

# Railway Bearings Technical Data



2 WHEELERS



3 WHEELERS



4 WHEELERS



TRACTORS



LCV, HCV



INDUSTRIES



RAILWAYS



## About National Engineering Industries Ltd. (NBC Bearings)

A symbol of dependability and flexible engineering solutions, NB Bearings is the brand of National Engineering Industries. Founded in 1946, National Engineering Industries Ltd (NEI) is India's leading bearings manufacturer and exporter, renowned for excellence in quality and delivery. In 2021, NBC bearings completed 75 years of its incorporation.

Headquartered in Jaipur, Having started with 30,000 bearings in 19 sizes in 1946, NBC has evolved to manufacture over 200 million bearings each year offering in 2300+ variants to serve a host of customers in India and over 30 other countries across five continents in automotive, railways and industrial segments. NBC also serves the Indian aftermarket through a countrywide network of 550+ authorized stockists and thousands of retailers.

### Award & Recognitions :

NBC has been the recipient of several award and accolades for its quality consciousness and manufacturing prowess. Most prominent being the coveted Deming Grand Prize which is the highest honour in quality awarded to a company for excellence in Total Quality Management (TQM). NBC bearings is the only bearing manufacturer to win both - The Deming Application Award and The Deming Grand Prize Award.

The award is given by the Japanese Union of Scientists and Engineers (JUSE) to companies for demonstrating practicing TQM in the areas of production, customer service, safety, human resource, corporate social responsibility, environment, etc. NBC stands committed to an endless journey of continuous improvement through TQM.

## Railway Bearing Technical Data

### 22.1 Bearing and Axle Box details for Railway Applications

NBC provides cost effective solution and bearings to meet railway applications requirements. The bearings are specially designed to sustain harsh environment, shock & variable loads and high temperature. The railway product includes axle boxes and different types of bearings.

NBC is manufacturing axle boxes and bearings for fitment to

- locomotives
- ICF broad and meter gauge coaches, as well as
- For various wagon builders.



#### Cylindrical Roller bearings

Cylindrical Roller bearings are used in all traction motors for electric locomotives and electric cars. These bearings are utilized due to their high-speed and heavy-load capabilities, as well as their ease of assembly and disassembly.

Insulated bearings were developed for traction motor



### Cartridge Tapered Roller Bearing

CTRB bearings are highly integrated with surrounding components and advanced sealing mechanisms. They offer outstanding performance and durability.

CTRB inch series are approved by the Association of American Railroads (AAR) for use on freight car axles and has been widely used in markets all over the world.

Optimo series: Upgraded cartridge tapered roller was developed for 25 ton axle load.



### Spherical Roller Bearings

Spherical roller bearings can sustain, not only heavy radial loads, but also axial loads in either direction. They have excellent radial load carrying capacity and are suitable for use where there are heavy or impact loads.



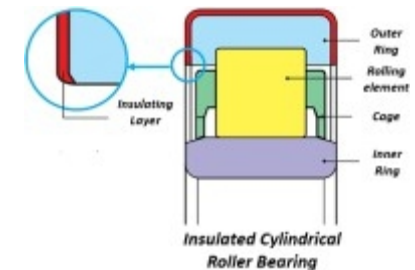
### “Insuohm” Insulated Cylindrical Roller Bearing

Electrical insulation coating to prevent electrical pitting in the bearings and hence improved bearing life in Traction motor bearings. Features:

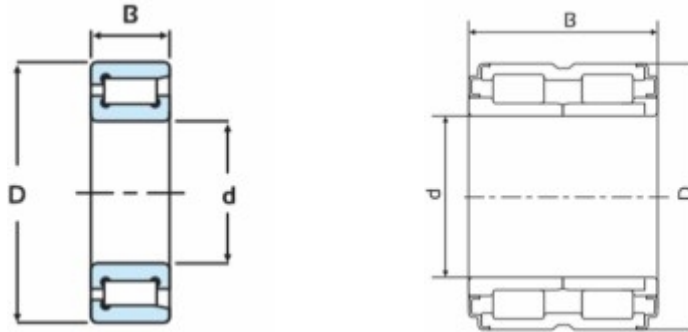
- Improves bearing life in electrical current passage
- Optimized coating with plasma spray process
- High insulation resistance
- High dimensional stability after coating
- Easy to mount

#### Benefits:

- Higher operational reliability
- Increased machine uptime
- Reduced overall operating costs
- Improves lubricant life
- Insulation over wide range of operating temperature.



