



McGILL®

**Cam
Follower
Bearings**




EMERSON
Industrial Automation

EMERSON. CONSIDER IT SOLVED.™



A Century of Innovation



In 1905 James H. McGill founded what is today McGill Manufacturing Company, a key part of Emerson Power Transmission. McGill developed a variety of products, including bearings in the 1920s. Since then, McGill bearings have continued to evolve to meet the needs of an ever-expanding list of industries and applications. McGill now has 100 years experience in design and manufacturing, with a long line of “firsts”:

A Future in Improving Productivity

System uptime and operational efficiencies are key to profitable manufacturing in the twenty-first century and McGill precision bearings play an important role.

Premature bearing failure can dramatically drive up operating costs and increase system maintenance requirements. That’s why McGill engineers design bearings to meet a host of different needs – easing installation, reducing maintenance and decreasing equipment downtime.

As our customer base has expanded, McGill has continued to design unique bearing solutions beyond our standard offerings. By applying years of engineering and manufacturing expertise, our staff of bearing specialists has created a broad array of bearing solutions to meet some of the toughest application requirements.

As we celebrate 100 years of manufacturing excellence, McGill looks forward to the next century of working with you to help select and design better, more efficient bearing solutions to reduce costs and positively impact your bottom line.

MULTI-ROL

1930-needle bearings

CAMROL®

1937-cam follower bearings

GUIDEROL®

1956-needle bearings

NYLAPLATE®

1964-seal

SPHERE-ROL®

1967-spherical roller bearings

LAMBDA®

1973-seal

LUBRI-DISC®

1974-seal

LUBRI-DISC+

1992-seal

Metric CAMROL®

1993-liquid metal retention

Special-Duty CAMROL®

1998-cam follower bearings

Heavy-Duty CAMROL®

1999-cam follower bearings

CRES

2000-CAMROL stainless steel

McGill Precision Bearings Reduce Operating Cost

CAMROL Cam Follower Selection Guide

Condition →	How to identify →	Potential solutions		
General Purpose Applications	Using an unsealed bearing and desire longer life	LUBRI-DISC Seal CF-1-S Can extended bearing life 10 times longer than an unsealed bearing 		
Ease of installation	Standard stud type cam followers feature a screwdriver slot to hold bearing during installation			
Blind Hole Applications	Stud type cam follower installed into drilled and tapped hole		Hex-Hole CF-1-S-B Provides superior holding power 	
Misalignment/Corner Loading	Wear pattern on roller diameter offset from center	 Crowned OD CCF-1-S Helps to center load 		
Thrust	<ul style="list-style-type: none"> Thrust loads present Bearing supports rotating table Bearing roller develops excessive end play 	 Heavy Duty CFD-3 Incidental thrust loads 		
		TRAKROL PCF-3 Higher thrust loads 		
Corrosion	<ul style="list-style-type: none"> Visible rust Washdown environment Bearing lock-up 	 CRES CAMROL® CF-1-SB-CR Corrosion resistant 440C material 		
Contamination	<ul style="list-style-type: none"> Dusty or contaminated environment Bearing lock-up 		Increased sealing protection:	
		LUBRI-DISC Seal CF-1-S		
		Heavy Duty CFD-3		
		Special Duty SD-CF-1		
TRAKROL PCF-3				
Maintenance Free	<ul style="list-style-type: none"> Bearing difficult to reach Relubrication not desired 		Maintenance free options:	
			Bushing Type BCF-1-S	
			Heavy Duty CFD-3	
			Special Duty SD-CF-1	
TRAKROL PCF-3				

