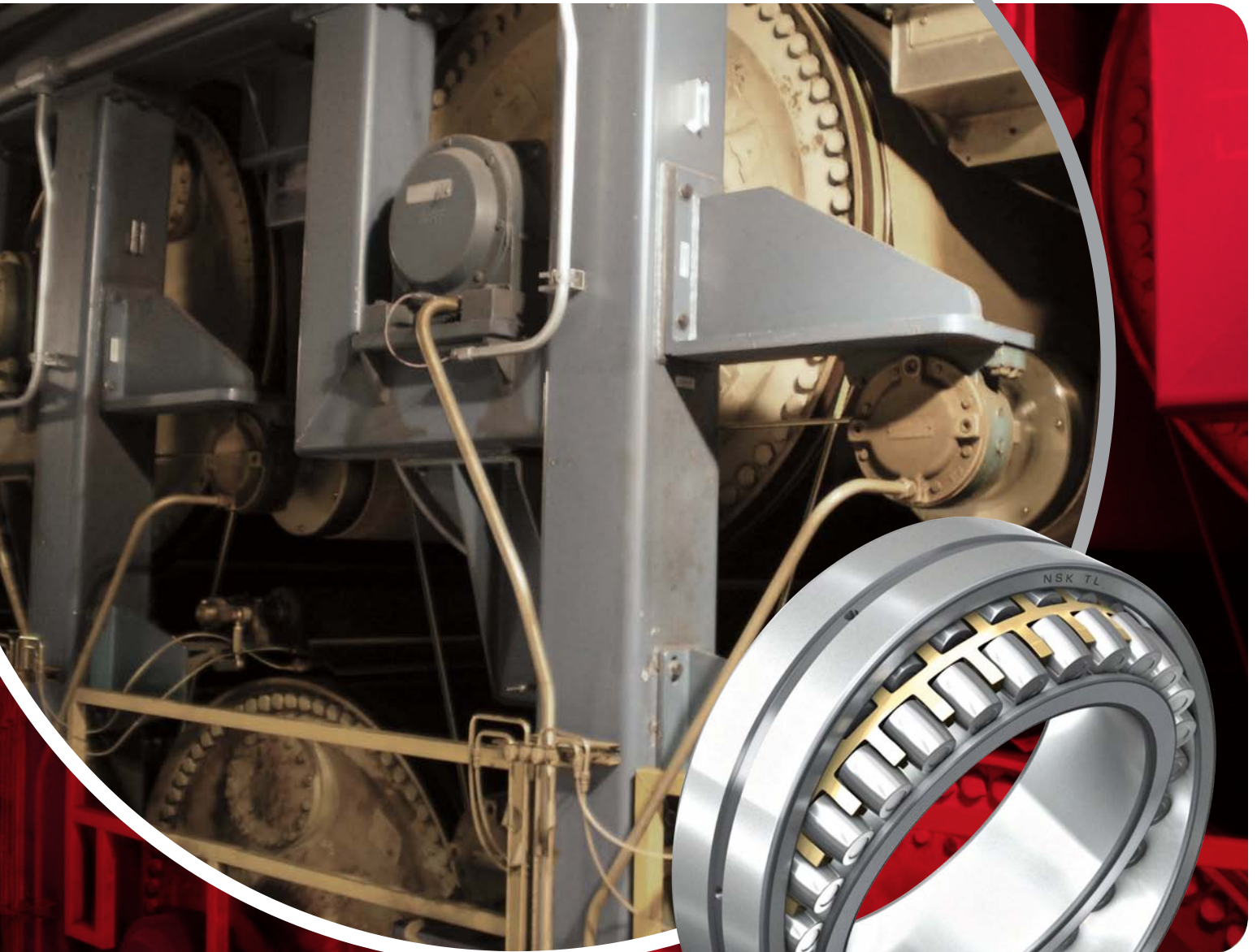




TOUGH AND LONG LIFE (TL) SERIES SPHERICAL ROLLER BEARINGS



SUBSCRIBE TO NSK NEWSLETTER 

TOUGH PERFORMANCE IN HIGH TEMPERATURES.

High temperature processing and manufacturing environments, such as those in the dryer section of paper making machinery, are particularly vulnerable to bearing inner ring fractures. Considering the moisture, high speeds, and operating temperatures, extending bearing service life with utmost operational reliability in these conditions is a critical priority.

True to NSK's tradition of innovative, tough technology solutions for challenging conditions, our TL (Tough and Long Life) series spherical roller bearings for dryer section applications optimizes machinery's uptime and productivity with superior resistance to inner ring fractures, providing high dimensional stability and longer service life.



