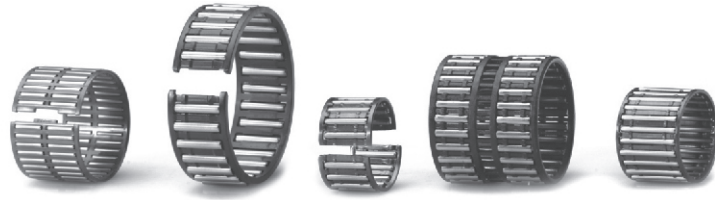


NEEDLE CAGES AND ROLLER CAGES



Needle cages are inexpensive and very easy to install. They can be fitted by hand without the use of tools. They may be manufactured in two parts and can then be mounted on an inner raceway between two shoulders. This arrangement allows the rigidity of the shaft to be increased.

The double cage, that is one having two rows of needles, comprises of two bearings side by side in one continuous unit. It allows parts such as idler pinions to be fitted easily and ensures their stability. The double cage can also be manufactured in two separate parts.

NRB manufacture's cages in steel, polyamide, brass and aluminium bronze materials. Needle rollers used in these assemblies are made of high carbon chrome steel, hardened, ground and lapped to close tolerances for diameter and roundness.

NRB cages, manufactured in steel, present the following advantages:

- Great rigidity preventing deformation during handling
- Good mechanical stability that resists ageing and ensures long operational life without excessive wear whilst maintaining the geometrical shape of the cage at high temperatures
- Excellent resistance to synthetic additives contained in many lubricants
- Minimal thickness allowing maximum oil penetration thus assisting effective lubrication
- Low weight minimising the centrifugal effects of rapid acceleration

CONSTRUCTION

NRB needle cages have both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load ratings of needle roller bearings.

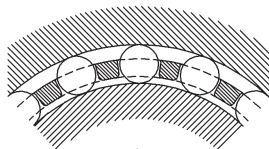
Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies have either one or two rows of needle rollers. Also listed are needle cages using moulded, one piece or split type glass reinforced engineered polymer cages (suffix TN). These operate well at temperatures up to 120°C. However, care should be exercised when these assemblies are lubricated with oils containing additives, as service life may be reduced if the operating temperature exceeds 100°C. At such high temperatures oil can deteriorate with time and it is recommended that oil change intervals are observed.

In wrap and welded cages the convergent faces of the cage pockets form a V-shaped cradle which ensures correct retention of the needles and prevents them from falling inwards. The cage is centred by the needles and does not come into contact with the raceways, thus considerably reducing operational wear and noise.

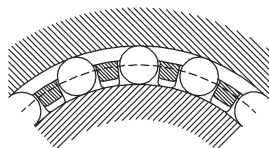
Retention of the needles to prevent them moving outwards from the cage is effected by small wedges which remain out of contact with the needles during operation. The sides of two adjacent cage pockets and the needle form a prism ensuring retention of lubricant and silent operation.

PREFIXES

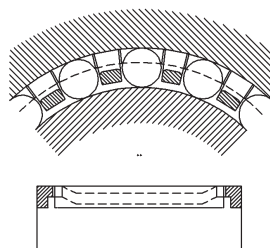
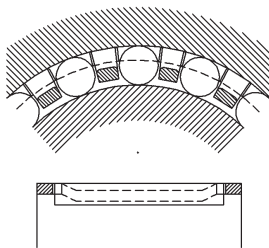
- B : Cage with one row of needle rollers
- BB : Cage with two rows of needle rollers
- MB : Cage in two parts, with one row of needles
- MBB : Cage in two parts, with two row of needles



Standard Cage



Cage - Inner Centered On Shaft



Cage - Outer Centred In the Housing

SUFFIXES

A,a	: Modified internal design
No Suffix	: Welded cage
FS	: Formed Strip welded cage
FT	: Cage outside diameter ground (applicable to welded cages only)
Fta	: Cage outside diameter ground (applicable to welded cages only), modified internal design
FS	: Formed Strip welded cage
D	: Drawn cup type cage
DC	: Drawn cup type cage, copper plated
DMC	: Drawn cup type cage, cage material alloy steel, copper plated
DS	: Drawn cup type cage, silver plated
DMS	: Drawn cup type cage, cage material alloy steel, silver plated
T	: Machined (turned) cage
TC	: Machined (turned) cage, copper plated
TM	: Machined (turned) cage, cage material alloy steel
TMA	: Machined (turned) cage, cage material alloy steel, modified internal design
TMC	: Machined (turned) cage, cage material alloy steel, copper plated
TS	: Machined (turned) cage, silver plated
TMS	: Machined (turned) cage, cage material alloy steel, silver plated
TN	: Polyamide cage

MANUFACTURING TOLERANCES

The needles of a particular cage have a diameter restricted to a tolerance of 2 µm according to one of the groups shown in the table below. Unless otherwise specified in advance, NRB may supply a batch of cages within several tolerance groups without distinction by colour coding.

However, if several cages are used on the same shaft, their needles should be of the same tolerance group to ensure the best possible distribution of load.

The tolerance on the width L conforms to ISO standard 3030, or -0.2/-0.55

Tolerance Group Microns	Colour Code
0 / -2	red
-2 / -4	blue
-4 / -6	white
-6 / -8	green
-8 / -10	yellow
-1 / -3	pink
-3 / -5	sky blue
-5 / -7	grey
-7 / -9	orange

SHAFT AND HOUSING REQUIREMENTS

For obtaining optimum performance from the needle cages, the shaft and housing should conform to the following parameters for tolerances, hardness, and surface finish when directly used as raceways for needles.

Tolerances

Functional Clearance	Shaft Dimension Ci	Housing Dimension Ce
Closer than standard	J5 h5	G6 H6
Standard	h5 g5	G6 H6
Greater than standard	g6 f6	G6 H6

Cylindrical tolerance, defined as the difference in radii of two coaxial cylinders (ISO Standard 1101) must normally be less than a quarter of the manufacturing tolerance. In the case of precision applications or high speed operation it is recommended to reduce this tolerance to one eighth of the manufacturing tolerance.

