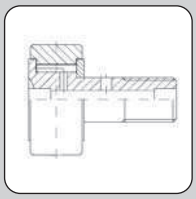
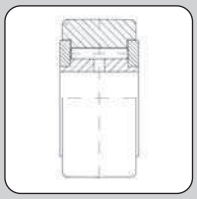
Metric cam follower bearings

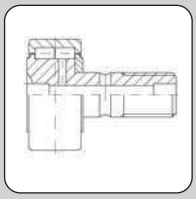
Cam follower stude type, standard



Cam follower yoke type, standard



Cam follower stude type, heavy load



Cam follower yoke type, heavy load

Load ratings

The Basic Load Rating or Basic Dynamic Rating, as defined by ABMA and ISO, is that calculated, constant radial load which 90% of a group of apparently identical bearings with stationary outer ring can theoretically endure for a rating life of 1.000.000 revolutions ($33^1/_3$ rpm for 500 hours). The Basic Load Rating is a reference value only, the base value of 1.000.000 revolutions chosen for ease of calculation.
The dimensional tables list the Basic Dynamic (C) and Basic Static (Co) Load Ratings as calculated by the ISO and AFBMA Standards. Also listed are the Dynamic and Static Ratings for the CAMROL bearings operating as track rollers. These dynamic and static ratings are less than those calculated by the basic load rating formulas (C and Co) and account for the additional bending stressed present because the outer ring is unsupported. The load applied on the bearing while it is operating dynamically should not exceed 50% of the Dynamic Rating as a Track Roller.

Bearing life

Statistical L_{10} bearing fatigue life can be calculated according to the following formula:

$$L_{10}\,\text{Life in Hours} = \frac{16666}{N} \times \left(\frac{BDR}{P}\right)^{\frac{10}{3}}$$

BDR = Basic Dynamic Rating (Newtons)
P = Radial Load (Newtons)
N = Speed(RPM)
L_{10} = Fatigue Life (Hours)

To determine the Basic Dynamic Rating required for a given application, use the following formula:
$BDR = 0.054 \times P \times (L_{10} \times N)^{0,3}$

Mounting

The following should be considered in mounting CAMROL bearings:

- The housing that supports the cam follower stud (or the shaft on which the cam yoke roller is mounted) should be of sufficient strength to resist excessive deformation and bending under the expected applied load.
- The face of the housing should be flat and square with the housing bore, and must have a diameter of at least that listed in the dimensional tables for proper support of the bearing endplate.
- In order to obtain the best support for the CAMROL bearing, the chamfer on the housing bore should not exceed 0.5 mm x 45 °.
- When mounting Stud Type CAMROL bearings in a machine member, the radial lubrication hole (it is in line with the McGill name) should be located in the unloaded portion of the raceway.
- Any pressure required for installation should be applied against the solid center portion of the flanged inner stud (not on the flange perimeter), and the cam follower should be drawn up tightly by the nut so the bearing endplate is securely backed up.
- Precaution should be taken to avoid excessive torque when tightening the clamping nut; otherwise undue stress may be set up in the stud.
- The clamping nut should not be tightened beyond the maximum clamping torque listed in the dimensional table.
- Yoke Type CAMROL bearings should be mounted with the lubrication hole in the unloaded portion of the raceway and according to the recommended shaft dimensions listed in the tabular data.
- When a tight fit of the bearing on a shaft is desired, an ISO j6 shaft tolerance should be employed.
- For heavily loaded applications, the bearing should be clamped endwise and mounted on a high strength shaft with an ISO j6 tolerance.
- If the bearing cannot be clamped endwise, it is essential to have a close axial fit in the yoke in which the bearing is mounted to prevent axial displacement of the endplates under load.

Provision for relubrication – stud type

Stud type CAMROL bearings have provision for relubrication either through the end of the inner stud or through a cross drilled hole in the stud shank. The drilled hole is located above the ”G” of the McGill marking.

Sizes up through 19 mm OD do not have an axial hole from the threaded end, and no cross drill hole is present in the stud shank on sizes through 26 mm OD. The counterbored ends of the axial holes are designed to accept a press-fitted type metric lubrication fitting. Closing plugs are supplied so that the unused axial hole or holes can be sealed. If the cross drilled hole is not used for relubrication, it should be covered by the housing; therefore, no plug is supplied for this hole.

Provision for relubrication – yoke type

Yoke Type CAMROL bearings have a lubrication hole in the inner ring bore so relubrication can be accomplished through a cross-drilled hole in the supporting shaft if desired.

Track design

Since cam followers or cam yoke rollers are merely one component of a two-piece bearing construction, along with the track or cam on which it operates, proper selection of the track or cam material must be considered. This selection has a direct effect upon ultimate life and performance of the cam roll application.