DESIGN FEATURES

- Manufactured with an innovative chemical steel composition
- Special heat-treatment process
- High strength inner and outer rings
- Increased hardness of raceway surface promotes longer service life
- High temperature dimensional stability specification
- High strength steel or machined brass cage
- Availability from 65 mm to 380 mm bore diameter

OPERATING BENEFITS

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

FIG. 1 - ROLLING LIFE UNDER HIGH TEMPERATURES WITH FOREIGN DEBRIS

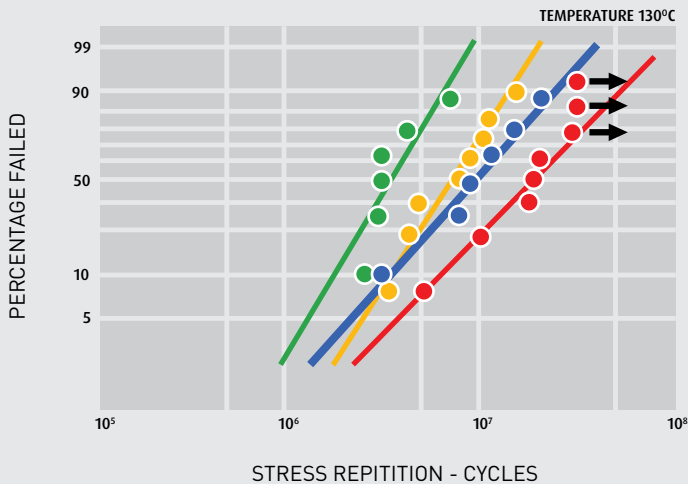
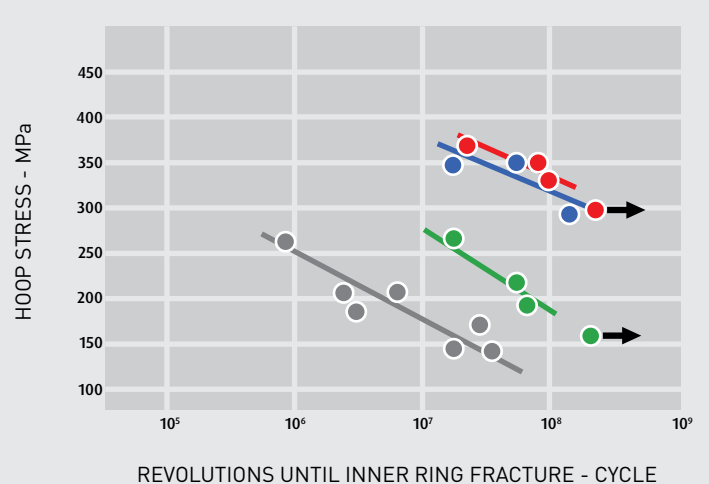


FIG. 2 - INNER RING FRACTURE



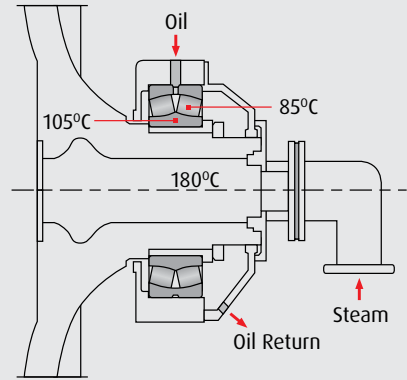
● TL SPEC. STEEL

● CARBURIZED STEEL

● BEARING STEEL WITH BAINITE TREATMENT

TL Application - Dryer Roll

- Steam is passed through the roll to heat it
- The journal expands faster than the bearing, making the fit tighter
- Severe hoop stress on inner ring occurs every time the machine is started
- Inner ring fracture becomes a common problem
- Tests show fracture resistance is higher than stress levels in other steels
 - Up to 50% higher than bainite steel
 - Up to 150% higher than through hardened steel
- Dimensional stability is equal to or better than standard heat stabilized (S11/200°C) bearings
- Fatigue Life
 - 2 times carburized steel (contaminated lube test)
 - 3.5 times bainite (contaminated lube test)



BEARING DAMAGE EXAMPLES

Examples of Major Bearing Damage			
Damage	Application	Cause of Damage	Countermeasure
Inner ring creep	Press CC roll Dryer canvas roll	<ul style="list-style-type: none"> • Aging expansion of bearing • Insufficient interference (hollow shaft) • Dimensional variation at high temperatures 	<ul style="list-style-type: none"> • Tighten interference • Use TL steel or apply dimension-stabilizing treatments (S11) • High temperature dimensional stability specification
Inner ring fracture	Dryer (cylinder)	<ul style="list-style-type: none"> • Excessive force applied during mounting • Defective bore face contact • High hoop stress • Temperature difference between shaft and inner ring • Interference increases 	<ul style="list-style-type: none"> • Control residual clearance • Adjust with taper gauge • Use TL or carburized steel • Improved strength of inner ring • Selection of appropriate interference
Rust/corrosion	Wire suction roll Press suction roll	<ul style="list-style-type: none"> • Insufficient oil film formation due to water entry • Improper storage condition 	<ul style="list-style-type: none"> • Reinforce lubrication oil control • Improve the sealing mechanism • Anti-rust treatment for periods of non-running
Short bearing life	Multiple	<ul style="list-style-type: none"> • High temperature condition • Viscosity of lubricant oil lowers 	<ul style="list-style-type: none"> • Improved hardness of bearing raceway surface (long life) • Selecting high viscosity oil • Lowered temperature of bearing part (increased amount of circulating oil, adiabatic sleeve)

