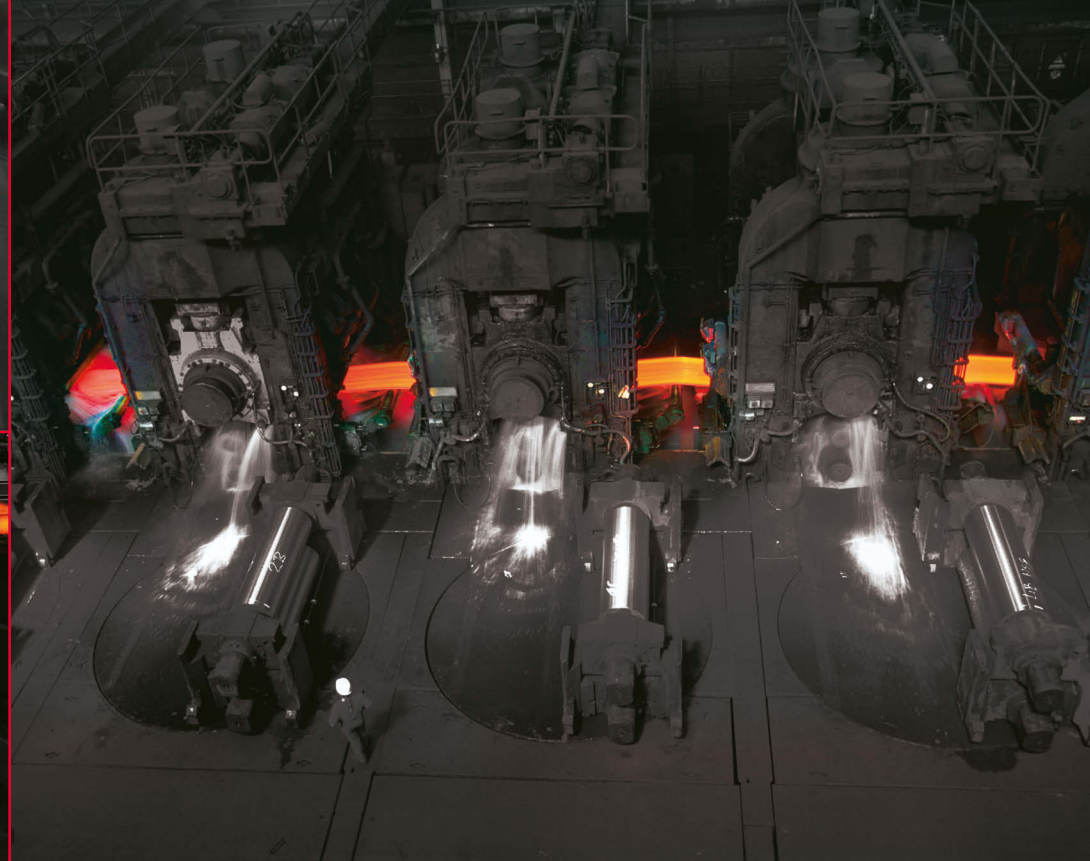


SENDZIMIR BACK-UP ROLL BEARINGS

FOR MULTI-ROLL ROLLING CLUSTER MILLS



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:

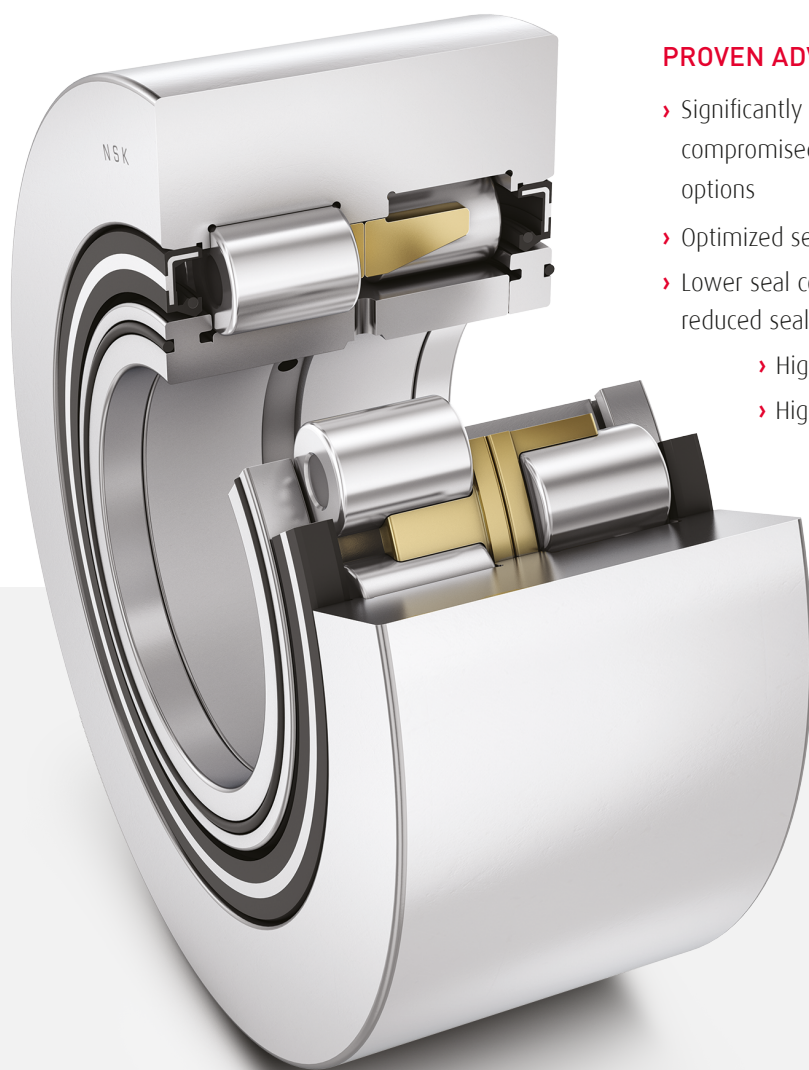
- › increasing capacities for high loads and high speeds
- › advanced materials for durability, wear resistance and longer life
- › lubrication and seal technology for smooth and clean running

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

STRENGTH AND ACCURACY FOR HIGH, PRECISE OUTPUT

With the demands for precise thickness tolerance and optimal surface finish of plate and sheet metals becoming increasingly stringent, the expectations placed on the back-up bearings used in Sendzimir / multi-roll cold rolling are similarly high. Not only must these bearings withstand the heavy and impact loads transmitted, but they must run with high rotational accuracy to ensure dimensional quality of the end product.

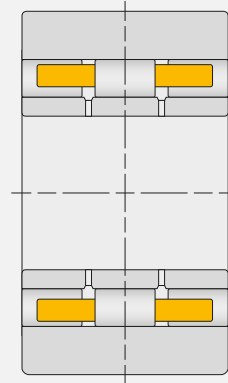
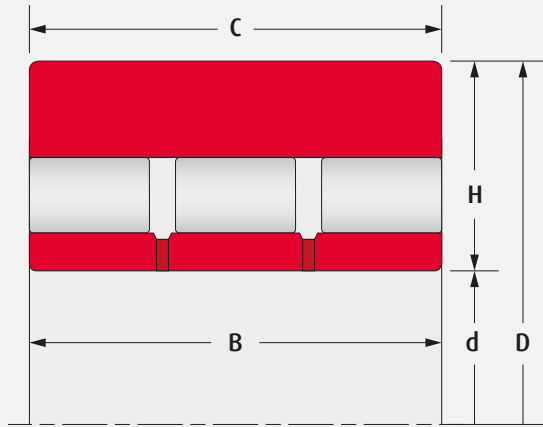
NSK's back-up roller bearings for cluster mills are engineered with the requisite ring strength and running accuracy to support precise plate and sheet making. With advanced options including our long-life STF steel and innovative seal design, they withstand heavy loads and lubrication challenges to deliver a long and reliable service life.