Where bearings are used as support or guide rollers, it is often difficult to obtain high hardness and tensile strength values for the machine members against which the bearings operate. In the interest of economy, relatively soft structural materials can be applied in most applications where dimensional accuracy is not extremely critical. The work hardening of ferrous, low carbon track materials, accompanied by relatively small amounts of wear-in of the bearing into the track surface, generally results in satisfactory bearing performance. In the application of cam follower or cam yoke roller bearings (lift truck mast rollers, for instance), it is common to employ formed structural steel sections as bearing track support members, and the wearing-in and work hardening of the track surface generally results in a satisfactory bearing application, providing loads are not excessive.

Cam design

Cam applications are similar in many respects to track or support roller applications, except that bearing speeds are higher due to the multiplication of cam revolutions per minute by the ratio of the cam OD to the cam follower OD. Because of these higher speeds, oil lubrication is preferred, but where such lubrication methods are not possible, grease should be replaced frequently.

In the application of box or drum cams, it is possible to obtain differential rotation of the cam follower outer race as well as associated load reversals. This may result in excessive wear of cams or cam followers unless proper cam hardness and materials are employed, as well as ample lubrication. In box cams of this nature, the cam rise and cam fall should be watched closely, since the load reversal encountered can cause shock loads in excess of the capacity of the stud or bearing.

The same precaution applies to ordinary circular cams. Instantaneous loads due to rapid cam rise should be carefully calculated and kept below the ultimate strength of the follower and the stud.

In ordinary cam design it is possible to employ the most efficient materials for best resistance to fatigue and brinelling, and attainment of high track surface hardnesses associated with good wear resistance is quite feasible. The same general precautions concerning tensile strength, as listed under track design above, should be followed for cam design; applications involving high marginal bearing or cam loading should be referred to the McGill Engineering Department.

Track capacity

Track capacity of all cam follower and cam yoke roller bearings is the load which a steel track of a given tensile strength will withstand continuously without deformation or brinelling. Table II lists track capacities for steel tracks for the standard crowned roller outside diameter versions. For the straight cylindrical roller outside diameter versions (”-X” suffix), multiply by 1.25 to obtain the track capacity ratings.

To obtain track capacities for track hardnesses other than Rockwell ”C” scale 40 (tensile strength 1242 MPa), multiply track capacity by track capacity factor listed in Table I. Regardless of track capacity, dynamic load should not exceed 50% of basic dynamic rating as a track roller and static load should not exceed maximum static rating as a track roller.

Table 1 – Track Tensile Strength

MPa	Track hardness Rockwell "C"	Track capacity Factor
828	26	0.445
966	32	0.667
1104	36	0.792
1242	40	1.000
1380	44	1.237
1518	47	1.495
1656	50	1.775
1794	53	2.090
1932	56	2.420
2070	58	2.780

Table 2 – Track Capacities

Basic bearing number	Track capacity Newton
MCFR 13	1910
MCFR 16	2940
MCYRR 5	2940
MCFR 19	3490
MCYRR 6	3490
MCFR 22	4270
MCYRR 8	5500
MCFR 26	5050
MCFR 30	6350
MCYRR 10	6350
MCFR 32	6780
MCYRR 12	6780
MCFR 35	9840
MCYRR 15	9840
MCFD 35	9840
MCYRD 15	9840
MCFR 40	12000
MCYRR 17	12000
MCFD 40	12000
MCYRD 17	12000
MCFR 47	17400
MCYRR 20	17400
MCFD 47	17400
MCYRD 20	17400
MCFR 52	19200
MCYRR 25	19200
MCFD 25	19200
MCYRD 25	19200
MCFR 62	28400
MCYRR 30	27400
MCFD 62	28400
MCYRD 30	27400
MCFR 72	31800
MCYRR 35	30500
MCFD 72	31800
MCYRD 35	30500
MCFR 80	43800
MCYRR 40	36700
MCFD 80	43800
MCYRD 40	36700
MCFR 85	46400
MCYRR 45	39000
MCYRD 45	39000
MCFR 90	49200
MCYRR 50	41300
MCFD 90	49200
MCYRD 50	41300

Tolerance limits

Stud type MCF series

Cylindrical Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	18	0	-0.008
18	30	0	-0.009
30	50	0	-0.011
50	80	0	-0.013
80	120	0	-0.015

Crowned Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	120	0	-0.050

Stud Dia. “SD”

SD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
2	6	0	-0.012
6	10	0	-0.015
10	18	0	-0.018
18	30	0	-0.021

Stud type MCFD series

Cylindrical Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
30	50	0	-0.011
50	80	0	-0.013
80	120	0	-0.015

Crowned Roller Dia. “RD”

SD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
30	120	0	-0.050

Stud Dia. “SD”

SD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
10	18	0	-0.018
18	30	0	-0.021

Yoke type MCYR series

Cylindrical Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	18	0	-0.008
18	30	0	-0.009
30	50	0	-0.011
50	80	0	-0.013
80	120	0	-0.015