FIG. 3 - RESIDUAL STRESS IN INNER RING CRACK

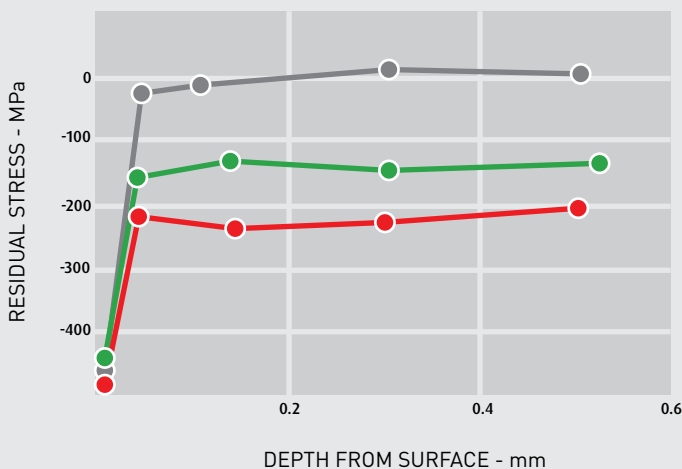
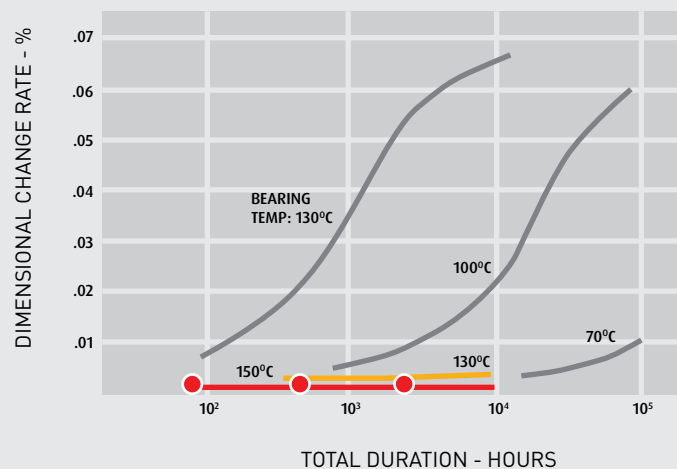


FIG. 4 - DIMENSIONAL STABILITY UNDER HIGH TEMPERATURES

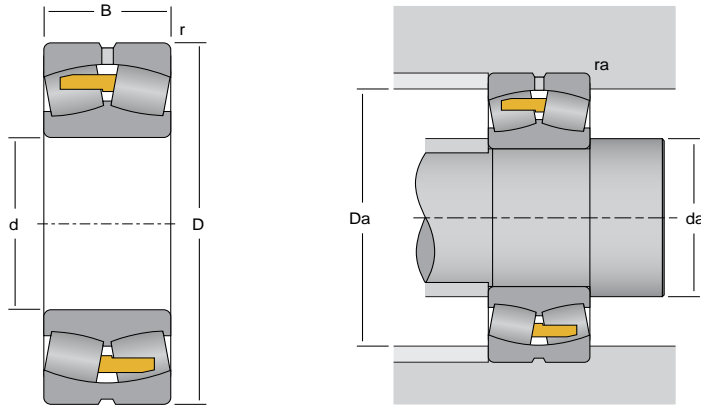


● BEARING STEEL WITH DIMENSION STABILIZING TREATMENT

● BEARING STEEL WITH STANDARD HEAT TREATMENT

TL SERIES SPHERICAL ROLLER BEARINGS

Bearing Dimension and Operating Data: Bore Diameter 65 - 190 mm



Dynamic equivalent load

$$P_0 = F_r + Y_0 F_a$$

$F_a / Fr \leq e$		$F_a / Fr > e$	
X	Y	X	Y
1	Y_3	0.67	Y_2

Static equivalent load

$$P_0 = F_r + Y_0 F_a$$

The values for e , Y_2 , Y_3 and Y_0 are given in the chart below.