The width of the housing formed by the lateral abutments must at least be equal to the nominal dimension L (recommended tolerance: H11).

Hardness

Both shaft and housing should have hardness of 58 to 64 HRC.

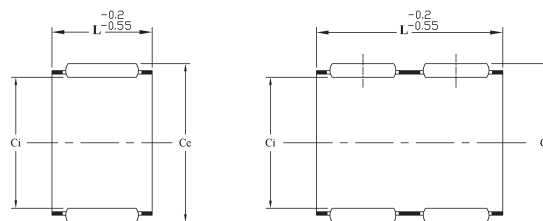
Surface finish

Shaft : 0.35 µm C.L.A.
Housing : 0.40 µm C.L.A.

LATERAL RETENTION

Needles must be laterally retained whether on the shaft or in the housing. Snap rings for shafts or for housings must not be used in direct contact with the faces of the cage, but only with a spacer interposed.

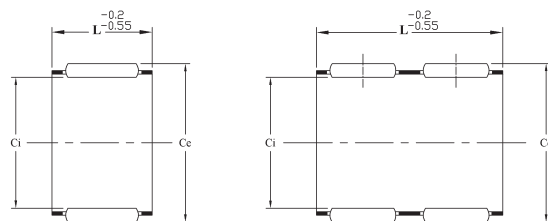
NEEDLE CAGES



Shaft dia	Designation	Ci	Ce	L	Basic capacities		Limiting speed (oil)	Approx weight
					Dynamic (C)	Static (Co)		
					Newtons	Newtons		
m m		m m	m m	m m			rpm	gms
6	B 6 9 8	6	9	8	3000	2600	65000	1.10
	B 6 10 13	6	10	13	5400	4700	65000	2.60
8	B 60 204 TM	8	11	9.8	3800	3900	50000	3.75
	B 8 11 10	8	11	10	5400	4600	50000	1.70
	B 8 12 12	8	12	12	5900	5500	50000	3.00
9	B 9 12 10	9	12	10	4900	5500	44000	2.00
	B 9 12 13	9	12	13	6000	6950	44000	3.00
10	B 10 13 9	10	13	9	3700	3900	40000	2.40
	B 10 13 10	10	13	10	4500	5100	40000	2.70
	B 10 13 13	10	13	13	6000	7400	40000	2.80
	B 60 205 TM	10	13	13.5	5500	6500	40000	3.63
	B 60 091 TM	10	13	14.5	5500	6600	40000	3.20
	B 10 13 14.5 T	10	13	14.5	5600	6700	40000	4.64
	B 10 14 10 T	10	13.78	9.8	4600	4300	40000	4.59
	B 60 194 S	10	14	10	4500	4350	40000	3.90
	B 10 14 13	10	14	13	7000	7100	40000	4.30
	B 10 14 13.5 TN	10	14	13.5	8000	8900	40000	4.64
11	B 11.11 15.11 12.6TN	11.11	15.11	12.6	7300	8100	36000	3.32
12	B 12 15 17.3 T	12	14.78	17.3	7600	10400	33300	6.60
	B 12 15 10	12	15	10	4800	5600	33000	3.20
	B 12 15 13 T	12	15	12.8	6100	7800	33300	4.91
	B 12 15 13	12	15	13	6300	8300	33000	4.20
	B 12 16 13	12	16	12.8	8900	10600	33300	4.75
	B 12 16 15 T	12	16	14.8	8200	9500	33300	8.01
	B 12 17 10	12	16.9	9.8	7500	7400	33300	4.86
13	B 13 17 17.5 T	13	17	17.5	10100	12700	30700	10.04
14	B 14 17 20	14	17	20	10500	16000	28500	8.80
	B 14 18 10	14	18	10	6200	6900	28500	4.40
	B 14 18 13	14	18	13	8700	10800	28500	5.90
	B 60 015 TM.2	14	18	19.8	11200	14800	28500	12.01
	B 60 015	14	18	20	9800	12400	30800	9.80
14.4	B 50 160	14.4	20.4	19.4	14000	17500	27700	13.00
15	B 15 19 10	15	19	10	6300	8200	26500	4.70
	B 15 19 13	15	19	13	9400	11700	26500	6.30
	BB 15 19 22.2	15	19	22.2	12100	16800	23500	10.00
	B 15 19 24	15	19	24	17000	25000	26500	11.30
15.034	V 60 158 D	15.034	21.034	21.03	19700	24300	26600	15.00
15.2	B 600 10 FT	15.2	22.2	12	12300	12100	26300	8.70
16	B 16 20 10	16	20	10	6800	8200	25000	5.00
	B 16 20 13	16	20	13	9400	12400	25000	6.60
	B 60 218 TM	16	20	20	11800	16900	25000	13.48
	B 50 792	16	20	20	12500	17700	25000	11.20
	B 60 025	16	20	21.7	12300	17400	25800	9.50
	B 16 22 12 a	16	22	12	10500	11000	25000	9.80
	B 60 044*	16	22	16	15700	18500	25000	14.00
	B 16 22 17	16	22	17	11700	14200	25000	13.80
	B 60 239 FS	16	20	17	11700	16400	25000	10.18
	B 17 21 10	17	21	10	6500	8800	23500	5.20
17	B 17 21 13	17	21	13	9300	12500	23500	7.10
	B 60 099 D	17	21	13	10500	14500	23500	5.50
	B 17 21 15	17	21	15	11800	16300	23500	8.30
	B 17 27 17	17	27	17	18900	19800	23500	23.00