Crowned Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	120	0	-0.050

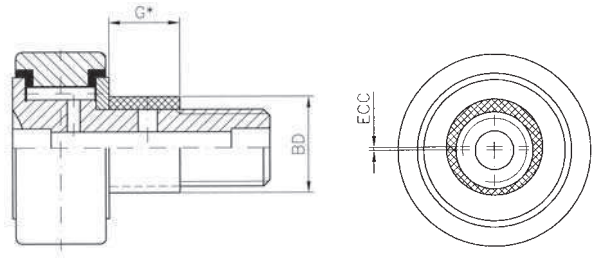
Yoke type MCYRD series

Cylindrical Roller Dia. “RD”

RD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	18	0	-0.008
18	30	0	-0.009
30	50	0	-0.011
50	80	0	-0.013
80	120	0	-0.015

Crowned Roller Dia “RD”

SD (NOM.) over mm	incl. mm	Tolerance MAX. mm	MIN. mm
6	120	0	-0.050



Stude type with eccentric collar

Basic bearing number	G* + 0.05 - 0.15	BD		Ecc. Eccentricity	Recommended housing bore dia. +0.025 -0.000
	mm	MIN.	MAX.	mm	mm
16	7	8.964	9.000	0.5	9.050
19	9	10.957	11.000	0.5	11.050
22	10	12.957	13.000	0.5	13.050
22A	10	12.957	13.000	0.5	13.050
26	10	12.957	13.000	0.5	13.050
26A	10	12.957	13.000	0.5	13.050
30	11	14.957	15.000	0.5	15.050
32	11	14.957	15.000	0.5	15.050
35	14	19.948	20.000	1.0	20.050
40	16	21.948	22.000	1.0	22.050
40A	16	21.948	22.000	1.0	22.050
47	18	23.948	24.000	1.0	24.050
47A	18	23.948	24.000	1.0	24.050
52	18	23.948	24.000	1.0	24.050
52A	18	23.948	24.000	1.0	24.050
62	22	27.948	28.000	1.0	28.050
62A	22	27.948	28.000	1.0	28.050
72	22	27.948	28.000	1.0	28.050
72A	22	27.948	28.000	1.0	28.050
80	29	34.938	35.000	1.5	35.050
85	29	34.938	35.000	1.5	35.050
90	29	34.938	35.000	1.5	35.050

* For positive clamping. housing thickness should be 0.3 mm greater than G dimension.

Interchangeability charts

Unsealed metric CAMROL bearings stude type

McGill		INA SKF NTN		IKO THK	
cage	full complement	cage	full complement	cage	full complement
MCFR 13	-	-	-	CF 5	-
MCFR 16	MCF 16	KR-16	KRV-16	CF 6 R	CF 6 VR
MCFR 19	MCF 19	KR-19	KRV-19	CF 8 R	CF 8 VR
MCFR 22	MCF 22	KR-22	KRV-22	-	-
MCFR 26	MCF 26	KR-26	KRV-26	-	-
MCFR 30	MCF 30	KR-30	KRV-30	CF 12 R	CF 12 VR
MCFR 32	MCF 32	KR-32	KRV-32	CF 12-1 R	CF 12-1 VR
MCFR 35	MCF 35	KR-35	KRV-35	CF 16 R	CF 16 VR
MCFR 40	MCF 40	KR-40	KRV-40	-	-
MCFR 47	MCF 47	KR-47	KRV-47	-	-
MCFR 52	MCF 52	KR-52	KRV-52	-	-
MCFR 62	MCF 62	KR-62	KRV-62	-	-
MCFR 72	MCF 72	KR-72	KRV-72	-	-
MCFR 80	MCF 80	KR-80	KRV-80	CF 30 R	CF 30 VR
MCFR 85	MCF 85	KR-85	-	CF 30-1 R	CF 30-1 VR
MCFR 90	MCF 90	KR-90	KRV-90	CF 30-2 R	CF 30-2 VR

Unsealed metric CAMROL bearings yoke type

McGill		INA SKF NTN		IKO THK	
cage	full complement	cage	full complement	cage	full complement
MCYRR 5	MCYR 5	NATR-5	NATV-5	NART-5R	NART-5VR
MCYRR 6	MCYR 6	NATR-6	NATV-6	NART-6R	NART-6VR
MCYRR 8	MCYR 8	NATR-8	NATV-8	NART-8R	NART-8VR
MCYRR 10	MCYR 10	NATR-10	NATV-10	NART-10R	NART-10VR
MCYRR 12	MCYR 12	NATR-12	NATV-12	NART-12R	NART-12VR
MCYRR 15	MCYR 15	NATR-15	NATV-15	NART-15R	NART-15VR
MCYRR 17	MCYR 17	NATR-17	NATV-17	NART-17R	NART-17VR
MCYRR 20	MCYR 20	NATR-20	NATV-20	NART-20R	NART-20VR
MCYRR 25	MCYR 25	NATR-25	NATV-25	NART-25R	NART-25VR
MCYRR 30	MCYR 30	NATR-30	NATV-30	NART-30R	NART-30VR
MCYRR 35	MCYR 35	NATR-35	NATV-35	NART-35R	NART-35VR
MCYRR 40	MCYR 40	NATR-40	NATV-40	NART-40R	NART-40VR
MCYRR 45	MCYR 45	NATR-45	-	NART-45R	NART-45VR
MCYRR 50	MCYR 50	NATR-50	NATV-50	NART-50R	NART-50VR