CAMROL *Cam Follower Bearings*



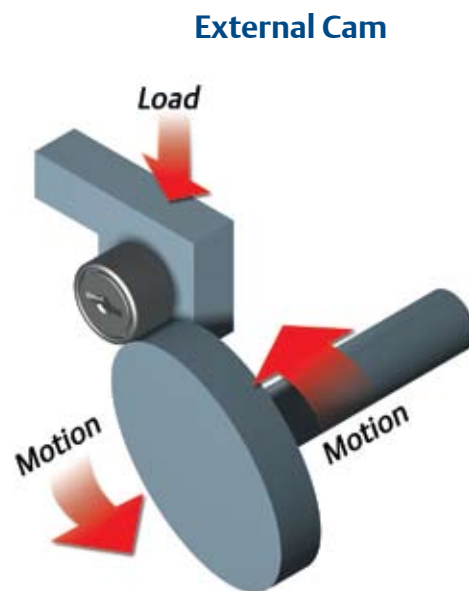
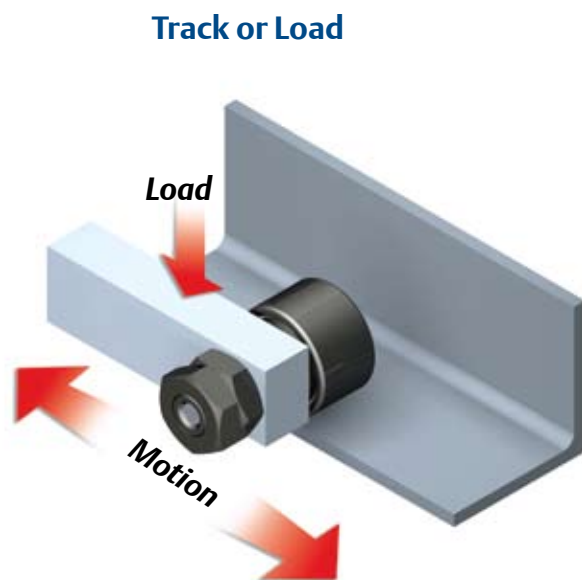
CAMROL – The Industry Standard

In 1937, McGill engineers invented the first needle bearing cam follower. Since that time, McGill has maintained its leading position through the continuous development of new features and improvements to the CAMROL bearing product line.

As today's leading manufacturer of quality cam follower bearings, McGill has developed many features to extend bearing life for a variety of operating conditions, lubrication requirements and application environments. McGill offers the broadest range of cam follower bearings on the market with over 1,400 standard designs to choose from.

Overview

The typical functions of a cam follower are to provide anti-friction support of linear movement or to follow the surface of a cam. The CAMROL cam follower from McGill was designed to withstand the intermittent shock, loading and precision requirements associated with these applications.



Industries

- Auto plants
- Food and beverage
- Forest products
- Oil drilling
- Printing
- Steel mills
- Textiles

Applications

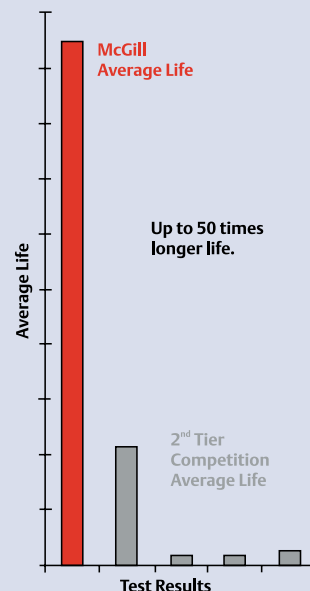
- Automation equipment
- Machine tools
- Packaging equipment
- Unit material handling

Superior Design Features Promote Longer Life, Lower Cost

Although others have tried to copy the outward appearance of CAMROL bearings, our customers find vast differences in performance. In laboratory testing, CAMROL bearings last up to 50 times longer than some competitors in a variety of laboratory and customer tests.

Proven Performance

Eight bearings from each manufacturer were tested under identical laboratory conditions without relubrication. CF-1-S size tested at 200 lbs and 1,500 RPM.



Heavy Sectioned Outer Race

The heavy sectioned outer race helps withstand shock loading of cam follower operation.

Black Oxide Finish

CAMROL bearings have a black oxide finish on all external surfaces to help inhibit corrosion.

High Quality Materials

Although other steels may be less expensive, McGill only uses high quality, specialty steel to boost the performance and endurance that is the hallmark of a CAMROL bearing.