## Bearings and Axle Boxes For Diesel Electric Locomotives



Locomotives	NEI Assembly Drg.	Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number
		mm				KN		Kgf		KN	
		d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu	
WDP4	X-190	Refer CTRB Page of Catalogue									Adapter Assembly with CTRB 6-1/2x12 Class 'F' Bearing
WDG3A, WDM3D	X-191	150	270	174	1.2	1280	198	130522	20190	19	RB5081D-E (End Axle) RB5081D-M (Middle Axle)
WDM3D, WDM3E, WDM3F	X-192	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
2300 HP Cape Gauge Diesel Electric Locomotive	X-194	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
WDM3A	X-197	150	270	174	1.2	1280	198	130522	20190	19	RB5081D-E (End Axle) RB5081D-M (Middle Axle)
WDG3A, WDM3D	X-198	150	270	174	1.2	1280	198	130522	20190	19	RB5081D-E (End Axle) RB5081D-M (Middle Axle)
WAG9, WAP7	X-181	150	250	160	2.1	1184	1800	120681	183546	178	RB5080D
	X-202	148	250	160	2.1	1184	1800	120681	183546	178	RB5088D
	(Step Size)										
Sri Lankan Railways M8A Loco	X-205	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
WDP1M	X-211	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021
WDP3AM	X-212	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5022