Basic Bearing No.		Bearing Dimensions				Basic Load Ratings			
Bore Type		mm				(lbf)		(N)	
Cylindrical	Tapered	d	D	B	r (min)	Dynamic	Static	Dynamic	Static
TL22313EAW507	TL22313EAKW507	65	140	48	2.1	84 500	85 500	375 000	380 000
TL22314EAW507	TL22314EAKW507	70	150	51	2.1	95 500	98 000	425 000	435 000
TL22318EAW507	TL22318EAKW507	90	190	64	3.0	149 500	158 500	665 000	705 000
TL22320EAW507	TL22320EAKW507	100	215	73	3.0	193 500	209 000	860 000	930 000
TL23022CDW507	TL23022CDKW507	110	170	45	2.0	66 000	104 500	293 000	465 000
TL23222CW507	TL23222CKW507	110	200	69.8	2.1	116 000	171 000	515 000	760 000
TL22322EAW507	TL22322EAKW507	110	240	80	3.0	185 500	252 000	825 000	1 120 000
TL22324EAW507	TL22324EAKW507	120	260	86	3.0	214 500	296 500	955 000	1 320 000
TL22326CAW507	TL22326CAKW507	130	280	93	4.0	223 500	303 500	995 000	1 350 000
TL23028CDW507	TL23028CDKW507	140	210	53	2.0	94 500	160 500	420 000	715 000
TL22228CDW507	TL22228CDKW507	140	250	68	3.0	145 000	209 000	645 000	930 000
TL23228CW507	TL23228CKW507	140	250	88	3.0	187 500	292 500	835 000	1 300 000
TL23030CDW507	TL23030CDKW507	150	225	56	2.1	105 500	183 000	470 000	815 000
TL23130CAW507	TL23130CAKW507	150	250	80	2.1	163 000	265 500	725 000	1 180 000
TL22230CDW507	TL22230CDKW507	150	270	73	3.0	172 000	252 000	765 000	1 120 000
TL22330CAW507	TL22330CAKW507	150	320	108	4.0	274 500	380 000	1 220 000	1 690 000
TL23032CDW507	TL23032CDKW507	160	240	60	2.1	121 500	214 500	540 000	955 000
TL22232CDW507	TL22232CDKW507	160	290	80	3.0	204 500	296 500	910 000	1 320 000
TL23232CW507	TL23232CKW507	160	290	104	3.0	247 500	398 000	1 100 000	1 770 000
TL23934BCAW507	TL23934BCAKW507	170	230	45	2.0	78 500	148 500	350 000	660 000
TL23034CDW507	TL23034CDKW507	170	260	67	2.1	144 000	245 000	640 000	1 090 000
TL23134CAW507	TL23134CAKW507	170	280	88	2.1	211 500	353 000	940 000	1 570 000
TL22334CAW507	TL22334CAKW507	170	360	120	4.0	355 000	474 500	1 580 000	2 110 000
TL23036CDW507	TL23036CDKW507	180	280	74	2.1	168 500	285 500	750 000	1 270 000
TL23236CAW507	TL23236CAKW507	180	320	112	4.0	292 500	474 500	1 300 000	2 110 000
TL23038CAW507	TL23038CAKW507	190	290	75	2.1	174 000	303 500	775 000	1 350 000
TL23138CAW507	TL23138CAKW507	190	320	104	3.0	267 500	454 000	1 190 000	2 020 000
TL22238CAW507	TL22238CAKW507	190	340	92	4.0	256 500	389 000	1 140 000	1 730 000
TL23238CAW507	TL23238CAKW507	190	340	120	4.0	323 500	528 500	1 440 000	2 350 000
TL22338CAW507	TL22338CAKW507	190	400	132	5.0	425 000	582 500	1 890 000	2 590 000

Note: W507 includes multiple special features. Please see Nomenclature Structure chart on page 5.