Lubrication Groove Extends Bearing Life

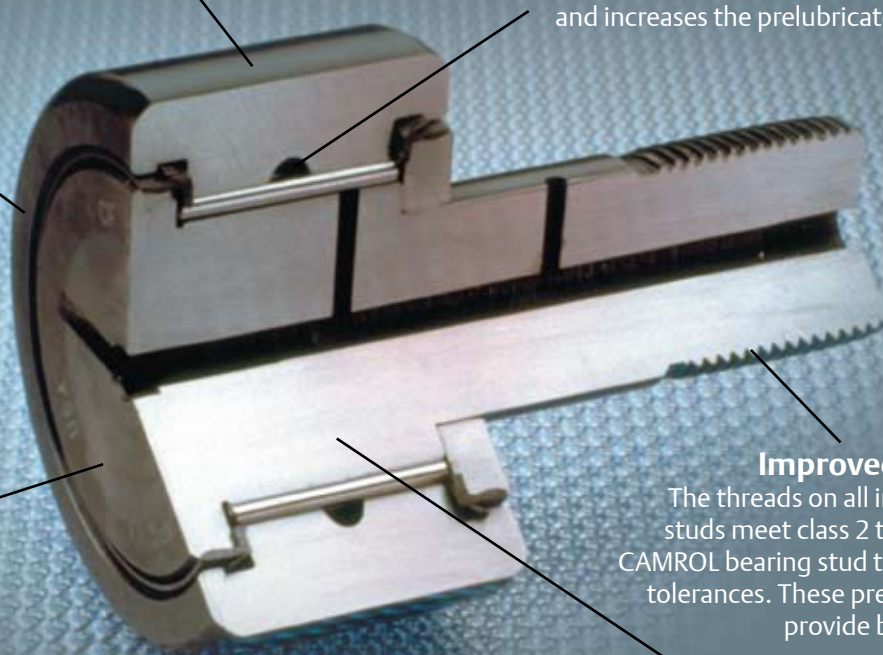
All inch dimension CAMROL bearings with seals have a lubrication groove that extends lubrication intervals and increases the prelubricated life of the bearing.

Improved Holding Power

The threads on all inch CAMROL bearing studs meet class 2 tolerances and metric CAMROL bearing stud threads meet class 6G tolerances. These precise geometrics help provide better holding power.

Specialized Heat Treatment

All raceways are heat treated to a minimum of 58 HRC. Inner studs are induction heat treated to McGill specifications to provide a hardened raceway and a ductile stem that provides toughness for absorbing the shocks of cam follower operations.



METRIC CAMROL *Cam Follower Bearings*



Metric Cam Follower Bearings

McGill offers Metric CAMROL bearings in metric dimensions equivalent to ISO standard series. Both European and Asian versions are available.

Metric CAMROL bearings are available in stud or yoke type versions. Specifying the type of bearing needed depends upon the preference for either a straddle (yoke) mounting or a cantilever (overhung) mounting.