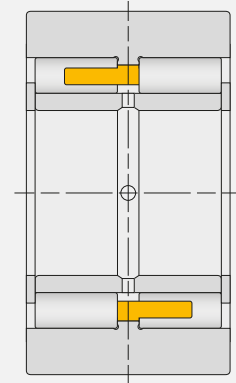
PROVEN ADVANTAGES

- › Significantly longer fatigue life under heavy loads and severely compromised lubrication conditions with STF and EP material options
- › Optimized seal design for oil-mist / oil-air lubrication conditions
- › Lower seal contact force allows for higher speed operation with reduced seal wear
 - › High rotational accuracy
 - › Higher reliability with reduced bearing consumption

BEARING DIMENSIONS AND OPERATING VALUES



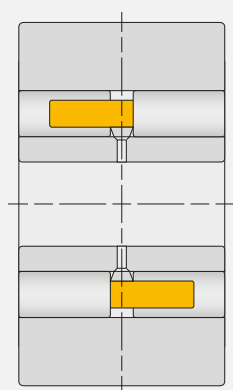
Design 1



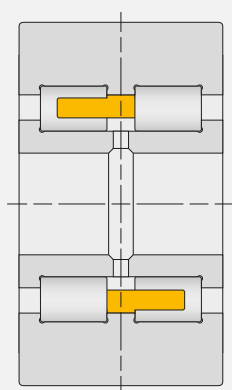
Design 2

BASIC BEARING NO.	BEARING DIMENSIONS					BASIC LOAD RATINGS	DESIGN
	mm					kN	
	d	D	B	C	H	Dynamic	
2U55-1	55.004	120.016	64	63.2	-	182	4
2U55-3	55	119.1	52.2	52	32.05	151	2
3PL70-1	70	160	90	90	45	410	1
2U80-5	80	220	130	120	69.968	625	6
2U90-14	90	220	94	94	65	630	3
2U90-11		220	120	119	65	680	4
2U90-13		220.02	96	94	65	520	4
2PL100-3	100	225	80	80	62.47	535	3
2U100-16		225	100	100	62.48	575	5
2U100-17		225	120	119	62.5	550	2
3PL100-1		225	120	120	62.47	715	1
2U110-12	110	260	98	98	75	625	4
2U130-32	130	300	132	129	85	1 000	4
3PL130-2		300	160	159.5	84.95	1 470	1
3PL130-7		300	172.64	172.64	84.95	1 540	1
2U130-37		300	172.75	169	85	1 170	4
2U130-34		300.02	150	149	85.01	1 100	2
2U130-23		300.02	160	158	85.01	1 290	4
2U130-17		300.02	172.65	171.6	85.01	1 370	4

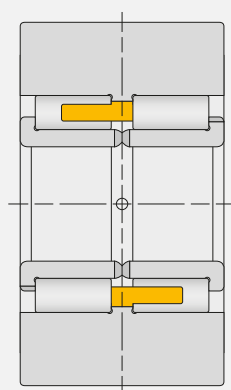
Additional bearing sizes are available. Please contact NSK for additional information.



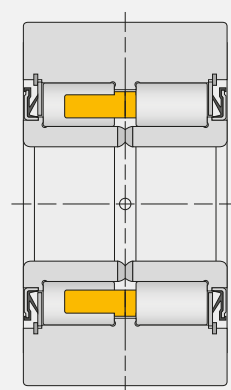
Design 3



Design 4



Design 5



Design 6

BASIC BEARING NO.	BEARING DIMENSIONS					BASIC LOAD RATINGS	DESIGN
	mm					kN	
	d	D	B	C	H	Dynamic	
2U180-2	180	406.42	171.04	170	113.2	1 850	2
2U180-5		406.42	171.04	170	113.2	1 650	4
3PL180-3		406.42	171.04	171.04	113.155	2 000	1
2U180-7		406.42	171.04	171.04	113.155	1 520	6
3PL180-2		406.42	224	224	113.155	2 610	1
2U180-4		406.42	224	224	113.16	2 360	2
2U190-5	190	380	112	110	94.95	875	6
2U190-4		380	142	140	94.95	1 210	6