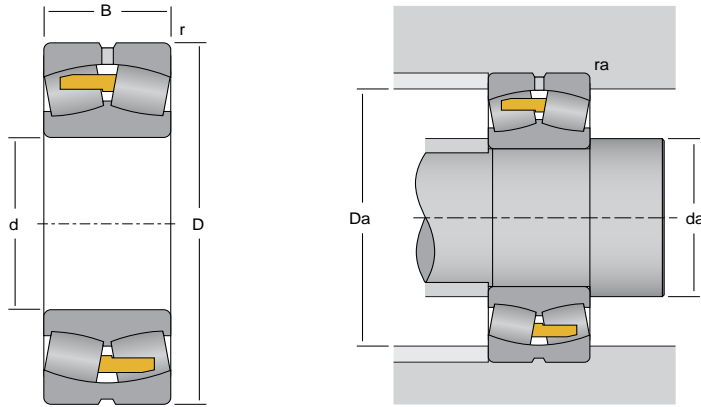
NOMENCLATURE STRUCTURE

TL	23152	CA	g3	M	K	C4	W507
MATERIAL PREFIX	BEARING NUMBER	CAGE OPTIONS	CARBURIZED STEEL	CAGE MATERIAL	BORE TYPE	INTERNAL CLEARANCE	OTHER FEATURES
TL: Tough and Long Life	223xx: Heavy 230xx: Very Light 231xx: Light 232xx: Medium, Wide 239xx: Extra Light	CA: One Piece Machined Brass Cage CD: Two Piece Steel Cage EA: Two Piece Steel Cage	g: Carburized Bearing - Complete g3: Inner Ring g5: Inner and Outer Ring	Blank: Steel M: Brass	Blank: Straight Bore K: Tapered Bore	Blank: C Normal Greater than C3: Greater than Normal Clearance C4: Greater than C3 Clearance C5: Greater than C4 Clearance	S11: Both Rings Heat Stabilized to 200°C P55: Both Rings ABEC5 Running Accuracy U22: Special Inspection Measure W507: S11, E4 (Lube Groove & Holes, Outer Ring), Special Pkg. W509: S11, E7, (Lube Groove & Holes, Inner & Outer Ring), Special Pkg.

Limiting Speeds		Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass
(RPM)		da		Da		ra		Y ₂	Y ₃	Y ₀	kg
Grease	Oil	min	max	min	max	max	e				Approx.
3 200	4 000	77	84	119	128	2.0	0.33	3.0	2.0	2.0	3.5
3 000	3 800	82	91	129	138	2.0	0.33	3.0	2.0	2.0	4.3
2 400	3 000	104	115	163	176	2.5	0.33	3.1	2.1	2.0	8.6
2 000	2 600	114	130	184	201	2.5	0.33	3.0	2.0	2.0	12.7
2 000	2 400	120	124	153	160	2.0	0.24	4.2	2.8	2.8	3.8
1 500	1 900	122	130	170	188	2.0	0.34	3.0	2.0	1.9	9.5
1 700	2 200	124	145	206	226	2.5	0.30	3.1	2.1	2.0	17.6
1 600	2 000	134	157	222	246	2.5	0.32	3.1	2.1	2.0	22.2
1 300	1 600	148	—	236	262	3.0	0.34	2.9	2.0	1.9	27.8
1 600	1 900	150	157	190	200	2.0	0.22	4.5	3.0	2.9	6.5
1 400	1 700	154	167	219	236	2.5	0.25	4.0	2.7	2.6	14.5
1 100	1 500	154	163	213	236	2.5	0.35	2.9	1.9	1.9	18.8
1 400	1 800	162	168	203	213	2.0	0.22	4.6	3.1	3.0	7.9
1 100	1 400	162	—	218	238	2.0	0.30	3.4	2.3	2.2	15.8
1 300	1 600	164	179	236	256	2.5	0.26	3.9	2.6	2.5	18.4
1 100	1 400	168	—	270	302	3.0	0.35	2.9	1.9	1.9	41.5
1 300	1 700	172	179	216	228	2.0	0.22	4.5	3.0	2.9	9.7
1 200	1 500	174	190	255	276	2.5	0.26	3.8	2.6	2.5	23.1
1 000	1 300	174	189	245	276	2.5	0.34	2.9	2.0	1.9	30.5
1 400	1 800	180	—	213	220	2.0	0.17	5.8	3.9	3.8	5.4
1 200	1 600	182	191	233	248	2.0	0.23	4.3	2.9	2.8	13.0
1 000	1 300	182	—	245	268	2.0	0.29	3.5	2.3	2.3	21.0
1 000	1 200	188	—	304	342	3.0	0.35	2.9	1.9	1.9	57.9
1 200	1 400	192	202	249	268	2.0	0.24	4.2	2.8	2.8	17.1
850	1 100	198	—	274	302	3.0	0.35	2.9	1.9	1.9	38.5
1 100	1 400	202	—	261	278	2.0	0.24	4.2	2.8	2.8	17.6
850	1 100	204	—	276	306	3.5	0.31	3.2	2.2	2.1	34.0
1 000	1 200	208	—	296	322	3.0	0.26	3.8	2.6	2.5	35.5
800	1 100	208	—	288	322	3.0	0.35	2.9	1.9	1.9	46.5
900	1 100	212	—	338	378	4.0	0.34	2.9	2.0	1.9	77.6

TL SERIES SPHERICAL ROLLER BEARINGS

Bearing Dimension and Operating Data: Bore Diameter 200 - 380 mm



Dynamic equivalent load

$$P_0 = F_r + Y_0 F_a$$

$F_a / Fr \leq e$		$F_a / Fr > e$	
X	Y	X	Y
1	Y_3	0.67	Y_2

Static equivalent load

$$P_0 = F_r + Y_0 F_a$$

The values for e , Y_2 , Y_3 and Y_0 are given in the chart below.