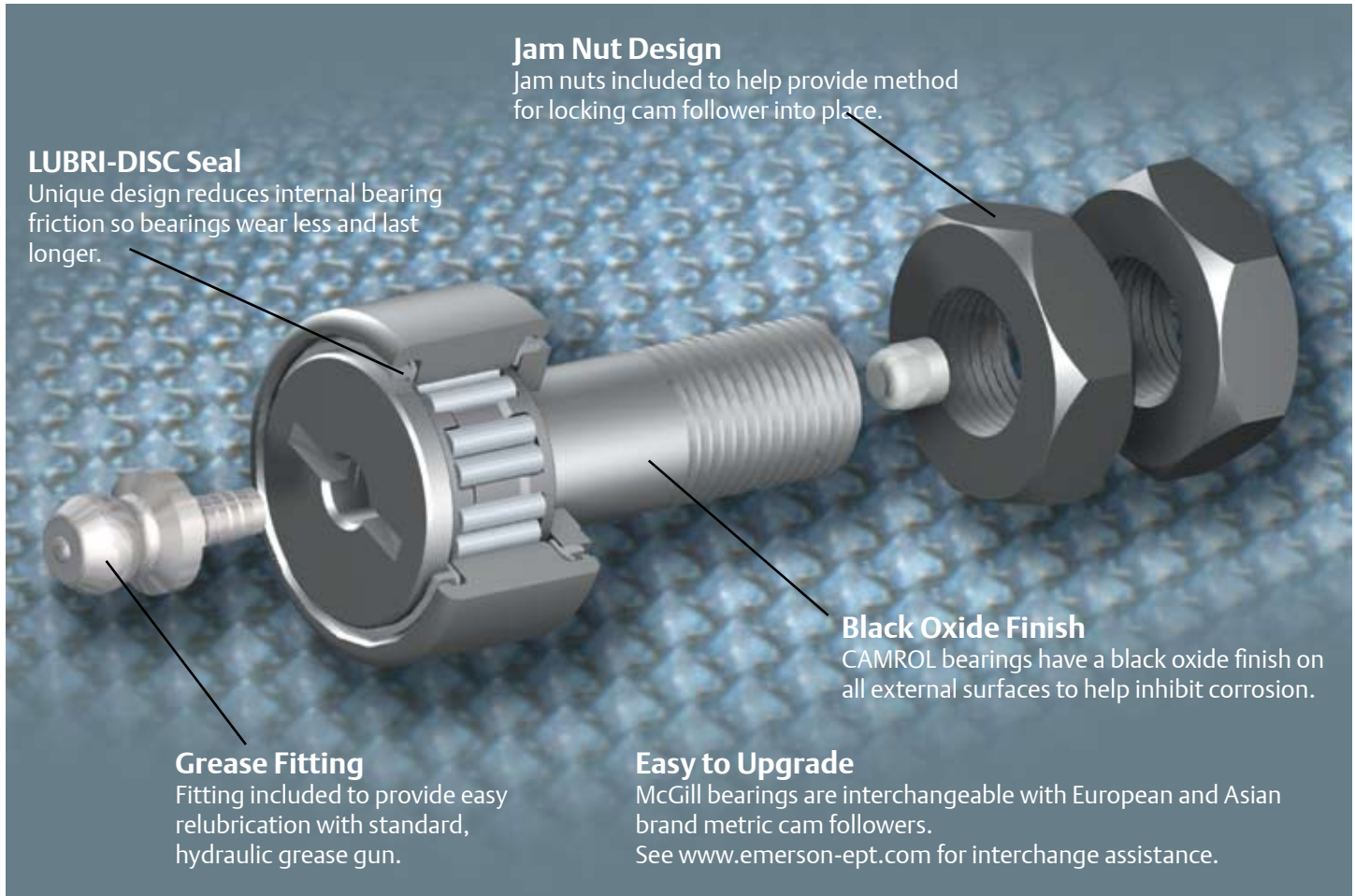
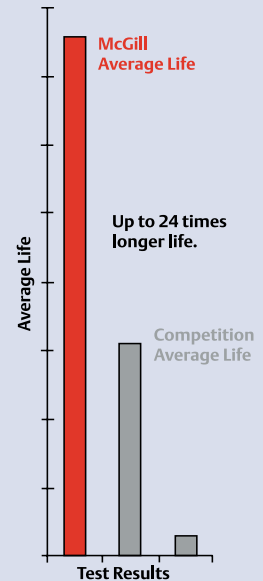
Metric CAMROL bearings are available with three types of internal construction: full complement needle rollers, retainer type needle rollers or cylindrical rollers.

With a proven track record on inch cam followers, McGill brings many key features and manufacturing practices to the metric CAMROL series that outlast the competition. In test laboratories, McGill CAMROL bearings last up to 24 times longer than some competitors.

Proven Performance

Eight bearings from each manufacturer were tested under identical laboratory conditions without relubrication.