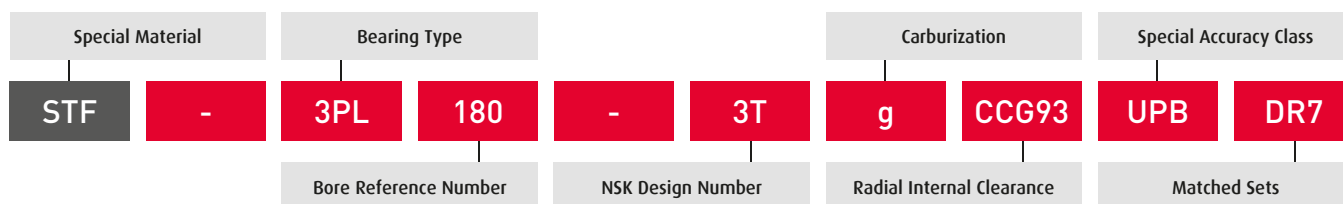
DESIGN FEATURES

- › Special design high capacity cylindrical roller bearings with inordinately thick outer rings, which serve as the back-up roll
- › Available with Super-TF or Extra-Pure (EP) material options for extraordinarily high endurance
- › In three- or double-row designs with machined brass cages
- › Advanced seal design option available for double-row bearings
- › With matched-set radial internal clearance
- › Special tolerances for precision running accuracy



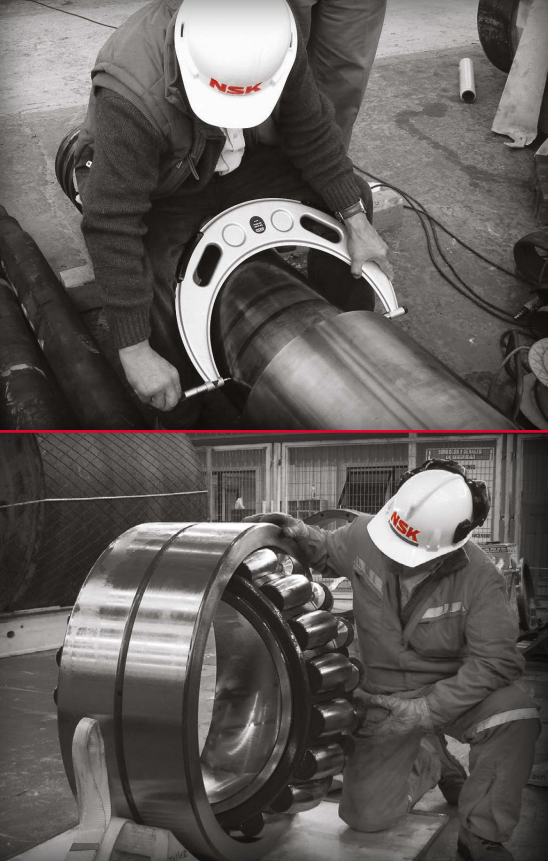
DESIGNATION SYSTEM

SENDZIMIR BACK-UP BEARINGS



DESIGNATION	ATTRIBUTE	
Special Material Designation	blank	standard bearing steel
	STF	long-life Super-TF™ steel
	EP3	Extra-Pure steel
Bearing Type	3PL	three roller rows, no inner or outer ring ribs
	2PL	two roller rows, no inner or outer ring ribs
	2U	two roller rows, various inner and outer ring rib / flange ring configuration
		sealed-type design options
Bore Reference Number		bearing bore diameter expressed in mm
NSK Design Number		internal design and modification number- assigned by NSK

DESIGNATION	ATTRIBUTE	
Carburization	g	entire bearing
	g2	outer ring only
	g3	inner ring only
Radial Internal Clearance	CCGXX	special internal clearance expressed in microns
	blank	C-normal clearance
	C2	less than C-normal
Special Accuracy Class	UPA	special precision tolerances
	UPB	
Matched Sets	DR#	number of bearings supplied as a matched set



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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