Basic Bearing No.		Bearing Dimensions				Basic Load Ratings			
Bore Type		mm				(lbf)		(N)	
Cylindrical	Tapered	d	D	B	r (min)	Dynamic	Static	Dynamic	Static
TL23040CAW507	TL23040CAKW507	200	310	82	2.1	211 500	382 000	940 000	1 700 000
TL23140CAW507	TL23140CAKW507	200	340	112	3.0	305 500	524 000	1 360 000	2 330 000
TL22240CAW507	TL22240CAKW507	200	360	98	4.0	292 500	452 000	1 300 000	2 010 000
TL23240CAW507	TL23240CAKW507	200	360	128	4.0	373 000	618 000	1 660 000	2 750 000
TL23044CAW507	TL23044CAKW507	220	340	90	3.0	245 000	445 000	1 090 000	1 980 000
TL23144CAW507	TL23144CAKW507	220	370	120	4.0	353 000	609 000	1 570 000	2 710 000
TL22244CAW507	TL22244CAKW507	220	400	108	4.0	353 000	546 500	1 570 000	2 430 000
TL23244CAW507	TL23244CAKW507	220	400	144	4.0	452 000	764 500	2 010 000	3 400 000
TL22344CAW507	TL22344CAKW507	220	460	145	5.0	528 500	764 500	2 350 000	3 400 000
TL23948CAW507	TL23948CAKW507	240	320	60	2.1	143 000	292 500	635 000	1 300 000
TL23048CAW507	TL23048CAKW507	240	360	92	3.0	261 000	481 000	1 160 000	2 140 000
TL23148CAW507	TL23148CAKW507	240	400	128	4.0	402 500	697 000	1 790 000	3 100 000
TL22348CAW507	TL22348CAKW507	240	500	155	5.0	584 500	854 500	2 600 000	3 800 000
TLI-112618CAW507	TLI-112618CAKW507	250	410	128	4.0	400 200	708 200	1 780 000	3 150 000
TL23952CAW507	TL23952CAKW507	260	360	75	2.1	209 000	420 500	930 000	1 870 000
TL23052CAW507	TL23052CAKW507	260	400	104	4.0	321 500	580 000	1 430 000	2 580 000
TL23152CAW507	TL23152CAKW507	260	440	144	4.0	485 500	843 000	2 160 000	3 750 000
TL23956CAW507	TL23956CAKW507	280	380	75	2.1	208 000	438 500	925 000	1 950 000
TL23056CAW507	TL23056CAKW507	280	420	106	4.0	346 000	663 000	1 540 000	2 950 000
TL23156CAW507	TL23156CAKW507	280	460	146	5.0	501 500	899 000	2 230 000	4 000 000
TL23256CAW507	TL23256CAKW507	280	500	176	5.0	647 500	1 101 500	2 880 000	4 900 000
TL23960CAW507	TL23960CAKW507	300	420	90	3.0	276 500	560 000	1 230 000	2 490 000
TL23060CAW507	TL23060CAKW507	300	460	118	4.0	431 500	832 000	1 920 000	3 700 000
TL23160CAW507	TL23160CAKW507	300	500	160	5.0	600 000	1 079 000	2 670 000	4 800 000
TL23260CAW507	TL23260CAKW507	300	540	192	5.0	764 500	1 326 500	3 400 000	5 900 000
TL23164CAW507	TL23164CAKW507	320	540	176	5.0	787 000	1 236 500	3 500 000	5 500 000
TL23068CAW507	TL23068CAKW507	340	520	133	5.0	512 500	989 000	2 280 000	4 400 000
TL23168CAW507	TL23168CAKW507	340	580	190	5.0	809 500	1 483 500	3 600 000	6 600 000
TL23072CAW507	TL23072CAKW507	360	540	134	5.0	537 500	1 056 500	2 390 000	4 700 000
TL23976CAW507	TL23976CAKW507	380	520	106	4.0	420 500	921 500	1 870 000	4 100 000

Note: W507 includes multiple special features. Please see Nomenclature Structure chart on page 7.

NOMENCLATURE STRUCTURE

TL	23152	CA	g3	M	K	C4	W507
MATERIAL PREFIX	BEARING NUMBER	CAGE OPTIONS	CARBURIZED STEEL	CAGE MATERIAL	BORE TYPE	INTERNAL CLEARANCE	OTHER FEATURES
TL: Tough and Long Life	223xx: Heavy 230xx: Very Light 231xx: Light 232xx: Medium, Wide 239xx: Extra Light	CA: One Piece Machined Brass Cage CD: Two Piece Steel Cage EA: Two Piece Steel Cage	g: Carburized Bearing - Complete g3: Inner Ring g5: Inner and Outer Ring	Blank: Steel M: Brass	Blank: Straight Bore K: Tapered Bore	Blank: C Normal Greater than Normal Clearance C3: Greater than C3 Clearance C4: Greater than C4 Clearance C5: Greater than C4 Clearance	S11: Both Rings Heat Stabilized to 200°C P55: Both Rings ABEC5 Running Accuracy U22: Special Inspection Measure W507: S11, E4 (Lube Groove & Holes, Outer Ring), Special Pkg. W509: S11, E7, (Lube Groove & Holes, Inner & Outer Ring), Special Pkg.