Metric CAMROL bearings stude type, full complement

McGill	INA FAG NTN
MCFD 35	NUKR-35
MCFD 40	NUKR-40
MCFD 47	NUKR-47
MCFD 52	NUKR-52
MCFD 62	NUKR-62
MCFD 72	NUKR-72
MCFD 80	NUKR-80
MCFD 90	NUKR-90

Metric CAMROL bearings yoke type, full complement

McGill	INA FAG	NTN
MCYRD 15	NUTR-15	NUTR-202
MCYRD 17	NUTR-17	NUTR-203
MCYRD 20	NUTR-20	NUTR-204
MCYRD 25	NUTR-25	NUTR-205
MCYRD 30	NUTR-30	NUTR-206
MCYRD 35	NUTR-35	NUTR-207
MCYRD 40	NUTR-40	NUTR-208
MCYRD 45	NUTR-45	NUTR-209
MCYRD 50	NUTR-50	NUTR-210

Coding for Other Cam Follower and Yoke Roller Types

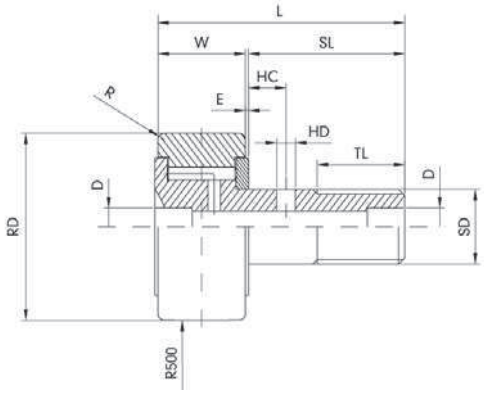
Optional features	McGill	INA SKF	IKO	NTN	THK
Seals	-S	-PP	-UU	-LL	-UU
Cylindrical OD	-X	-X	ohne R	-X	ohne R
Hexagonal Hole *	-B	-SK	-B	-H	-A
Eccentric Collar *	E	E	E	-	-

*) Not applicable for yoke roller types

ASK McGILL Metric cam follower bearings

MCF Series - full complement, crowned roller diameter
Serie MCFR - cage type, crowned roller diameter

For other versions add following suffix:
-S: sealing
-B: broach slot (5)
-X: cylindrical roller diameter
E: eccentric collar design
(All features are to combine together)



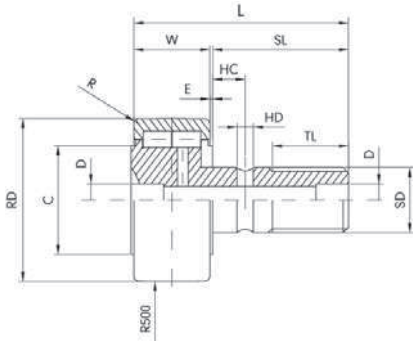
Designation	RD	W $^{+0.00}_{-0.12}$	SD	SL	L	E	M	TL	HC	HD	D	R
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MCFR 13	**13**	9	5	13.0	23	0.6	M 5x0.8	7.5	-	-	3.1 •	0.3
MCF 16	**16**	11	6	16.0	28	0.6	M 6x1	9.0	-	-	4.0 •	0.3
MCFR 16	**16**	11	6	16.0	28	0.6	M 6x1	9.0	-	-	4.0 •	0.3
MCF 19	**19**	11	8	20.0	32	0.6	M 8x1.25	11.0	-	-	4.0	0.3
MCFR 19	**19**	11	8	20.0	32	0.6	M 8x1.25	11.0	-	-	4.0	0.3
MCF 22	**22**	12	10	23.0	36	0.6	M 10x1	12.0	-	-	4.0	0.5
MCFR 22	**22**	12	10	23.0	36	0.6	M 10x1	12.0	-	-	4.0	0.5
MCF 26	**26**	12	10	23.0	36	0.6	M 10x1	12.0	-	-	4.0	0.5
MCFR 26	**26**	12	10	23.0	36	0.6	M 10x1	12.0	-	-	4.0	0.5
MCF 30	**30**	14	12	25.0	40	0.6	M 12x1.5	14.0	6	3	6.0	1.0
MCFR 30	**30**	14	12	25.0	40	0.6	M 12x1.5	14.0	6	3	6.0	1.0
MCF 32	**32**	14	12	25.0	40	0.6	M 12x1.5	14.0	6	3	6.0	1.0
MCFR 32	**32**	14	12	25.0	40	0.6	M 12x1.5	14.0	6	3	6.0	1.0
MCF 35	**35**	18	16	32.5	52	0.8	M 16x1.5	18.0	8	3	6.0	1.0
MCFR 35	**35**	18	16	32.5	52	0.8	M 16x1.5	18.0	8	3	6.0	1.0
MCF 40	**40**	20	18	36.5	58	0.8	M 18x1.5	19.0	8	3	6.0	1.5
MCFR 40	**40**	20	18	36.5	58	0.8	M 18x1.5	19.0	8	3	6.0	1.5
MCF 47	**47**	24	20	40.5	66	0.8	M 20x1.5	21.0	9	4	8.0	1.5
MCFR 47	**47**	24	20	40.5	66	0.8	M 20x1.5	21.0	9	4	8.0	1.5
MCF 52	**52**	24	20	40.5	66	0.8	M 20x1.5	21.0	9	4	8.0	1.5
MCFR 52	**52**	24	20	40.5	66	0.8	M 20x1.5	21.0	9	4	8.0	1.5
MCF 62	**62**	29	24	49.5	80	0.8	M 24x1.5	25.0	11	4	8.0	1.5
MCFR 62	**62**	29	24	49.5	80	0.8	M 24x1.5	25.0	11	4	8.0	1.5
MCF 72	**72**	29	24	49.5	80	0.8	M 24x1.5	25.0	11	4	8.0	2.0
MCFR 72	**72**	29	24	49.5	80	0.8	M 24x1.5	25.0	11	4	8.0	2.0
MCF 80	**80**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0
MCFR 80	**80**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0
MCF 85	**85**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0
MCFR 85	**85**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0
MCF 90	**90**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0
MCFR 90	**90**	35	30	63.0	100	1.0	M 30x1.5	32.0	15	4	8.0	2.0

