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MOTION & CONTROL™

**NSK**

# TL SERIES FOR THE PULP & PAPER INDUSTRY

BRANDS OF **NSK EUROPE**

**NSK** RHP bearings



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# TL SERIES BEARINGS FOR PAPER MACHINES DELIVER MORE THAN TWICE THE SERVICE LIFE OF CONVENTIONAL BEARINGS WHEN OPERATING UNDER CONTAMINATED CONDITIONS

More than twice the service life of conventional bearings when operating under contaminated conditions.

Throughout the entire paper making process you can rely on NSK's uncompromising commitment to superior products.

From high temperature resistance to heavy load capabilities, NSK delivers products that offer solutions in all mill applications.

Upgrading to NSK ensures productivity and reliability for you and your entire operation.



**EXCELLENT PERFORMANCE  
IN HARSH CONDITIONS**

# TOUGH AND LONG LIFE SPHERICAL ROLLER BEARINGS FOR THE PULP & PAPER INDUSTRY

The dryer section of the paper machine is particularly vulnerable to various types of bearing failures. Considering the ubiquitous moisture, marginal lubrication, high speeds and temperatures, extending bearing service life with utmost operational reliability in these conditions is a critical priority.

## HOT STEAM GOES THROUGH DRYING CYLINDER AND WARMS UP BEARING UNIT

Lubricant viscosity gets lower

Risk of metal-to-metal contact at raceways

Moisture and contamination ingress to lubricant

Bearing operates under high temperatures

Aging expansion of the material under high temperatures

Not enough tight fit, poor fitting surfaces geometry

Temperature difference between bearing inner ring and fitting surface

Interference of the bearing inner ring increases

Additional stress concentrators lead to increase of the hoop stress

Surface wear and flaking



Bearing creeping



Inner ring cracks



TL bearings optimize machinery's uptime and productivity with outstanding resistance to inner ring fractures, high dimensional stability under high-temperatures, and long life due to superior hardness.

# OPERATING BENEFITS

- › **Longer service life** – more than twice that of conventional bearings under contaminated conditions (Fig. 1)
- › **High resistance to hoop stress** resulting from rising shaft temperatures (Fig. 2)
- › **Reduced fracturing** of bearing inner rings (Fig. 2 and 3)
- › **Reduced downtime and maintenance costs** due to longer bearing life
- › **Greater dimensional stability** under temperatures as high as 200°C (see Fig. 4)

TL	231	52	CA	G3	M	K	C4	P55W507
MATERIAL	DIMENSIONAL SERIES	BORE REF. NO	INTERNAL DESIGN	CARBURISED STEEL	CAGE	BORE TYPE	INTERNAL CLEARANCE	SPECIFICATION
MATERIAL SERIES	TL: tough and long life				CAGE			M: heavy-duty machined brass BLANK: high-strength pressed steel
DIMENSIONAL SERIES	222, 223, 230, 231, 232, 239, 240, 241				BORE TYPE			BLANK: cylindrical, K: 1:12 tapered, K30: 1:30 tapered
BORE DIAMETER	Bore code * 5mm				INTERNAL CLEARANCE			Normal (blank), C3, C4, C5
INTERNAL DESIGN	CA, EA, CD				SPECIAL FEATURES			S11: Thermostabilisation up to 200°C W31: Special packaging + S11 W507: E4 (lubrication groove and holes -outer ring)+W31+S11 W509: E7 (lubrication groove and holes - inner and outer ring)+W31+S11 P55: both rings running accuracy P5
CARBURISATION	G: complete bearing, G3: inner ring, G5: inner and outer ring							