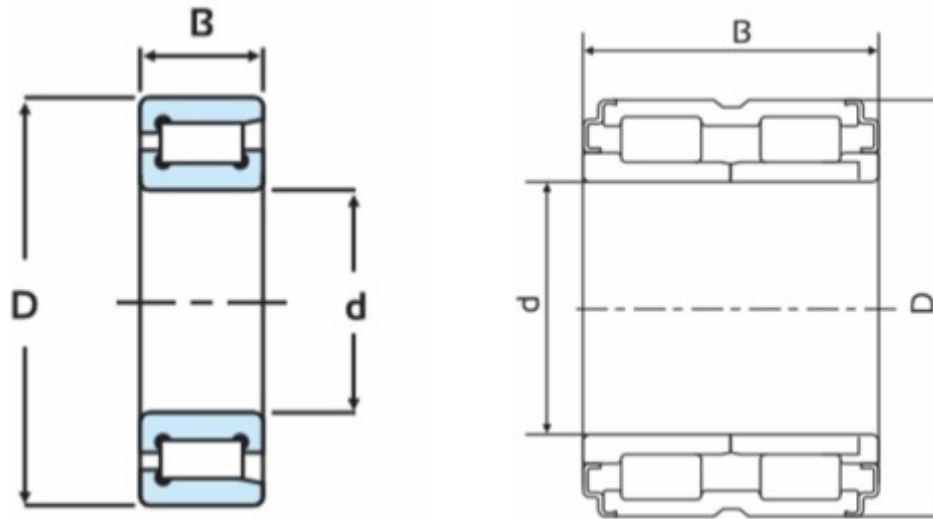
L6204 & L6205

## Bearings and Axle Boxes For Diesel Electric Locomotives



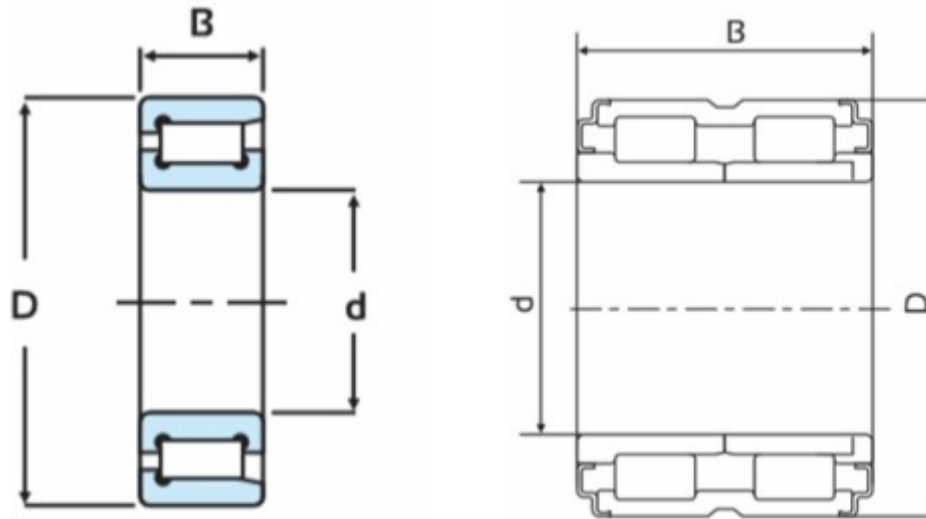
Locomotives	NEI Assembly Drg.	Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number
		mm				KN		Kgf		KN	
		d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu	
ZDM4	X-158	100	200	67	4.0	394	496	40146	50536	54	WJ100X200 & WU100X200W
YDM4, YDM4A	92-4253	120	215	60	4.0	374	540	38137	55054	56	L6179 & L6180
	X-151 (Step Size)	118	215	60	4.0	374	540	38137	55054	56	RB5069 & RB5070
WDS5, WDS6, WDM2, WCG2, WAM4, WAM4A,	92-4271C	150	270	80	2.0	641	932	65363	95036	91	L6204 & L6205
	X-119 (Step Size)	148	270	80	2.0	641	932	65363	95036	91	RB5043 & RB5044
WDM3A, WAM4	X-105	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-141 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
WDS3	92-4204	200	360	98	4.0	913	1370	93076	139691	123	L6019 (2 Nos.)
WDS4	92-4277A	200	360	236	1.6	1568	2742	159838	279551	245	L6207 (1-Set)
WDP3A, WAP3, WAP6	X-180 (End Axle)	150	270	80	2.0	641	932	65363	95036	91	L6204 & L6205
	X-180 (Middle Axle)	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5022
WDP1	X-174	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
WDG3A, WDM3B, WDM3D	X-171	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-182 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
WAP1, WAP4	X-122	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-186 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
Sri Lankan Railways (SL3200WB)	X-187	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
Malaysian Railways 2300HP	X-188	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022

## Bearings and Axle Boxes For Electric Locomotives



Locomotives	NEI Assembly Drg.	Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number
		mm				KN		Kgf		KN	
		d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu	
WAM4, WAM4A, WAG5, WAG5A, WAG5C, WAG5D, WCAM1, WCG2	92-4271C	150	270	80	2.0	641	932	65363	95036	91	L6204 & L6205
	X-119 (Step Size)	148	270	80	2.0	641	932	65363	95036	91	RB5043 & RB5044
WAM4, WAG5B, WCAM1	X-105	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-141 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
WAP3, WAP6	X-180 (End Axle)	150	270	80	2.0	641	932	65363	95036	91	L6204 & L6205
	X-180 (Middle Axle)	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5022
WAG7, WCM6	X-171	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-182	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.)