(1) Clamping torque is based on dry threads. If threads are lubricated, use half of value shown.
(2) Since load, lubrication method, temperature and other factors affect the maximum operating speed, it is impossible to determine precise limiting speed. The listed limiting speeds are based on lightly loaded bearings having adequate lubrication and are listed only as a design guide. More frequent relubrication is required when operating at higher speeds. Actual bearing testing in the specific application should be conducted if the anticipated operating speed approaches the listed limiting speed.
(3) Dynamic load should not exceed 50% of Dynamic Rating as a track roller.
(4) Static load rating is based on stud strengh or on internal rolling element load distribution stresses.
(5) In this modification, relubrication through the flange end of the stud is not possible.
• Sizes marked have no lube holes in threaded end of stud.

Clamping dia min mm	Clamping torque max (1) Nm	Limiting speed grease (4) min^{-1}	Limiting speed oil (4) min^{-1}	Housing bore dia min mm	Housing bore dia max mm	**Load ratings dynamic C N**	**static C_0 N**	**Track roller dynamic C (3) N**	**load ratings static C_0 (2) N**	Weight kg
9	2.2	20000	30000	5	5.012	**2450**	**2260**	**2060**	**1650**	0.010
11	3.0	13000	17000	6	6.012	**6960**	**8340**	**5790**	**2350**	0.019
11	3.0	19500	25000	6	6.012	**4120**	**4120**	**3430**	**2350**	0.028
13	8.0	10500	13500	8	8.015	**8040**	**10490**	**6670**	**5100**	0.029
13	8.0	15500	20000	8	8.015	**4510**	**5000**	**3730**	**4140**	0.028
15	15.0	9000	11500	10	10.015	**9410**	**12360**	**7850**	**10400**	0.044
15	15.0	13500	17500	10	10.015	**6280**	**7260**	**5200**	**6050**	0.043
15	15.0	9000	11500	10	10.015	**9410**	**12360**	**7850**	**10400**	0.056
15	15.0	13500	17500	10	10.015	**6280**	**7260**	**5200**	**6050**	0.055
19	22.0	6400	8300	12	12.018	**13240**	**18140**	**11080**	**15300**	0.089
19	22.0	9600	12500	12	12.018	**8240**	**9710**	**6860**	**8050**	0.087
19	22.0	6400	8300	12	12.018	**13240**	**18140**	**11080**	**15300**	0.099
19	22.0	9600	12500	12	12.018	**8240**	**9710**	**6860**	**8050**	0.096
24	57.0	4200	5500	16	16.018	**20300**	**34130**	**16970**	**28500**	0.171
24	57.0	6300	8000	16	16.018	**13040**	**19030**	**10890**	**15900**	0.166
27	85.0	3300	4300	18	18.018	**23240**	**38540**	**19420**	**32200**	0.248
27	85.0	5000	6400	18	18.018	**15990**	**23730**	**13340**	**19800**	0.245
30	118.0	2600	3400	20	20.021	**30790**	**57670**	**25690**	**46700**	0.393
30	118.0	3900	5000	20	20.021	**21280**	**35700**	**17750**	**29800**	0.387
30	118.0	2600	3400	20	20.021	**30790**	**57670**	**25690**	**46700**	0.455
30	118.0	3900	5000	20	20.021	**21280**	**35700**	**17750**	**29800**	0.453
38	216.0	2100	2700	24	24.021	**46580**	**92680**	**38840**	**65400**	0.810
38	216.0	3100	4100	24	24.021	**31680**	**55700**	**26830**	**46300**	0.801
38	216.0	2100	2700	24	24.021	**46580**	**92680**	**38840**	**65400**	1.048
38	216.0	3100	4100	24	24.021	**31680**	**55700**	**26830**	**46300**	1.039
51	441.0	1500	2000	30	30.021	**76980**	**159850**	**64140**	**102300**	1.642
51	441.0	2200	2900	30	30.021	**56000**	**105030**	**46680**	**87600**	1.621
51	441.0	1500	2000	30	30.021	**76980**	**159850**	**64140**	**102300**	1.814
51	441.0	2200	2900	30	30.021	**56000**	**105030**	**46680**	**87600**	1.793
51	441.0	1500	2000	30	30.021	**76980**	**159850**	**64140**	**102300**	2.002
51	441.0	2200	2900	30	30.021	**56000**	**105030**	**46680**	**87600**	1.981