Limiting Speeds (RPM)		Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass
Grease	Oil	da		Da		ra		Y ₂	Y ₃	Y ₀	kg
		min	max	min	max	max	e				Approx.
1 000	1 300	212	—	279	298	2.0	0.25	4.0	2.7	2.6	22.6
800	2 000	214	—	293	326	2.5	0.32	3.2	2.1	2.1	41.5
950	1 200	218	—	315	342	3.0	0.26	3.8	2.6	2.5	42.6
750	1 000	218	—	307	342	3.0	0.35	2.9	1.9	1.9	57.0
950	1 200	234	—	302	326	2.5	0.24	4.1	2.8	2.7	29.7
710	950	238	—	320	352	3.0	0.31	3.2	2.2	2.1	52.0
850	1 000	238	—	348	382	3.0	0.27	3.7	2.5	2.4	59.0
670	900	238	—	337	382	3.0	0.36	2.8	1.9	1.8	79.5
750	950	242	—	391	438	4.0	0.33	3.0	2.0	2.0	116.0
950	1 200	252	—	298	308	2.0	0.17	6.0	4.0	3.9	13.3
850	1 100	254	—	324	346	2.5	0.24	4.2	2.8	2.7	32.6
670	850	258	—	347	382	3.0	0.31	3.3	2.2	2.2	64.5
670	850	262	—	423	478	4.0	0.32	3.2	2.1	2.1	147.0
640	840	268	—	357	392	3.0	0.30	3.4	2.2	2.2	65.2
850	1 000	272	—	333	348	2.0	0.19	5.4	3.6	3.5	23.0
800	950	278	—	356	382	3.0	0.25	4.1	2.7	2.7	46.6
600	800	278	—	380	422	3.0	0.32	3.2	2.1	2.1	88.2
800	950	292	—	351	368	2.0	0.18	5.7	3.9	3.8	24.5
710	900	298	—	377	402	3.0	0.24	4.2	2.8	2.7	50.5
560	750	302	—	400	438	4.0	0.30	3.3	2.2	2.2	94.3
530	670	302	—	425	478	4.0	0.35	2.9	1.9	1.9	147.0
710	900	314	—	386	406	2.5	0.19	5.2	3.5	3.4	38.2
670	850	318	—	413	442	3.0	0.24	4.2	2.8	2.7	70.5
500	670	322	—	433	478	4.0	0.31	3.3	2.2	2.2	125.0
480	630	322	—	458	518	4.0	0.35	2.9	1.9	1.9	189.0
480	600	342	—	466	518	4.0	0.31	3.2	2.1	2.1	162.0
560	710	362	—	465	498	4.0	0.24	4.2	2.8	2.8	101.0
430	560	362	—	499	558	4.0	0.31	3.2	2.1	2.1	206.0
530	670	382	—	485	518	4.0	0.24	4.2	2.8	2.8	106.0
530	670	398	—	482	502	3.0	0.18	5.5	3.7	3.6	65.4

COMMON DRYER CAN BEARINGS, SLEEVES, THREADS & HYDRAULIC NUTS: PART NUMBER

Bearing Number	Bearing Bore (mm)	Sleeve Number	Sleeve Thread used to dismount			Journal Thread used to mount			Mount Hyd. Nut	Dismount Hyd. Nut *
			Major Dia.	Pitch Dia	Threads per inch	Major Dia.	Pitch Dia.	Threads Per inch	NSK p/n	NSK p/n
TLI-112618	250	I-79804 x 9 1/4	10.600	10.492	6	9.125	9.055	8	HMV231Z-1	269Z
TL23152	260	AHA3152 x 9 5/8	11.000	10.892	6	9.125	9.055	8	HMV231Z-1	279Z
TL23152	260	none	n/a	n/a	n/a	10.192	10.0837	6	HMV258Z-1	n/a
TL23160	300	AHA3160 x 11 1/4	12.938	12.83	6	11.004	10.8957	6	HMV279Z-1	328Z
TL23038	190	none	n/a	n/a	n/a	7.472	7.3908	8	HMV189Z-1	n/a
TL22238	190	none	n/a	n/a	n/a	7.472	7.3908	8	HMV189Z-1	n/a
TL23238	190	none	n/a	n/a	n/a	7.472	7.3908	8	HMV189Z-1	n/a
TL22244	220	none	n/a	n/a	n/a	8.628	8.5468	8	HMV219Z-1	n/a
TL22244	220	SK 44 x 7 7/8	9.442	9.3245	6	7.847	7.7658	8	HMV199Z-1	239Z
TL22244	220	AHA3148 x 7 15/16	8.628	8.5468	8	7.847	7.7658	8	HMV199Z-1	219Z
TL23148	240	none	n/a	n/a	n/a	9.442	9.3337	6	HMV239Z-1	n/a
TL23148	240	H3138 x 220mm	n/a	n/a	n/a	220mm	220mm	n/a	HMV220-1	n/a
TL23156	280	none	n/a	n/a	n/a	11.004	10.8957	6	HMV279Z-1	n/a
TL22230	150	none	n/a	n/a	n/a	5.888	5.8339	12	HMV149Z-1	n/a