## Bearings and Axle Boxes For Electric Locomotives

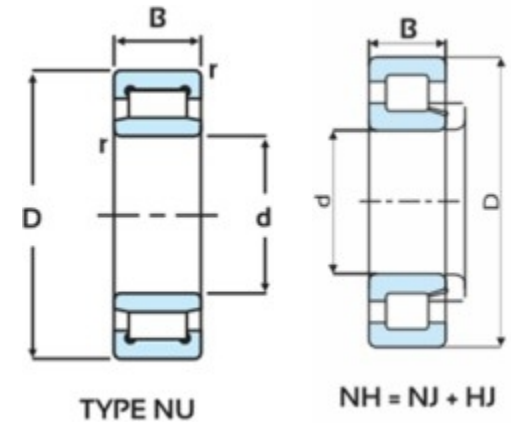


Locomotives	NEI Assembly Drg.	Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number
		mm				KN		Kgf		KN	
		d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu	
WAP1, WAP4	X-122	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-186 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
WAP3, WAP6	X-149	150	270	80	2.0	641	932	65363	95036	91	L6204 & L6205
WAG9, WAP7	X-181	150	250	160	2.1	1184	1800	120681	183546	178	RB5080D
	X-202 (Step Size)	148	250	160	2.1	1184	1800	120681	183546	178	RB5088D
WAG7	X-207	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.) with Special Loose Lip RB5021 & RB5022
	X-182 (Step Size)	148	270	80	1.5	641	932	65363	95036	91	RB5062 (2 Nos.) with Special Loose Lip RB5063 & RB5064
WAG5HB, 1400 HP LOCO	X-179	150	270	80	2.0	641	932	65363	95036	91	RB5020 (2 Nos.)

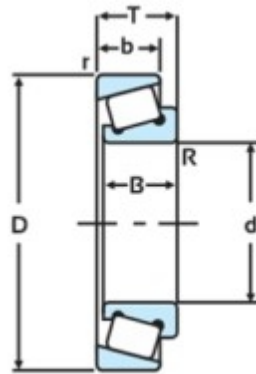
## Bearing for Traction Motor Suspension Unit Application

### Cylindrical roller bearing

Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number	Mass Kg. (Approx.)
mm				KN		Kgf		KN		
d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu		
220	340	56	3	500	750	50985	76478	67	NH1044	20.6
320	440	56	3	625	1100	63731	112167	90	NU1964	24.7



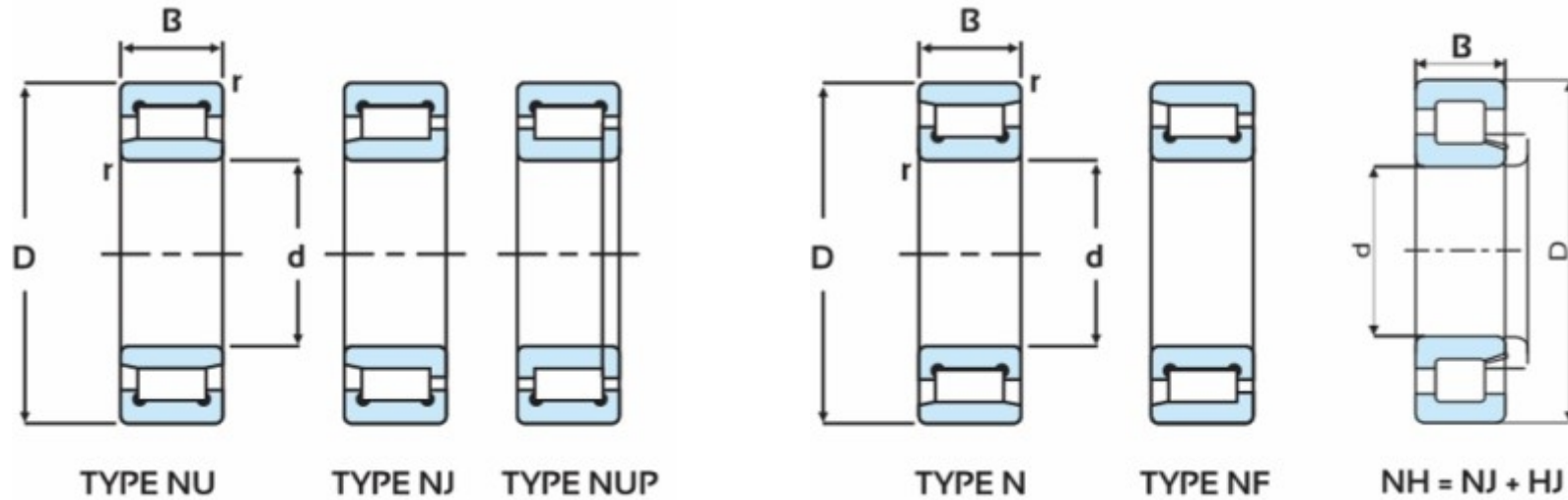
### Single Row Taper Roller Bearing (Inch series)