Serie MCFD - full complement of cylindrical rollers, shielded, crowned roller diameter

For other versions add following suffix:
-B: broach slot (5)
-X: cylindrical roller diameter
(All features are to combine together)



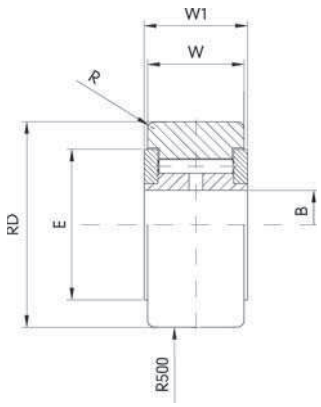
Designation	RD	W $^{+0.00}_{-0.12}$	SD	SL	L	E	M	TL	HC	HD	D	R
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MCFD 35	**35**	18	16	32.5	52	0.8	M 16x1.5	17	8	3	6	0.6
MCFD 40	**40**	20	18	26.5	58	0.8	M 18x1.5	19	8	3	6	1.0
MCFD 47	**47**	24	20	40.5	66	0.8	M 20x1.5	21	9	4	8	1.0
MCFD 52	**52**	24	20	40.5	66	0.8	M 20x1.5	21	9	4	8	1.0
MCFD 62	**62**	29	24	49.5	80	0.8	M 24x1.5	25	11	4	8	1.0
MCFD 72	**72**	29	24	49.5	80	0.8	M 24x1.5	25	11	4	8	1.1
MCFD 80	**80**	35	30	63.0	100	1.0	M 30x1.5	32	15	4	8	1.1
MCFD 90	**90**	35	30	63.0	100	1.0	M 30x1.5	32	15	4	8	1.1

(1) Clamping torque is based on dry threads. If threads are lubricated, use half of value shown.
(2) Since load, lubrication method, temperature and other factors affect the maximum operating speed, it is impossible to determine precise limiting speed. The listed limiting speeds are based on lightly loaded bearings having adequate lubrication and are listed only as a design guide. More frequent relubrication is required when operating at higher speeds. Actual bearing testing in the specific application should be conducted if the anticipated operating speed approaches the listed limiting speed.
(3) Dynamic load should not exceed 50% of Dynamic Rating as a track roller.
(4) Static load rating is based on stud strengh or on internal rolling element load distribution stresses.
(5) In this modification, relubrication through the flange end of the stud is not possible.

C	Clamping torque max (1)	Limiting speed grease (4)	Limiting speed oil (4)	Housing bore dia min	Housing bore dia max	**Load ratings dynamisch C**	**statisch C_0**	**Track roller dynamisch C (3)**	**load ratings statisch C_0 (2)**	Weight
mm	Nm	min^{-1}	min^{-1}	mm	mm	**N**	**N**	**N**	**N**	kg
21	57	6500	8500	16	16.018	**23000**	**27000**	**16000**	**18000**	0.165
23	85	5500	7200	18	18.018	**25000**	**31000**	**18000**	**22000**	0.242
27	118	4200	5500	20	20.021	**38000**	**48000**	**27000**	**32000**	0.380
21	118	3400	4400	20	20.021	**42000**	**57000**	**30000**	**35000**	0.450
38	216	2600	3400	24	24.021	**58000**	**76000**	**41000**	**48000**	0.795
44	216	2100	2700	24	24.021	**64000**	**89000**	**46000**	**57000**	1.010
47	441	1800	2300	30	30.021	**94000**	**129000**	**67000**	**91000**	1.540
47	441	1800	2300	30	30.021	**94000**	**129000**	**67000**	**101000**	1.960