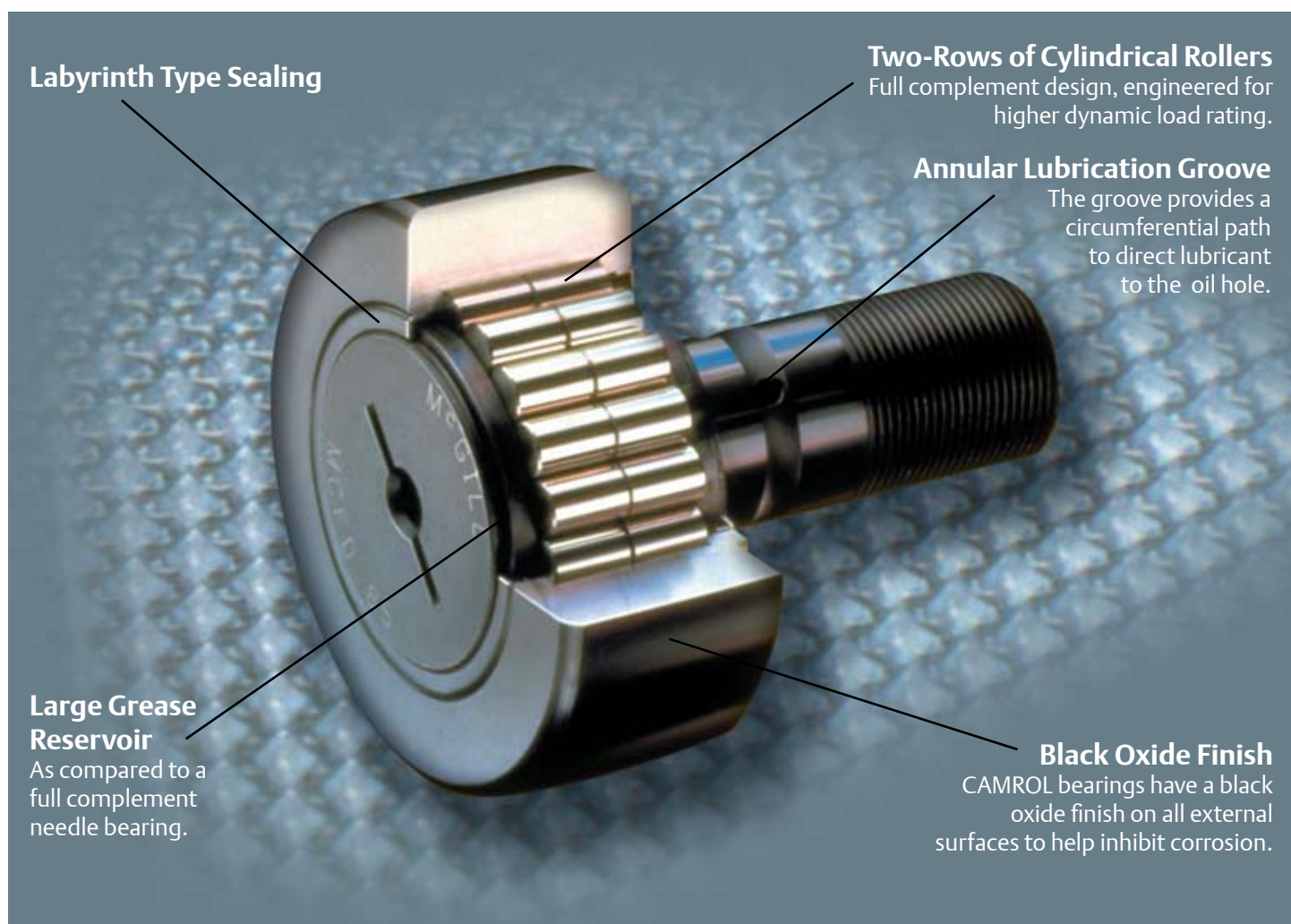
MCF-26-S size tested at 160 lbs and 1,975 RPM.



Heavy-Duty Metric CAMROL

This series provides greater dynamic load ratings by using cylindrical rollers in place of standard needle rollers. This construction allows the bearings to support radial loading, as well as some axial loading.

MCFD Series



MCYRD Series

Yoke type Heavy-Duty Metric CAMROL bearings are designed for yoke (straddle) mounting on a shaft.



For part nomenclature, see page 19.



LUBRI-DISC Seal Option

The LUBRI-DISC seal option increases bearing life up to 10 times longer than unsealed bearings:

- Labyrinth and contact sealing help protect against loss of lubrication and help prevent entrance of contaminants while providing low drag operation.
- Vents help prevent seal blow-out during relubrication.
- Integral backplate design reduces internal friction by eliminating metal-on-metal contact. Less friction lowers the operating temperature, which extends grease life and allows for higher operating speeds.