* Cages centered on outer raceway

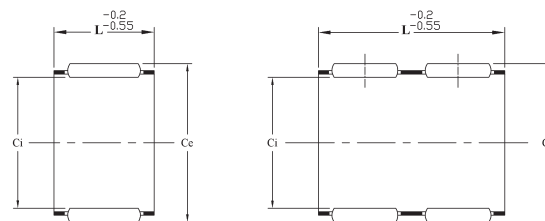
NEEDLE CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C) Newtons	Static (Co) Newtons		
17.5	B 60 018*	17.5	22	16	11900	15900	22800	12.00
18	SB 18 22 10 TN	18	22	10	7700	10000	22200	3.78
	B 18 22 13	18	22	13	10400	14000	22000	7.40
	B 18 22 17 a	18	22	17	12900	19300	22000	9.70
	B 60 002 FT	18	24	12	12400	13900	21600	9.00
	B 60 050	18	24	20	18700	23800	22000	19.00
	B 18 25 22.2	18	25	22.2	26800	34500	22000	23.90
	B 18 26 16	18	26	16	16700	19400	22000	17.50
	B 18 28 16	18	28	16	22500	21500	22000	22.50
18.25	B 60 182	18.25	24.25	25	21900	29000	21900	21.90
19	B 19 23 13	19	23	13	9700	13500	21000	8.30
20	B 20 24 10	20	24	10	8300	11300	20000	6.10
	B 20 24 10.2	20	24	10.2	8300	11300	20000	6.10
	B 20 24 13	20	24	13	10600	15500	20000	8.20
	SB 20 24 13 TN	20	24	13	9900	14100	33300	5.00
	B 20 24 17	20	24	17	14700	22800	20000	11.00
	BB 20 24 29.7	20	24	29.7	22000	38500	20000	19.50
	B 60 292 TM	20	26	13	12900	15100	20000	-
	B 20 26 13.6	20	26	13.6	12400	13800	20000	11.60
	B 600 14 DA	20	26	16.8	17300	22000	20000	16.70
	B 20 26 17	20	26	17	16000	20000	20000	16.70
	B 20 27 30	20	27	30	30000	40600	20000	31.00
	B 20 27 30 TN	20	27	30	29000	38800	20000	26.00
	B 60 119	20	28	18	21800	24800	18600	18.00
	B 60 119 TM	20	28	18	21800	24800	20000	26.80
	B 20 28 20 TN	20	28	20	24100	28200	20000	21.00
	B 60 051*	20	28	20.2	21700	24600	20000	20.00
	B 20 30 19 TN	20	30	19	27900	30000	20000	30.00
	B 20 30 30.2 TN	20	30	30.2	36400	41900	20000	42.70
20.21	V 60 155 D	20.21	28.178	25.4	29800	37300	19700	28.00
20.218	V 60 136 D	20.218	28.178	18.26	23200	27000	19700	25.00
21	B 60 206 T	21	25	18	13600	21500	19000	25.45
	B 60 349 TM	21	27	17.8	16900	21700	19000	18.20
	MB 21 27 15	21	27	15	16000	20300	18200	12.00
	SB 21 27 15 TN	21	27	15	16000	20300	18200	6.00
22	B 22 26 13	22	26	13	10800	16300	18000	9.50
	SB 22 26 13 TN	22	26	13	9500	13600	18000	5.14
	B 22 26 17	22	26	17	15000	24000	18000	12.80
	SB 22 27 14 TN	22	27	14	12200	19200	17300	9.00
	B 60 198 TM	22	28	23	24200	34900	18100	25.05
	B 60 175 TM	22	29	16.8	19500	23900	18100	22.48
	B 60 263 D	22	28	17	19700	26800	14200	20.00
	B 22 30 15 TN	22	30	15	18800	20900	18200	15.00
	B 22 30 20 TN	22	30	20	25500	31000	18200	23.00
	B 22 32 18	22	32	18	28000	29500	18000	30.00
	B 22 33 20	22	33	20	25000	24000	18000	33.50
23	MB 23 27 15	23	27	15	12200	19200	18200	13.00
	SB 23 27 15 TN	23	27	15	12200	19200	17400	7.00
	B 60 122	23	28	24	19600	30300	17400	24.00
	B 61 009 D	23	35	16.2	29300	29500	17300	38.30
23.5	B 23.5 27.5 13	23.5	27.5	13	10700	16400	17400	10.00
24	B 24 28 13	24	28	13	10600	16400	16600	10.00