Serie MCYR - full complement, crowned roller diameter
Serie MCYRR - cage type, crowned roller diameter

For other versions add following suffix:
-S: sealing
-X: cylindrical roller dia.
(All features are to combine together)



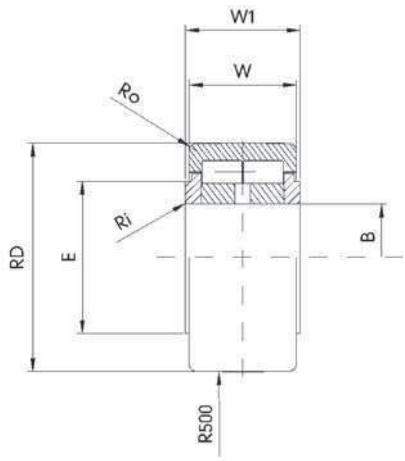
Designation	**B max**	B min	RD	W $+_{0.00}{}^{-0.12}$	W_1 max	W_1 min	R	g_6 max. (1)	g_6 min. (1)	h_6 max. (1)
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MCYR 5	**5**	4.992	16	11	12	11.82	0.3	4.996	4.988	5
MCYRR 5	**5**	4.992	16	11	12	11.82	0.3	4.996	4.988	5
MCYR 6	**6**	5.992	19	11	12	11.82	0.3	5.996	5.988	6
MCYRR 6	**6**	5.992	19	11	12	11.82	0.3	5.996	5.988	6
MCYR 8	**8**	7.992	24	14	15	14.82	0.5	7.995	7.986	8
MCYRR 8	**8**	7.992	24	14	15	14.82	0.5	7.995	7.986	8
MCYR 10	**10**	9.992	30	14	15	14.82	1.0	9.995	9.986	10
MCYRR 10	**10**	9.992	30	14	15	14.82	1.0	9.995	9.986	10
MCYR 12	**12**	11.992	32	14	15	14.82	1.0	11.994	11.983	12
MCYRR 12	**12**	11.992	32	14	15	14.82	1.0	11.994	11.983	12
MCYR 15	**15**	14.992	35	18	19	18.79	1.0	14.994	14.983	15
MCYRR 15	**15**	14.992	35	18	19	18.79	1.0	14.994	14.983	15
MCYR 17	**17**	16.992	40	20	21	20.79	1.5	16.994	16.983	17
MCYRR 17	**17**	16.992	40	20	21	20.79	1.5	16.994	16.983	17
MCYR 20	**20**	19.990	47	24	25	24.79	1.5	19.993	19.980	20
MCYRR 20	**20**	19.990	47	24	25	24.79	1.5	19.993	19.980	20
MCYR 25	**25**	24.990	52	24	25	24.79	1.5	24.993	24.980	25
MCYRR 25	**25**	24.990	52	24	25	24.79	1.5	24.993	24.980	25
MCYR 30	**30**	29.990	62	28	29	28.79	1.5	29.993	29.980	30
MCYRR 30	**30**	29.990	62	28	29	28.79	1.5	29.993	29.980	30
MCYR 35	**35**	34.988	72	28	29	28.79	2.0	34.991	34.975	35
MCYRR 35	**35**	34.988	72	28	29	28.79	2.0	34.991	34.975	35
MCYR 40	**40**	39.988	80	30	32	31.75	2.0	39.991	39.975	40
MCYRR 40	**40**	39.988	80	30	32	31.75	2.0	39.991	39.975	40
MCYR 45	**45**	44.988	85	30	32	31.75	2.0	44.991	44.975	45
MCYRR 45	**45**	44.988	85	30	32	31.75	2.0	44.991	44.975	45
MCYR 50	**50**	49.988	90	30	32	31.75	2.0	44.991	49.975	50
MCYRR 50	**50**	49.988	90	30	32	31.75	2.0	44.991	49.975	50

(1) For loose fit for light loads, use tolerance g6.
For light transition fit for medium loads, use tolerance h6.
For a tight fit and heavy loads, use ISO tolerance j6.
(2) Since load, lubrication method, temperature and other factors affect the maximum operating speed, it is impossible to determine precise limiting speed. The listed limiting speeds are based on lightly loaded bearings having adequate lubrication and are listed only as a design guide. More frequent relubrication is required when operating at higher speeds. Actual bearing testing in the specific application should be conducted if the anticipated operating speed approaches the listed limiting speed.
(3) Dynamic load should not exceed 50% of Dynamic Rating as a track roller.