Boundary Dimensions							Basic Load Rating				Fatigue load limit	e	Bearing Number	Mass Kg. (Approx.)
mm							KN		Kgf		KN			
d	D	T	B	b	R	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu			
198.298	279.4	46.038	49.212	36.513	3.5	3.3	363.9	786.8	37107	80230	73	0.51	67981/67919	9.3
199.949	279.4	46.038	49.212	36.513	3.5	3.3	363.9	786.8	37107	80230	73	0.51	67982/67919	9.0
220.662	314.325	61.912	66.675	49.212	1.6	5.0	625	1239	63731	126341	113	0.33	M244249A/N1060	15.0
221.17	314.325	61.91	66.675	49.212	1.6	5.0	625	1239	63731	126341	113	0.33	M244210/N1059	14.0
255.6	342.9	57.15	63.5	44.45	1.5	3.3	614.1	1282.4	62620	130766	113	0.35	M349547/M349510	13.80
257.175	358.775	71.438	76.2	53.975	1.5	3.3	818.5	1663.6	83462	169637	145	0.33	M249747/M249710	20.65

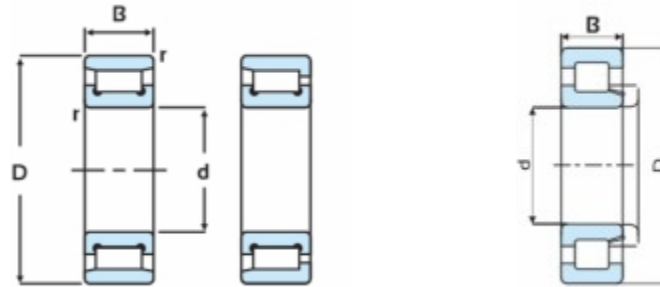


## Cylindrical Roller Bearing for Traction Motor



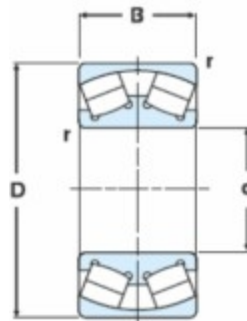
Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number	Mass Kg. (Apporox.)
mm				KN		Kgf		KN		
d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu		
90	190	43	3	315	355	32121	36199	39	<b>TS2-NH318C L1BX C4 P6</b>	6.7
90	190	43	3	315	355	32121	36199	39	<b>TS2-NH318C L1BX2 C4 P6</b>	6.6
100	215	47	3	380	425	38749	43337	45	<b>TS2-NH320C L1BX CS123 PX1</b>	9.8
100	215	47	3	380	425	38749	43337	45	<b>TS2-NH320C L1BX2 CS123 PX1</b>	9.8
120	260	55	4	475	550	48436	56084	55	<b>TS2-NH324 L1BX1 CS175M P6</b>	17.0
130	280	58	4	620	795	63221	81066	78	<b>TS2-NU326C L1BX C4 PX1</b>	18.8
140	300	62	4	663	797	67606	81270	77	<b>TS2-NU328E L1BX C4 P6</b>	22.4
140	300	62	4	663	797	67606	81270	77	<b>TS2-NU328E L1BX2 C4 P6</b>	22.3
150	320	65	4	800	985	81576	100440	93	<b>TS2-NU330E L1BX1 CS188 P6</b>	26.9
150	320	65	4	800	985	81576	100440	93	<b>TS2-NU330C L1BX2 CS188 PX4</b>	26.7
160	340	68	4	888	1102	90549	112371	102	<b>TS2-N332E L1BX2 CS355</b>	31.5