* Cages centered on outer raceway

NEEDLE CAGES

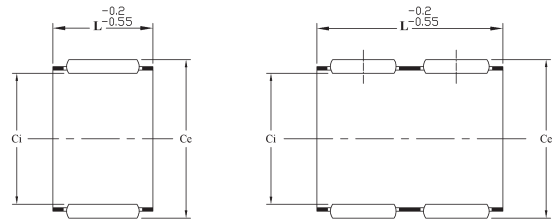


Shaft dia	Designation	Ci	Ce	L	Basic capacities		Limiting speed (oil)	Approx weight
					Dynamic (C)	Static (Co)		
					Newtons	Newtons	rpm	gms
m m		m m	m m	m m				
24	SB 24 28 13 TN	24	28	13	11100	17500	16500	7.00
	B 24 36 24 TN	24	36	24	9700	14800	16600	45.00
	B 60 221	24	28	17	13100	21300	16600	13.60
25	B 25 29 10	25	29	10	8900	13300	16000	8.10
	B 25 29 10 TN	25	29	10	8200	12000	16000	4.69
	B 25 29 13	25	29	13	11600	18600	16000	10.80
	B 25 29 17	25	29	17	16000	27500	16000	14.50
	B 60 277	25	29.9	20	19200	30400	16000	21.67
	B 60 281 D	25	30	20	21800	35900	16000	25.00
	B 25 30 13	25	30	13	13500	19400	16000	11.00
	B 25 30 17	25	30	17	17300	26700	16000	18.80
	B 60 022*	25	30	20	19200	30400	16000	22.60
	B 60 112	25	30	22	21100	34400	16300	24.00
	B 60 029*	25	30	24	23000	38400	16000	27.20
	BBSS 25 30 26 TN	25	30	26	21800	35600	16000	16.45
	BB 25 30 60 TN	25	30	60	34400	64700	16000	
	SB 60 029 TN	25	30	24	22100	36500	17000	16.00
	SB 60 029 TN.1	25	30	24	21400	35000	16000	157.00
	B 60 023*	25	30	25.2	24800	42400	16000	28.00
	B 25 30 25.2	25	30	25.2	24800	42400	16000	28.00
	MB 60 200 TN	25	30	26	22800	37800	16000	18.00
	BB 55 597 AJ	25	30	60	33200	61700	16000	47.00
	B 60 093 TM	25	31	17	18300	25300	16000	22.90
	B 60 161 TM	25	32	16	18500	23100	16000	23.00
	B 25 31 20	25	31	20	22200	32500	16000	24.00
	MB 60 201 TN	25	31	22	24100	36100	16000	21.00
	B 25 31 24	25	31	24	23500	39500	16000	29.50
	B 25 32 16	25	32	16	18800	23700	16000	25.00
	B 25 33 20	25	33	20	29000	36500	16000	27.50
	B 60 085 D	25	33	23.8	34200	46900	16000	38.70
	B 25 35 30.2 TN	25	35	30.2	42800	54300	16000	52.87
	B61 010 D	25	35	36	52600	70600	16000	73.70
	B 60 188 TM	25	37	23.8	39600	44000	16000	68.15
	BIM 25 46 25 T**	25	46	25	42035	57450	11750	170.00
25.4	B 25.4 30.4 11.6	25.4	30.4	11.6	10700	14400	15700	10.00
	V 16 21 16 D	25.4	33.32	25.4	33300	51500	15200	42.00
	V 16 22 14 D	25.4	34.93	22.23	32500	25800	15700	40.00
26	B 60 219 TM	26	30	12.8	12300	20400	15300	29.00
	MB 60 298	26	33	34	34300	51500	15300	55.00
	B 7012 TN	26	40	26	50700	56100	15000	75.00
26.568	V 60 133 D	26.57	34.53	18.26	26300	34100	15000	32.00
	V 60 123 D	26.57	34.53	25.4	35900	51000	15000	
26.84	BB SS 26.84 31.85 30 TN	26.84	31.85	30	23600	40500	14900	20.00
27.5	B 60 145	27.5	33.5	22	22900	34600	14300	29.50
	MB 60 145	27.5	33.5	22	22900	34600	14300	29.50
28	B 28 33 13	28	33	13	13700	20400	14200	14.00
	B 28 33 17	28	33	17	18200	29500	14200	18.80
	B 28 33 27	28	33	27	31500	58000	14200	31.00
	B 28 35 18	28	35	18	22400	30600	14200	29.00
	B 60 180 D	28	35	18	23800	33000	14200	26.90
	B 60 304 TM	28	38	17	29100	34000	14200	45.79
	BB 60 086 D	28	38	33.8	48100	64800	14200	71.00

* Cages centered on outer raceway

** With inner ring. Without inner ring cage size 34 x 46 x 24.5

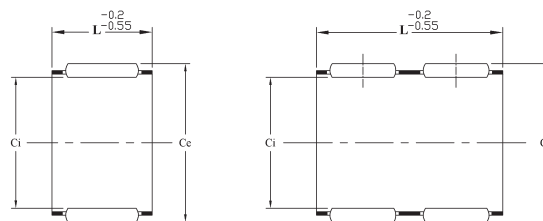
NEEDLE CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C) Newtons	Static (Co) Newtons		
28	B 7050 TN	28	48	23.8	59900	58400	14200	118.00
	B 60203 TN	28	48	31	74900	77800	14200	162.00
28.96	BB 29 32 30	28.96	32	30	20600	50200	13700	22.78
29	BB 29 33 30	29	33	30	25000	50000	13800	29.00
	B 60 042*	29	34	17	18100	29600	13700	20.00
	B 60 043*	29	34	24	25000	44700	13700	29.70
30	B 60 291 TM	30	35	16.8	19900	33900	13300	12.40
	B 30 35 17	30	35	17	19700	33500	13300	20.00
	B 30 37 16	30	37	16	25000	35000	13300	26.40
	B 60 024*	30	35	20	21400	37000	13300	26.00
	B 30 35 20	30	35	20	21900	38300	13300	26.00
	B 60 067*	30	35	25	25600	46800	13300	32.00
	SB 60 027 TN	30	35	25	23200	40900	13300	19.00
	SB 60 067 TN.1	30	35	25	23400	41600	46800	18.90
	MB 60 225 TN	30	35	25	24900	44900	13000	20.21
	BB 30 35 26.5	30	35	26.5	23200	46500	13300	31.00
	B 30 35 27	30	35	27	31000	59900	13300	33.00
	B 60 120	30	35	27	29700	56500	13300	33.00
	B 60 053*	30	35	27	29700	56500	13300	35.00
	SB 60 312 TN	30	35	27	30200	58000	13300	24.22
	B 60 307 TM	30	36	14	18100	26400	13300	20.47
	B 60 308 TM	30	38	24	33200	47200	13300	48.44
	B 61 005 TM	30	40	20	30300	36400	13300	49.80
	B 30 40 30	30	40	30	50400	70100	13300	78.00
	B 60 146	30	40	30	50400	70100	13300	78.00
	B 60 223 TN	30	44	19	41400	44400	13300	56.86
31.749	V 60 135 D	31.75	41.28	19.05	33400	43300	12400	45.00
32	BB 32 40 42 FS	32	40	42	48000	77100	12500	101.00
	B 32 37 17	32	37	17	18900	32400	12500	21.50
	B 32 37 22	32	37	22	24100	44300	12500	29.90
	B 60 116	32	37	25	25200	46800	12700	34.00
	B 32 37 27	32	37	27	33500	65000	12500	35.00
	B 60 121	32	37	27	33500	65000	12500	37.00
	BB 32 37 32	32	37	32	28500	62000	12500	40.00
	BB 32 37 58	32	37	58	45000	112000	12500	80.00
	BB 32 40 49.2 FS	32	40.02	49.2	57400	97100	12500	115.00
	B 60 245 D	32	52	25	68100	69700	12500	152.00
	B 32 52 31 TN	32	52	31	78500	83800	12500	164.00
32.5	BB 32.5 36.5 29 TN	32.5	36.5	29	22500	47400	12300	18.00
35	B 50 174	35	40	13	14200	23000	11500	17.00
	B 35 40 13	35	40	13	14200	23000	11400	18.30
	B 35 40 17	35	40	17	21400	39100	11500	23.00
	B 35 40 18.5 a	35	40	18.5	20900	37900	11500	24.50
	B 60 117	35	40	22	24900	47400	11400	32.00
	B 35 40 23.5 a	35	40	23.5	28000	55200	11500	31.00
	B 60 054*	35	40	27	31500	64300	11500	40.00
	BB 60 063	35	40	34.9	33900	70500	11400	51.00
	B 60 126 T	35	42	16	23400	34700	11400	35.00
	B 60 228	35	43	26.5	37000	56700	11400	52.30
	B 35 45 30	35	45	30	55000	80000	11400	47.30
	B 35 40 18.5 TN	35	40	18.5	19700	35200	11400	16.68
	B 60 326 TM	35	40	18.5	20500	37000	11400	27.00