h_6 min. (1)	Clamping dia E min.	Limiting speed grease (2)	Limiting speed oil (2)	**Load ratings dynamic C**	**static C_0**	**Track roller dynamic C (3)**	**load ratings static C_0**	Weight
mm	mm	min^{-1}	min^{-1}	**N**	**N**	**N**	**N**	kg
4.992	11	13000	17000	**6960**	**8340**	**5790**	**6900**	0.014
4.992	11	19500	25000	**4120**	**4120**	**3430**	**3380**	0.011
5.992	13	10500	13500	**8040**	**10490**	**6670**	**8760**	0.021
5.992	13	15500	20000	**4510**	**5000**	**3730**	**4090**	0.018
7.991	16	8400	11000	**11470**	**15200**	**9610**	**12600**	0.043
7.991	16	12500	16000	**6860**	**7750**	**5690**	**6450**	0.040
9.991	19	6400	8300	**13340**	**18240**	**11080**	**15300**	0.062
9.991	19	9600	12500	**8240**	**9710**	**6860**	**8050**	0.060
11.989	21	5400	7000	**14420**	**20890**	**12060**	**17400**	0.099
11.989	21	8100	10500	**8730**	**10890**	**7260**	**9120**	0.067
14.989	24	4200	5400	**20300**	**34130**	**16970**	**28500**	0.105
14.989	24	6300	8200	**13040**	**19030**	**10890**	**15900**	0.102
16.989	27	3300	4300	**23240**	**38540**	**19420**	**32200**	0.153
16.989	27	4900	6400	**15990**	**23730**	**13340**	**19700**	0.150
19.987	30	2600	3400	**30790**	**57670**	**25690**	**48000**	0.255
19.987	30	3900	5000	**21280**	**35700**	**17750**	**29800**	0.252
24.987	36	2200	2900	**34130**	**70410**	**28440**	**58700**	0.284
24.987	36	3300	4300	**22950**	**41780**	**19120**	**34900**	0.278
29.987	44	1700	2200	**49720**	**107290**	**41480**	**89000**	0.476
29.987	44	2500	3200	**34040**	**65120**	**28430**	**54300**	0.465
34.984	52	1500	1900	**56880**	**120230**	**47370**	**100000**	0.649
34.984	52	2200	2800	**38930**	**72960**	**32460**	**60900**	0.636
39.984	58	1300	1700	**70020**	**147990**	**58350**	**123000**	0.845
39.984	58	1900	2400	**49720**	**94440**	**41480**	**787000**	0.825
44.984	63	1200	1500	**73750**	**163190**	**61490**	**136000**	0.924
44.984	63	1800	2300	**51190**	**101010**	**42760**	**84100**	0.901
49.984	68	1100	1400	**77180**	**178390**	**64330**	**148000**	0.948
49.984	68	1600	2000	**54720**	**113570**	**45600**	**94800**	0.960

Serie MCYRD - full complement of cylindrical rollers, shielded, crowned roller diameter

For other versions add following suffix:
-X: cylindrical roller diameter



Designation	**B max**	B min	RD	W $^{+0.00}_{-0.12}$	W_1 max	W_1 min	Ro	Ri
	mm	mm	mm	mm	mm	mm	mm	mm
MCYRD 15	**15**	14.992	35	18	19	18.79	0.6	0.3
MCYRD 17	**17**	16.992	40	20	21	20.79	1.0	0.3
MCYRD 20	**20**	19.990	47	24	25	24.79	1.0	0.3
MCYRD 25	**25**	24.990	52	24	25	24.79	1.0	0.3
MCYRD 30	**30**	29.990	62	28	29	28.79	1.0	0.3
MCYRD 35	**35**	34.988	72	28	29	28.79	1.1	0.6
MCYRD 40	**40**	39.988	80	30	32	31.75	1.1	0.6
MCYRD 45	**45**	44.988	85	30	32	31.72	1.1	0.6
MCYRD 50	**50**	49.998	90	30	32	31.75	1.1	0.6

(1) Dynamic load should not exceed 50% of Dynamic Rating as a track roller.
(2) Since load, lubrication method, temperature and other factors affect the maximum operating speed, it is impossible to determine precise limiting speed. The listed limiting speeds are based on lightly loaded bearings having adequate lubrication and are listed only as a design guide. More frequent relubrication is required when operating at higher speeds. Actual bearing testing in the specific application should be conducted if the anticipated operating speed approaches the listed limiting speed.

E	Load ratings dynamic C	static C_0	Track roller load ratings dynamic C (2)	static C_0	Limiting speed (1)	Weight
mm	N	N	N	N	min^{-1}	kg
20	**23000**	**27000**	**16000**	**18000**	6500	0.099
22	**25000**	**31000**	**18000**	**22000**	5500	0.147
27	**38000**	**48000**	**27000**	**32000**	4200	0.245
31	**42000**	**57000**	**30000**	**35000**	3400	0.281
38	**58000**	**76000**	**41000**	**47000**	2600	0.465
44	**64000**	**89000**	**46000**	**57000**	2100	0.630
51	**89000**	**130000**	**64000**	**71000**	1600	0.816
55	**94000**	**143000**	**67000**	**72000**	1400	0.883
60	**99000**	**156000**	**71000**	**77000**	1300	0.950