Note: The LUBRI-DISC seal is rated up to 250°F maximum.

Hex Hole Option for Ease of Installation

The hex hole option reduces costs by speeding installation or removal of stud type cam followers. During typical installation or removal, the bearing must be held in place while torque is applied to the mounting nuts. The optional hex hole increases secure holding power over the standard screwdriver slot in the face of the bearing. The hex hole option is standard for stud type Heavy-Duty, Special-Duty and Corrosion-Resistant (CRES) CAMROL bearings and is an option for standard CAMROL bearings.

The hex hole option is ideal for:

- Difficult to reach assemblies
- Blind hole mounting
- Equipment with many bearings

Note: The hex hole option does not allow for relubrication from the roller end of the bearing on most sizes. (All metric versions and inch sizes below 3" OD.)



Crowned OD Option for Long Life

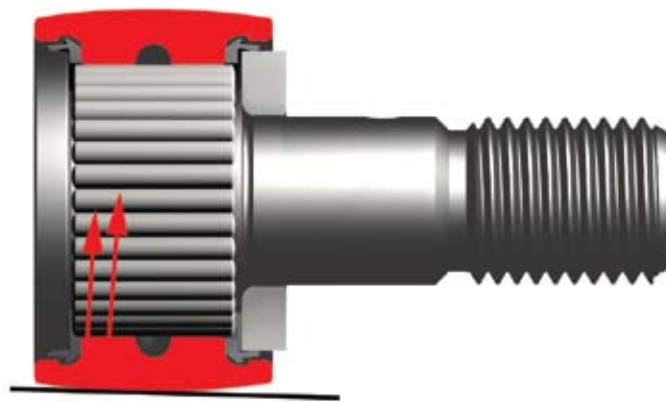
A slight crown on the OD of a cam follower bearing can increase bearing life up to three times longer than the standard, cylindrical OD bearing. The crown helps more evenly distribute stresses for the following conditions:

- Heavy loading
- Misalignment of track or housing
- Turntable or rotary cams

Note: The crowned O.D. is an option for standard CAMROL and Heavy-Duty CAMROL bearings.



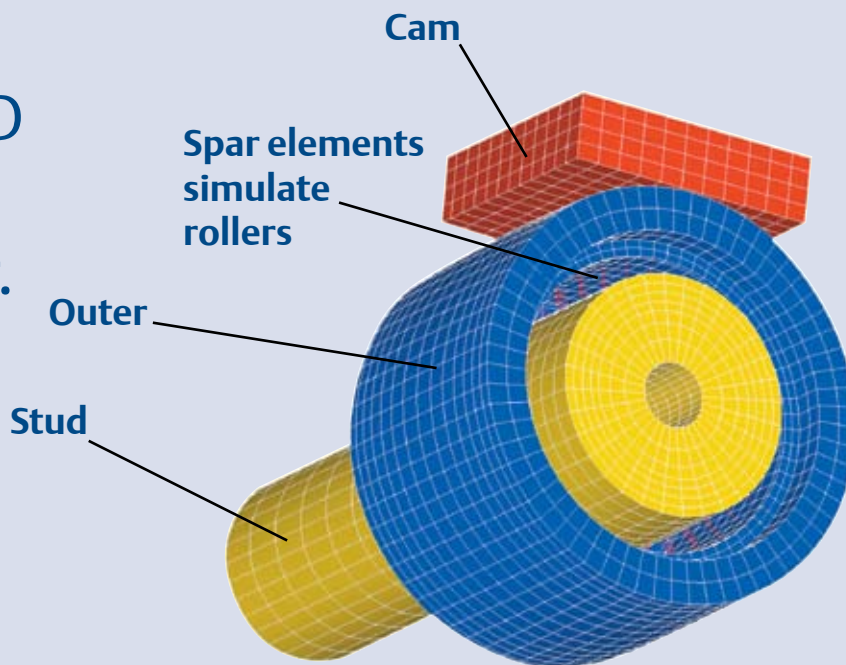
Cylindrical OD:
Misalignment can cause corner loading



Crowned OD:
Corner loading is reduced.