*only applies if withdraw sleeve used

COMMON DRYER CAN BEARINGS & CLEARANCE: AXIAL DISPLACEMENT

Bearing Number	Bearing Bore (mm)	Sleeve Number	Reduction in Radial Clearance (inch)		Radial Internal Clearance (inch)				1:12 Axial Displacement (inch)	
			min	max	C3		C4		Min	Max
					min	max	min	max		
TLI-112618	250	I-79804 x 9 1/4	0.0039	0.0047	0.0106	0.0140	0.0140	0.0178	0.072	0.094
TL23152	260	AHA3152 x 9 5/8	0.0043	0.0055	0.0118	0.0156	0.0156	0.0195	0.080	0.106
TL23152	260	none	0.0043	0.0055	0.0118	0.0156	0.0156	0.0195	0.080	0.106
TL23160	300	AHA3160 x 11 1/4	0.0047	0.0059	0.0118	0.0156	0.0156	0.0195	0.080	0.118
TL23038	190	none	0.0031	0.0039	0.0088	0.0114	0.0114	0.0146	0.056	0.082
TL22238	190	none	0.0031	0.0039	0.0088	0.0114	0.0114	0.0146	0.056	0.082
TL23238	190	none	0.0031	0.0039	0.0088	0.0114	0.0114	0.0146	0.056	0.082
TL22244	220	none	0.0035	0.0043	0.0099	0.0126	0.0126	0.0162	0.064	0.088
TL22244	220	SK 44 x 7 7/8	0.0035	0.0043	0.0099	0.0126	0.0126	0.0162	0.064	0.088
TL22244	220	AHA3148 x 7 15/16	0.0035	0.0043	0.0099	0.0126	0.0126	0.0162	0.064	0.088
TL23148	240	none	0.0039	0.0047	0.0106	0.0140	0.0140	0.0178	0.072	0.094
TL23148	240	H3138 x 220mm	0.0039	0.0047	0.0106	0.0140	0.0140	0.0178	0.072	0.094
TL23156	280	none	0.0043	0.0055	0.0118	0.0156	0.0156	0.0195	0.080	0.106
TL22230	150	none	0.0026	0.0031	0.0071	0.0091	0.0091	0.0118	0.048	0.062

NSK TL SUCCESS STORIES

TL Offering Lasting Solutions

Repeated bearing failures on the drive side of the dryer roll had a paper mill eager for a solution. After contacting a distributor, an NSK Industry Specialist offered an inspection. Upon inspection, NSK discovered that the use of a competitor's standard through hardened bearing, used in the high heat application, caused cracking on the inner ring.

TL bearings increase inner-ring toughness using a special surface-hardening heat treatment. From a metallurgical standpoint, the raceways are harder than conventional bearing steel but the core remains soft, giving the bearings the shock resistance needed to prevent fracturing. NSK TL bearings were installed on the drive side and proved to be a long-lasting solution. The success was so well received that the bearings on the tending side were also changed over to TL. Due to TL's success, during each scheduled shutdown, 6-8 bearings are being replaced in both PM8 and PM9 with NSK TL.

TL Out-Rolls the Competition Once Again!

A Wisconsin paper mill was having problems with their chilled iron roll bearings on their super calendar. Their application is very similar to a dryer can, but turns at higher rpm's. The competitor's bearings were failing on the rolls roughly every 3-4 months, costing downtime and maintenance cost.

Through an in-depth analysis, NSK determined that the bearings were experiencing thrust loading, causing inner ring cracking. NSK recommended a few modifications to the housing along with the use of TL technology. TL performed 18 months on the first roll. With slight application modifications and use of TL, the mill was able to assure uptime with reduced maintenance.

NSK CORPORATION 1.800.675.9930 • NSK CANADA INC. 1.877.994.6675
www.nskamericas.com