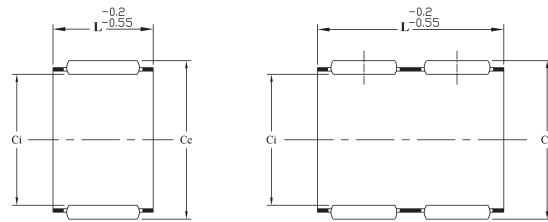
* Cages centered on outer raceway

NEEDLE CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C)	Static (Co)		
					Newtons	Newtons		
35	SB 35 40 22.5 TN	35	40	22.5	26500	51500	11400	22.077
	SB 60 226 TN	35	40	23	22400	41100	11400	18.985
	B 35 40 25 TN	35	40	25	18500	23100	16000	25.900
	B 35 40 28	35	40	28	31400	64000	11400	41.970
	B 60 300	35	40	33	30700	61800	11400	48.900
	BB SS 35 40 36.9 TN	35	40	36.9	36100	76500	11400	35.014
	BBSS 35 40 43 TN	35	40	43	42400	94300	11400	41.125
35.255	B 60 309 TM	35	47	30	55000	72600	11400	111.000
	V 60 131 D	35.255	43.218	18.5	31200	46400	11100	52.000
	V 60 114 D	35.255	43.218	31.8	53200	91500	11300	75.000
36	V 60 157 D	35.255	43.218	25.4	43500	70800	11400	60.000
	BB 36 40 29.8 TN	36	40	29.8	24800	55800	11100	21.000
	B 36 41 30.5 TN	36	41	30.5	32500	67400	11100	32.000
37	B 60 306 TM	36	48	22.4	43400	53900	11100	82.800
	B 60 303 TM	36	48	36	69400	98800	11100	137.300
37	B 37 42 17	37	42	17	22200	41900	10800	24.500
	B 37 42 27	37	42	27	36000	75000	10800	40.000
38	B 60 290 TM	38	43	26.8	32200	67600	10500	20.400
	B 60 301	38	44	33	38100	74000	10500	64.700
39	BB 39 44 26 a	39	44	26	27700	56400	10200	37.000
	BB 60 313	39	44	26	27700	56400	10200	40.000
	BB 60 299	39	44	43	41300	94300	10000	70.000
40	B 40 45 17	40	45	17	22600	43700	10000	26.000
	B 40 45 21 a	40	45	21	27100	55300	10000	33.000
	B 40 45 27	40	45	27	37500	80000	10000	43.000
	B 60 118	40	45	27	37500	80000	10000	46.000
	B 40 45 30	40	45	30	36700	81800	10000	51.000
	B 40 45 30 TN	40	45	30	33700	73100	10000	32.000
	B 40 48 20	40	48	20	36000	55000	10000	47.000
	B 60 181	40	53	44	88700	132000	10000	181.500
	B 40 60 26 FS	40	60	26	78200	86900	10000	182.000
	BB 40 50 27 FS	40	50	27	44500	64500	10000	96.000
	B 40 57 31.5 TN	40	57	31.5	29100	34000	14200	163.530
40.2	BB 50 458	40.2	44.2	29	24100	56100	10000	38.000
	BB SS 61037 TN A	40.2	44.2	30	28600	69500	9900	24.000
41.7	BB 60 340 FS	41.7	62	70	54800	113100	6600	148.000
42	BB 50 347	42	46	51.4	36200	95700	9500	70.000
	B 42 47 17	42	47	17	24500	48000	9500	27.500
	B 42 47 27 a	42	47	27	34100	75400	9500	46.000
	B 42 47 27 TN	42	47	27	34100	75400	9400	33.000
	B 42 47 28.4	42	47	28.4	34100	75400	9500	48.500
	BB 42 47 34	42	47	34	33500	72000	9500	59.000
	B 42 47 36 TN	42	47	36	39600	91700	9500	41.200
	B 60 156 D	42	50	30	51500	92300	9500	67.000
	B 42 52 20.2	42	52	20.2	44600	66100	9500	65.000
	B 42 54 30.7	42	54	30.7	62500	87000	9500	110.000
	SB 42 47 24 TN	42	47	24	30100	64500	9500	27.836
	SB 42 47 27.5 TN	42	47	27.5	33400	73400	9500	32.060
	BBSS 42 47 36 TN	42	47	36	39400	90800	9500	40.120
42.395	V 60 113 D	42.395	51.948	21.7	46000	71300	9400	82.000
42.422	V 60 134 D	42.422	51.948	25.4	54800	89200	9400	84.000
42.465	V 60 115 D	42.465	51.991	31.75	65900	113200	9412	110.000