### Insulated Cylindrical Roller Bearing for Traction Motor



Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number	Mass Kg. (Apporox.)
mm				KN		Kgf		KN		
d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu		
100	215	47	3	450	469	45887	47824	50	<b>TS2-NH320C L1BX CS123 PX1 ZC2</b>	9.8
160	340	68	4	888	1102	90549	112371	102	<b>TS2-N332E L1BX2 CS355 ZC2</b>	31.5

### Spherical Roller bearing for Passenger Car Wheel Application



Boundary Dimensions				Basic Load Rating				Fatigue load limit	Bearing Number	Mass Kg. (Apporox.)
mm				KN		Kgf		KN		
d	D	B	r	Dynamic Cr	Static Cor	Dynamic Cr	Static Cor	Cu		
100	215	73	3	600	730	61182	74438	77	<b>22320</b>	12.9
130	280	93	4	974	1231	99319	125525	120	<b>22326</b>	27.7
140	300	102	4	1131	1464	115328	149284	139	<b>22328 BL1C3</b>	33.8

## 22.2 AAR Standard Cartridge Taper Roller Bearing (CTRB)

Cartridge Tapered Roller Bearings (CTRB) are manufactured by National Engineering Industries Ltd. Jaipur under the technical collaboration and license of M/s Amsted Rail INC, USA.

This bearing is a self-contained, pre-assembled, pre-adjusted, pre-lubricated and completely sealed unit. The bearing has been designed for rapid mounting / dismounting and long service life.

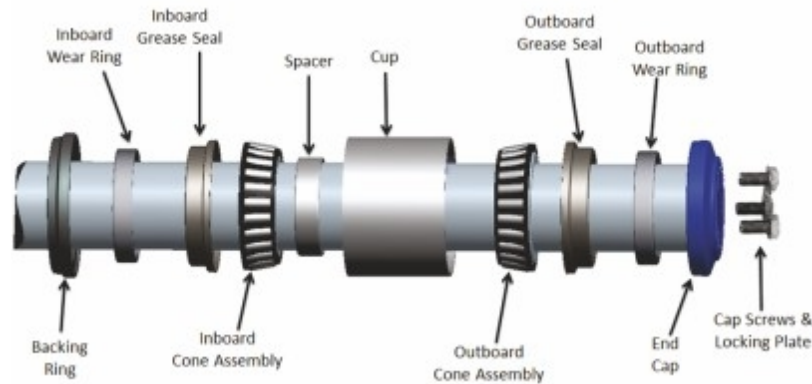


Fig. 1: Exploded View of Cartridge Tapered Roller Bearing



## CTRB part number details:

REF	DESCRIPTION	QTY.	CLASS 'C' (5X9) PART NO.	CLASS 'D' (5-1/2X10) PART NO.	CLASS 'E' (6X11) PART NO.	CLASS 'F' (6-1/2X12) PART NO.	CLASS 'K' (6-1/2X9) PART NO.
1	CONE ASSEMB	2	HM124646	HM127446	HM129848	HM133444	HM133444
2	DOUBLE CUP	1	HM124618XD	HM127415XD	HM129814XD	HM133416XD	G202
3	SPACER	1	HM124646XA	HM127446XA	HM129848XA	HM133444XA	G205
4	WEAR RING	2	906Z	1006Z	1106Z	1206Z	G206
5	EFFICIENCY PLUS DDL SEAL	2	907ST	1007ST	1107G	1207G	G207G
6	BACKING RING	1	915NFZ	1015FZ	1115FZ	1215FZ	G215
7	AXLE END ASSEMBLY	1	911	1011	1111	1211	G211
7.1	AXLE END CAP	1	900	1000	1100	1200	G200
7.2	LOCKING PLATE	1	913	1013	1113	1213	G213
7.3	CAP SCREW	3	1012	1012	1112	1212	G212