Computer analysis shows crowned OD can increase life three times longer.

Finite element analysis of cam followers under heavy loads shows crowned OD increases L10 life. More detailed results available in Motion System Design magazine, August 2003.

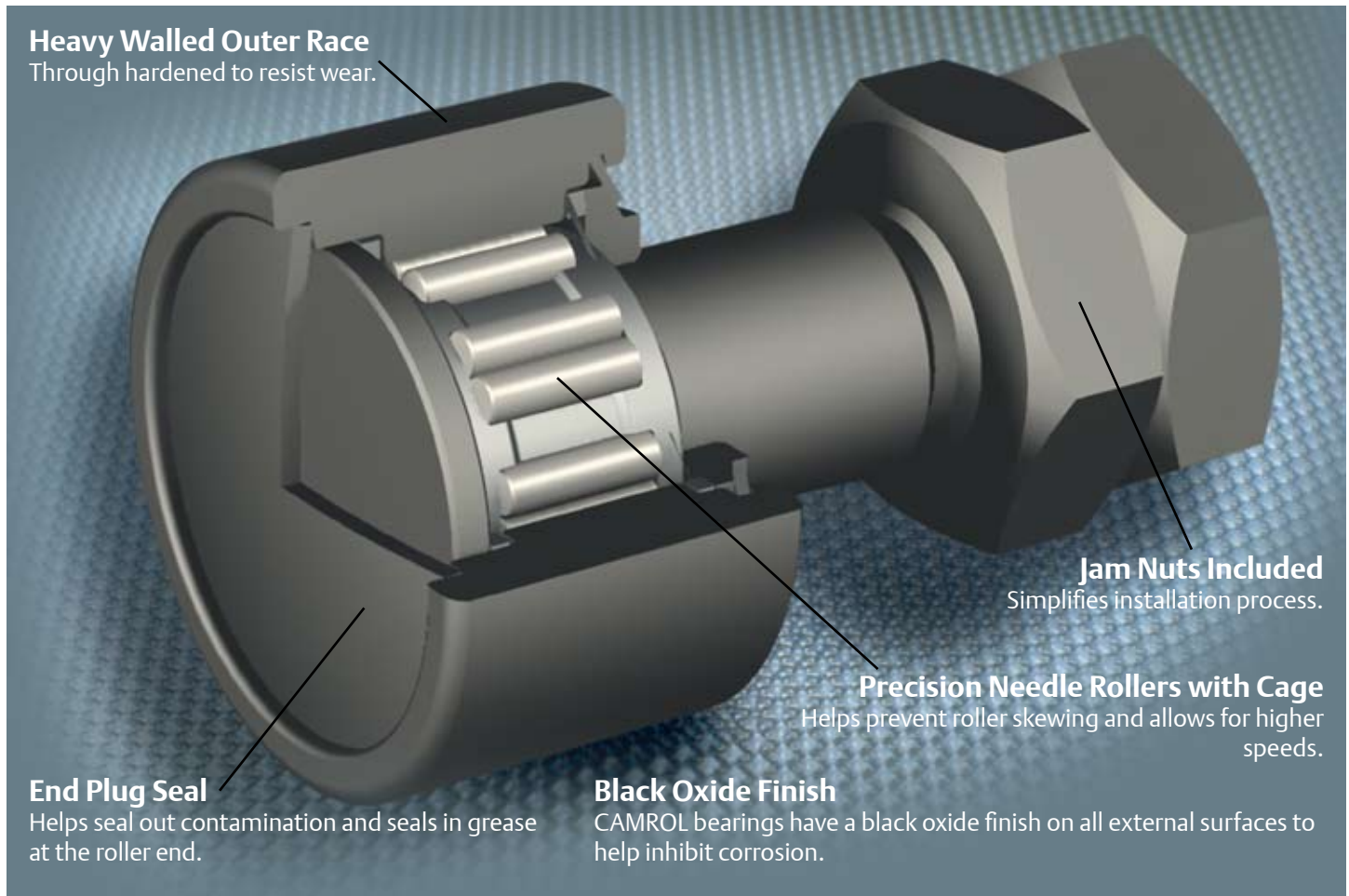


For part nomenclature, see page 19.