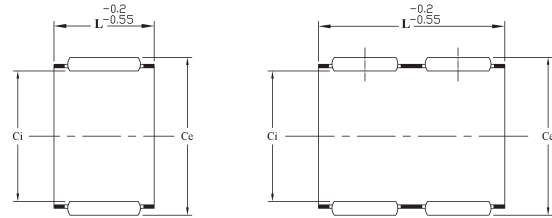
NEEDLE CAGES



Shaft dia	Designation	Ci	Ce	L	Basic capacities		Limiting speed (oil)	Approx weight
					Dynamic (C)	Static (Co)		
m m		m m	m m	m m	Newtons	Newtons	rpm	gms
42.467	V 60 125 D	42.467	58.341	31.75	84300	110800	9400	
43	BB 43 48 34	43	48	34	38000	99000	9300	57.000
	BBSS 43 48 49.5 TN	43	48	49.5	53800	137100	9300	59.150
	MB 60149	43	49	24	31900	61300	9300	27.270
44	BB 44 50 42.5 FS	44	50	42.5	50000	110000	9000	95.000
	BB 44 50 45 FS	44	50	44.8	52900	118300	9000	103.300
	BB 44 51 44.8	44	51	44.8	49500	97800	9000	98.900
	BB 60 102	44	51	44.8	49500	97800	9000	98.900
	BB 44 51 45 FS	44	51	45	50700	100900	9000	108.000
44.45	V 60 124 D	44.45	57.15	27	68400	99000	9000	
45	B 45 49 19.2	45	49	19.2	19200	43100	8800	28.500
	B 45 50 17	45	50	17	25300	51000	8800	29.000
	B 45 50 21	45	50	21	31300	67000	8800	37.000
	B 45 50 27	45	50	27	38100	89500	8800	48.000
	BB 45 50 27	45	50	27	33800	76800	8800	47.000
	B 45 52 21	45	52	21	27400	51500	8800	54.000
	BB 45 52 36 FS	45	52	36	51100	102600	8800	103.000
	BB 45 52 36 TN	45	52	36	53900	110200	8800	42.000
	B 45 53 28	45	53	28	51000	90000	8800	80.000
	B 45 50 27 TN	45	50	27	37600	87900	8800	37.053
	B 60 256	45	50	38	44400	108700	8800	75.000
	B 60 280 D	45	53	28	49600	89600	8800	70.000
	B 60 302 TM	45	60	25	59900	74800	8800	147.150
46	BB SS 46 53 36 TN	46	53	36	45400	88600	8600	58.000
47	B 47 52 17	47	52	17	25200	53500	8500	31.000
	B 60 172	47	52	27	34900	80800	8500	52.000
	B 47 52 27	47	52	27	41000	95000	8500	51.000
	SB 47 53 32 TN	47	53	32	45300	99300	8500	51.690
47.625	V 60 166 D	47.625	66.675	26.59	37500	89500	8400	220.000
48	B 60 173	48	53	17	22200	45500	8300	32.000
	B 48 53 17	48	53	17	23000	53500	8300	31.000
	B 60 047*	48	53	28	34400	79800	8300	56.200
	B 48 54 30.2	48	54	30.2	46500	103500	8300	71.000
	B 60 262	48	53	25	31400	70700	8300	50.141
	BB 48 60 50 FS	48	60	49.8	91800	152900	8300	249.900
49	B 60 148	49	54	25	32400	74500	8100	54.000
	SB 49 55 25 TN	49	55	25	37900	80000	8100	41.338
	B 60 257	49	55	30.5	47600	107400	8000	36.000
49.98	B 80 019 FS	49.98	55	30	39000	97000	8000	
50	B 60 174	50	55	20	27300	60100	8000	40.000
	B 50 55 20	50	55	20	28300	61000	8000	41.000
	B 50 55 30	50	55	30	40600	100300	8000	63.000
	B 80 019	50	55	30	40000	98300	8300	60.000
	B 50 56 23	50	56	23	35500	71000	8000	53.000
	BB 50 57 36	50	57	36	43000	95000	8000	98.000
	BB 50 55 27.5 TN	50	55	27.5	32300	74700	8000	32.950
	B 50 55 30 TN	50	55	30	40000	98300	8000	42.178
	BB 50 56 43.7 FS	50	56	43.7	57800	138700	8000	116.000
	BB 50 56 46.8 FS	50	56	46.8	61700	150600	8000	116.000
	B 50 57 24 TN	50	57	24	38300	73400	8000	45.871
	B 60 311 D	50	58	25	46700	86000	8000	75.000
50.8	B 61 020 D	50.8	60.33	25.4	56500	97900	7800	95.000