Upgraded Class E (6x11) CTRB

**OPTIMO X**

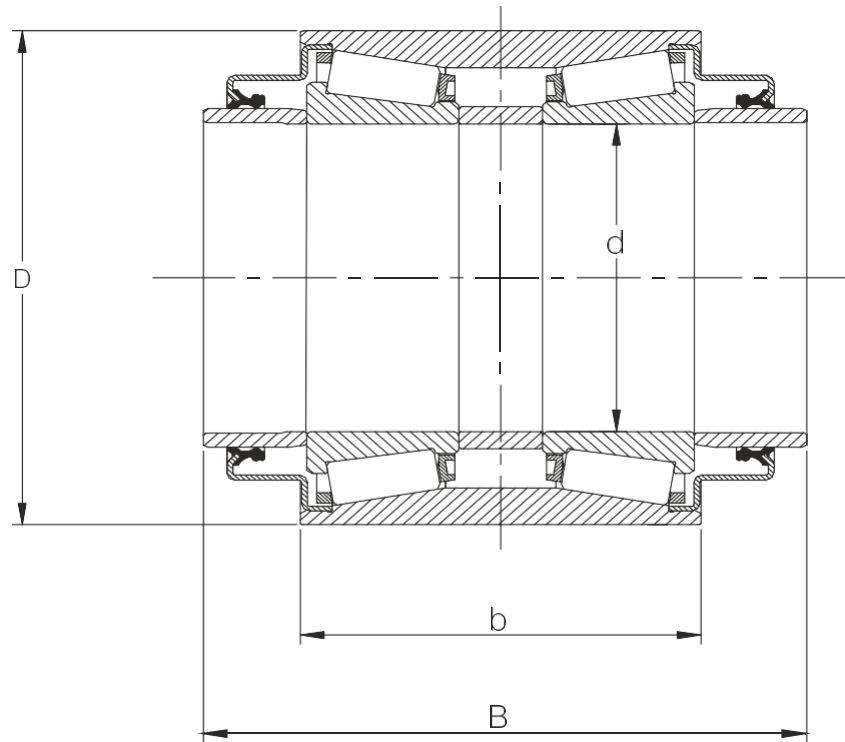
**Upgraded (OptimoX) Cartridge Taper Roller Bearing (CTRB 6x11 Class 'E') for 25 tonne axle load**

Upgraded (Optimo series) Cartridge Tapered Roller Bearings (CTRB 6x11 Class 'E') are manufactured by National Engineering Industries Ltd. Jaipur.

### Upgraded (Optimo series) Bearing Benefits

- Best Grease Retention and Lower Torque (Efficiency Plus®)
- Increase in  $L_{10}$  Bearing Life
- Stronger Polymer Cage for Rail Impact Conditions
- Optimized Raceways for the Rail Environment