# TL STEEL FEATURES AND ADVANTAGES

Fig. 1 Longer life under contaminated conditions

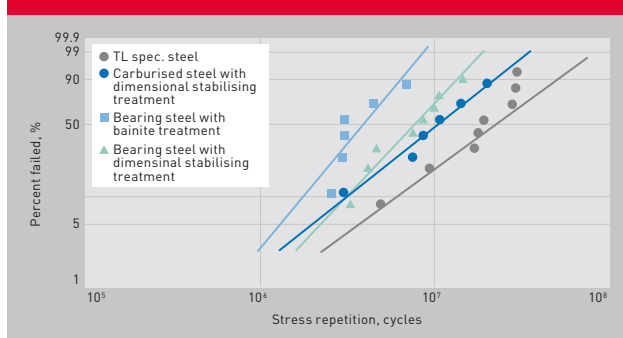


Fig. 2 Enhanced inner ring strength

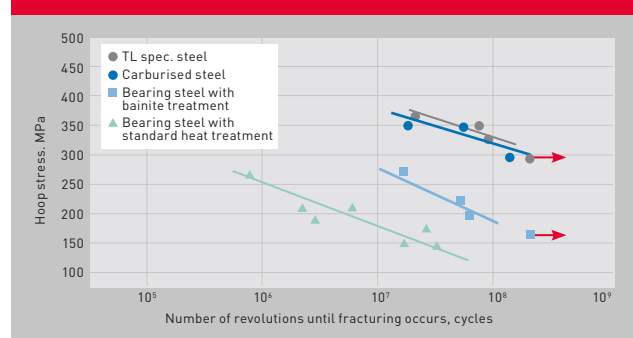


Fig. 3 Residual stress

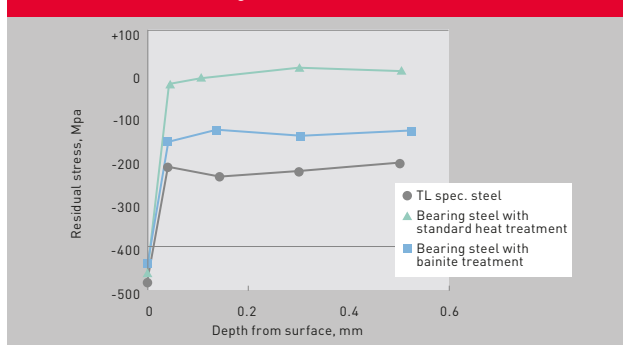
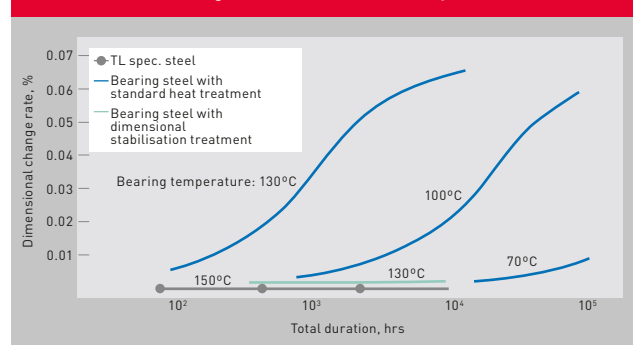


Fig. 4 Dimensional stability



## CALENDAR ROLL SUCCESS STORY: COST SAVINGS € 260 000 (5 YEARS)

Using a competitor's bearing a paper mill was experiencing failures in their calender roll bearings. Due to inner ring cracking, the mill had 10 failures annually which required downtime for change outs and additional maintenance time.

### THE KEY FACTS

- › Application: Calender roll
- › Status: Still in operation after 5 years
- › Problem: High bearing failure rate
- › Objective: Decrease bearing costs, change outs and downtime

### VALUE PROPOSALS

- › NSK worked with the customer building on successes seen at mills with similar issues.
- › NSK investigated the application and inspected the failed bearings.
- › The use of NSK's TL bearings with carburized inner rings was suggested.
- › Bearings were installed and have run 5 years without failure

COST SAVING BREAKDOWN		SAVINGS
DOWNTIME	4 hours @1350 € /hr x 5/year x 5 years	135 000 €
BEARING LIFETIME	Reduced bearing usage from 10 to 5 annually	125 000 €
<b>5 years TOTAL</b>		<b>260 000€</b>

Get more info about our solutions range for pulp & paper Industry:



[www.nsk.com/eu-en/industries/pulp-and-paper](http://www.nsk.com/eu-en/industries/pulp-and-paper)

# BRÜEL & KJÆR VIBRO CONDITION MONITORING SOLUTIONS FOR THE PULP & PAPER INDUSTRY



**Brüel & Kjær Vibro**

A member of the NSK Group

## SOLUTION STREAMS AND 3 CORE INGREDIENTS



# PLANT-WIDE CONDITION MONITORING SOLUTIONS: IMPROVE MACHINE UPTIME, PRODUCTIVITY, EFFICIENCY AND RELIABILITY, ALL WHILE REDUCING LIFE-CYCLE COSTS

## 5 Benefits Of Condition Monitoring For Your Machine And Operation



Offline		
	VST-100	VP-8000
Online		
	BKV Connect & Collect	BKV Go!
		
	VCM-3	VC-8000

Learn more about B&K Vibro's solutions for the pulp & paper industry:



[www.bkvibro.com/industries/pulp-paper/](http://www.bkvibro.com/industries/pulp-paper/)

About NSK's solutions for the pulp & paper industry:



[www.nsk.com/eu-en/](http://www.nsk.com/eu-en/)

**ACHIEVE COMPETITIVE GAIN WITH NSK AND BRÜEL & KJÆR VIBRO SOLUTIONS FOR THE PULP & PAPER INDUSTRY**

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