* Cages centered on outer raceway

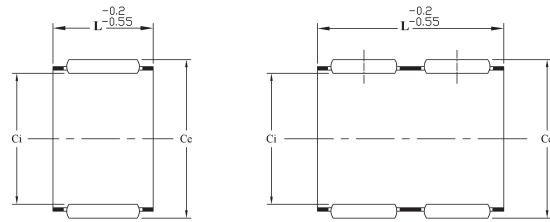
NEEDLE CAGES



Shaft dia	Designation	Ci	Ce	L	Basic capacities		Limiting speed (oil)	Approx weight
					Dynamic (C)	Static (Co)		
		m m	m m	m m	Newtons	Newtons	rpm	gms
52	B 60 183	52	58	19	27600	54300	7690	49.000
53	B 53 58 25 TN	53	58	25	32200	76000	7500	35.000
	BB 60 296	53	58	40	49700	132700	7500	85.000
55	B 55 59 13 TN	55	59	13	10600	21200	7500	9.000
	B 55 60 20	55	60	20	28300	65100	7300	45.000
	B 60 048*	55	60	24.5	33400	80700	7300	56.200
	B 55 60 30	55	60	30	40500	99000	7300	69.000
	B 60 049*	55	60	37	47300	126000	7300	84.500
	B 60 110	55	61	18.5	25400	49600	7200	50.000
	B 60 077 D	55	63	32	51700	100000	7200	86.000
	BBSS 55 60 28 TN	55	60	28	33700	81200	7200	35.790
	BB 60 244	55	61	34.5	45700	105500	7200	93.409
	B 55 63 29 TN	55	63	29	55200	110300	7000	75.036
56	BB 56 61 32	56	61	32	38300	96700	7300	85.000
	BB 56 61 40.2	56	61	40.2	47400	126900	7200	101.000
	BB 56 64 50	56	64	50	75000	185000	7200	175.000
	BB 60 364 FS	56	61	35	42500	110500	7100	80.350
58	BB 58 64 40	58	64	40	57700	145600	6800	108.000
	BB 58 64 51	58	64	51	61000	178000	6800	150.000
58.57	B 80 012	58.57	66.57	30	56500	115700	6800	108.000
	B 50749	58.57	66.57	30	56500	115700	6600	108.000
59.5	B 59.5 81.5 22.5 FS	59.5	81.5	22.3	80900	93500	6700	230.000
60	B 60 65 20	60	65	20	31000	72000	6700	50.000
	B 60 235	60	65	25	37300	95500	6600	62.000
	B 60 65 30	60	65	30	43800	117400	6700	75.000
	BB 50 162	60	66	39.9	50100	122600	6600	117.000
	B 60 68 25	60	68	25	51000	102400	6700	93.000
	SB 60 68 25.2 TN	60	68	25.2	39700	73900	6600	63.000
	BB 50 790	60	68	30	52800	106900	6600	105.200
	BB 50 791	60	68	34	60300	126700	6600	125.000
	B 60 68 38.8 FS	60	68	38.8	61600	129600	6600	172.000
	BBSS 60 66 54 FS	60	66	54	77500	215200	6600	157.000
	SB 60 68 25 TN	60	68	24.8	45900	89100	6600	61.750
	SB 60 68 25 FS	60	68	25	43500	82900	6600	102.000
	BB 60 68 30 FS	60	68	29.8	45100	86700	6600	125.500
	BB 60 68 31.5FS	60	68	31.5	50200	100000	6600	133.600
	BB 60 68 32.3FS	60	68	32.3	53200	107900	6600	136.000
	BB 60 68 40 FS	60	68	39.8	66100	142600	6600	171.000
	BB 60 68 41.8 FS	60	68	41.5	68600	149500	6600	180.000
	B 60 84 23 FS	60	84	23	93000	108000	6600	265.000
62	BB 62 70 32.8	62	70	32.8	48700	97400	6400	124.500
	BB 60 101	62	70	32.8	48700	97400	6400	124.500
	BB 62 70 33 FS	62	70	33	53700	110100	6500	147.000
	BB 62 70 39.8	62	70	39.8	68400	150700	6400	152.000
	BB 62 70 40	62	70	40	68400	150700	6400	152.000
	BB 62 70 40 FS	62	70	40	66400	144800	6500	177.800
	BB 62 70 40 TN	62	70	40	70600	156800	6400	110.000
	B 60 243	62	68	31.5	47400	115100	6400	97.042
	BB 62 68 35 FS	62	68	34.8	50000	123700	6400	106.623
	BBSS 62 70 36 TN	62	70	36	57700	120800	6400	88.800
62.1	BB 80 006	62.1	68.1	42.3	59000	153400	6400	131.000
63	BB 63 71 35.8 FS	63	71	35.8	58300	123100	6300	159.000

* Cages centered on outer raceway

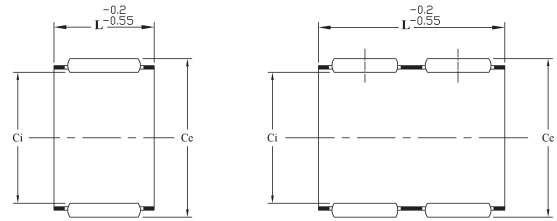
NEEDLE CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C) Newtons	Static (Co) Newtons		
63	BB 63 71 48.7 FS	63	71	48.7	79300	182700	6300	220.00
	BB 63 71 50.6 FS	63	71	50.6	82600	192600	6300	312.00
63.66	BB 80 005	63.66	71.66	38.8	74600	170500	6200	150.00
64	BB 64 70 38 FS	64	70	37.8	51100	128000	6200	119.20
65	B 65 70 20	65	70	20	30800	76800	6200	53.00
	B 65 70 23	65	70	23	43500	116000	6200	56.00
	B 65 70 30	65	70	30	47000	127000	6200	72.00
	B 65 73 23	65	73	23	53000	108000	6200	92.00
	B 65 73 30	65	73	30	60100	129700	6200	122.00
	B 60 026*	65	73	30	60100	129700	6200	124.00
66	BB SS 66 74 36 TN	66	74	36	55700	118300	6100	94.00
67	BB 67 75 37 FS	67	75	36.8	64100	142300	5900	173.00
	BB 67 75 44 FS	67	75	43.8	77500	181800	5900	208.40
68	BB 68 74 34.9	68	74	34.9	55000	138000	5900	118.00
	B 60 106	68	76	26.5	54200	115200	5800	110.00
	B 68 76 34.8	68	76	34.8	61700	136200	5800	141.00
	B 60 104	68	76	34.8	61700	136200	5800	141.00
	B 68 76 35 FS	68	76	35	64600	144100	6400	172.00
	BB 60 107	68	76	36	60200	131600	5800	145.00
	BB 60 108	68	76	38.5	60200	131600	5800	160.00
	BB 60 109	68	76	47.5	70000	159600	5800	200.00
70	B 70 76 20	70	76	20	37500	86000	5700	69.00
	B 70 76 30	70	76	30	56000	145000	5700	105.00
	BB 70 76 40.2	70	76	40.2	63300	174700	5700	144.00
	B 70 78 25	70	78	25	54800	118300	5700	107.00
	B 70 78 30	70	78	30	69000	155000	5700	130.00
	BB 70 78 48.5 FS	70	78	48.5	85900	209900	5700	240.00
	BB 70 78 49.8 FS	70	78	49.8	91700	229000	5700	247.70
72	BB 72 80 40 FS	72	80	40	70900	165500	5500	206.80
	BB 72 80 40 TN	72	80	40	73100	172700	5500	131.00
	BB 72 80 31 FS	72	80	31	52400	112200	5500	150.00
	BB 72 80 32 FS	72	80	32	54400	117900	5500	158.00
	BB 72 80 40 FS	72	80	40	72000	168900	5500	200.00
73	B 73 79 20	73	79	20	36800	88200	5500	72.00
	BB 50 181	73	79	39.9	55400	149000	5400	143.00
	B 60 229	73	79	44	64900	182100	5400	162.00
	B 60 230	73	79	47	64900	182100	5400	169.00
75	BB 75 81 40	75	81	40	65000	180000	5300	137.00
	B 75 83 23	75	83	23	51000	107000	5300	105.00
	SB 75 83 23 TN	75	83	23	43500	89500	5300	72.00
	B 75 83 30	75	83	30	70000	160000	5300	142.00
	BB 75 83 34.8	75	83	34.8	62200	142200	5300	163.00
	BB 75 83 35 FS	75	83	35	62200	142000	5300	182.30
	BB 75 83 39.8 FS	75	83	39.8	73400	175600	5300	212.00
	BB 75 83 46	75	83	46	86000	208000	5300	205.00
	B 75 83 23 FS	75	83	23	48000	101700	5300	197.00
77	BB 77 83 37.6FS	77	83	37.6	60400	169500	5200	266.00
	B 77 101 29.2 FS	77	101	29.2	121100	158700	5100	362.00
78	BB 78 86 48 FS	78	86	47.8	86100	218200	5100	256.00
80	B 80 86 20	80	86	20	38300	95900	5000	87.00
	B 80 88 30	80	88	30	73000	172000	5000	150.00
	BB 80 88 40 FS	80	88	40	75500	186000	5000	224.70