## AAR Standard Cartridge Tapered Roller Bearings

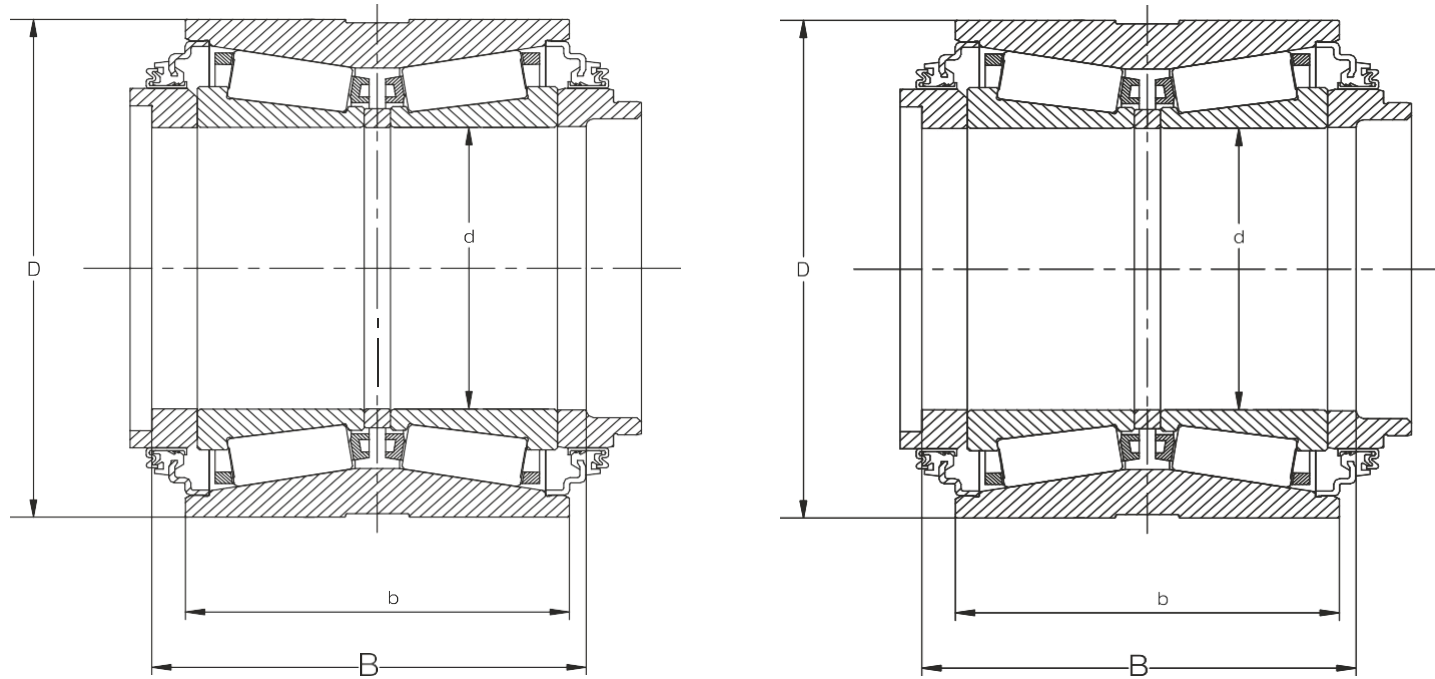


Boundary Dimensions				Basic Load Rating				Fatigue load limit	BEARING SIZE
mm				KN		Kgf		KN	
d	D	b	B	DYNAMIC C	STATIC Co	DYNAMIC C	STATIC Co	Cu	
119.063	195.263	142.9	217.1	684	1109	69747	113085	119	CTRB 5x9 CLASS 'C' *
131.75	207.963	152.4	225.4	724	1232	73826	125643	129	CTRB 5 1/2X10 CLASS 'D' *
144.45	220.663	163.5	241.3	774	1348	78925	137436	138	CTRB 6X11 CLASS 'E' **
157.15	252.413	184.15	273.1	1052	1825	107272	186095	180	CTRB 6 1/2X12 CLASS 'F'
157.15	249.873	160	216.6	1052	1825	107272	186095	180	CTRB 6 1/2X9 CLASS 'K'

\* Available with steel cage only

\*\* Available with upgraded (NEI optimo series)

## Metric Cartridge Tapered Roller Bearings (metric series)



Boundary Dimensions				Basic Load Rating				Fatigue load limit	BEARING SIZE
mm				KN		Kgf		KN	
d	D	b	B	DYNAMIC C	STATIC Co	DYNAMIC C	STATIC Co	Cu	
130	230	160	183	852	1636	86878	166823	167	UIC130X230
130	230	160	198	852	1636	86878	166823	167	UIC130X230
130	240	160	170	983	1727	100238	176104	176	UIC130X240
150	250	160	180	903	1834	92079	187013	181	UIC150X250

Note:- Available with polyamide cage only