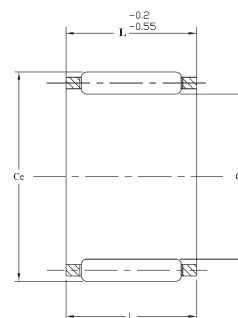
* Cages centered on outer raceway

NEEDLE CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C)	Static (Co)		
					Newtons	Newtons		
85	B 85 92 20	85	92	20	39800	91900	4700	95.00
	B 85 93 30	85	93	30	75000	180000	4700	160.00
	BB 85 93 53 FS	85	93	52.8	99300	270300	4700	307.20
	BB 85 93 60 FS	85	93	59.8	114400	324100	4700	357.10
86	BB 86 94 38 FS	86	94	37.9	72300	180300	4650	224.00
	BB 86 94 45 FS	86	94	45	86600	227400	4650	266.00
90	B 90 98 30	90	98	30	76000	190000	4400	170.00
	BB 90 98 45.8 FS	90	98	45.8	91400	247800	4400	295.00
	B 90 97 20 FS	90	97	20	42400	101700	4400	54.00
	B 90 98 41 FS	90	98	41	82500	216900	4400	280.00
	B 90 98 50 FS	90	98	49.8	96100	263600	4400	335.00
	BB 90 98 55 FS	90	98	54.8	113100	330000	4400	355.00
	BB 90 98 74 FS	90	98	74	138900	423300	4400	370.00
92	BB 92 100 63 FS	92	100	63	126800	380000	4300	390.00
95	BB 95 103 60 FS	95	103	59.8	120300	358900	4200	390.00
96	BB 96 104 71.8 FS	96	104	71.8	147500	467900	4100	750.00

ROLLER CAGES



Shaft dia m m	Designation	Ci m m	Ce m m	L m m	Basic capacities		Limiting speed (oil) rpm	Approx weight gms
					Dynamic (C) Newtons	Static (Co) Newtons		
20	NW 20 28 20	20	28	20	24100	28200	20000	30
22	NW 22 30 15	22	30	15	18800	20900	18200	26
	NW 22 30 20	22	30	20	25500	31000	18000	34
24	NW 24 36 24	24	36	24	35600	38000	16000	67
	NS 24 36 24	24	36	24	38200	41800	16700	
25	NW 25 33 24.3	25	33	24.3	29800	39100	16000	
	NS 25 35 24	25	35	24	37100	45300	16000	
	NW 25 35 24	25	35	24	37100	45300	16000	65
	NS 7005	25	35	30	46000	59600	16000	72
	NW 25 35 30	25	35	30	43300	55000	16000	
	NW 225	25	35	30	43300	55000	16000	
25.4	NW 0001	25.4	39.7	39.7	69300	82300	15500	146
26	NS 7012	26	40	26	50700	56100	15300	
	NW 7012	26	40	26	50700	56100	15300	100
	NW 26 40 26	26	40	26	47200	51000	15300	95
28	NS 28 44 24	28	44	24	48200	49300	14000	157
	NW 28 44 24	28	44	24	48200	49300	14000	118
	NS 7050	28	48	23.8	59900	58400	14000	157
	NW 7050	28	48	23.8	59900	58400	14000	155
	NW 28 48 24	28	48	24	59900	58400	14000	156
30	NW 230	30	42	30	51000	63400	13000	104
	NS 30 42 30	30	42	30	51000	63400	15400	98
31	NW 31 46 27	31	46	27	59400	68200	12900	133
	NW 31 46 27.2	31	46	27.2	62100	72500	12500	130
32	NW 32 52 25	32	52	25	60800	60300	11600	175
	NS 32 52 31	32	52	31	78500	83800	12500	207
	NW 32 52 31	32	52	31	78500	83800	12500	214