Special-Duty CAMROL for Tough Environments

Select Special-Duty CAMROL bearings for tough applications such as automotive production, metal forming assembly and welding environments.



Heavy Walled Outer Race
Through hardened to resist wear.

End Plug Seal
Helps seal out contamination and seals in grease at the roller end.

Black Oxide Finish
CAMROL bearings have a black oxide finish on all external surfaces to help inhibit corrosion.

Precision Needle Rollers with Cage
Helps prevent roller skewing and allows for higher speeds.

Jam Nuts Included
Simplifies installation process.

Resists Contamination

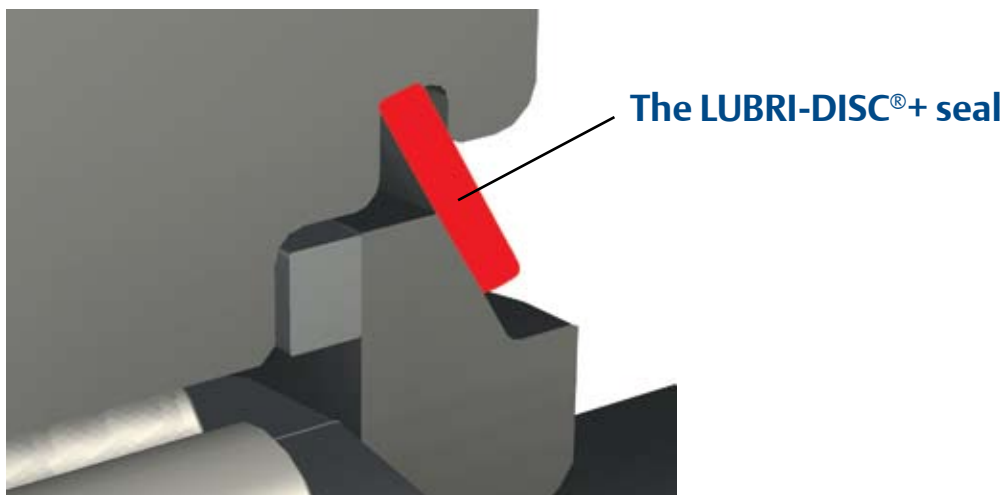
Special-Duty CAMROL bearings are specifically designed to resist contaminated environments. A metal end plug seal on the roller face helps block out contamination and resists welding spatter.

Maintenance Free

Special-Duty CAMROL bearings extend bearing life up to six times without lubrication maintenance by using synthetic grease and caged needle rollers. Caged needle rollers allow for a larger grease reservoir than standard needle bearing cam followers, a beneficial feature when relubrication is not possible.

Improved Protection

On the stud side of the Special-Duty CAMROL bearing, the LUBRI-DISC®+ seal offers improved protection over standard sealing.



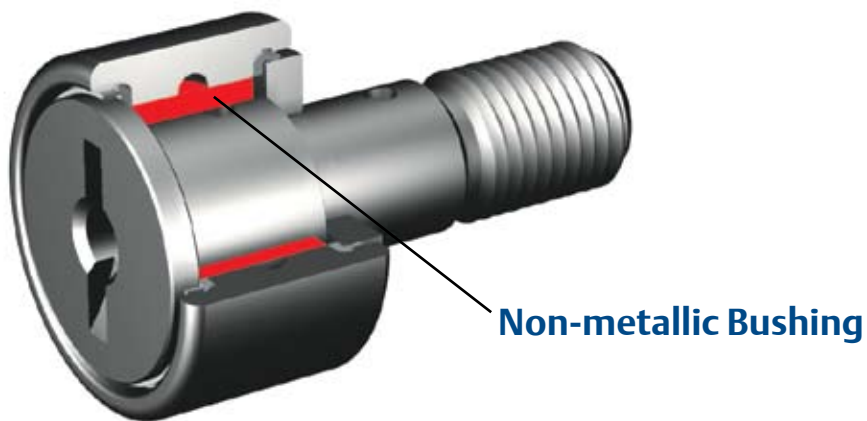
BUSHING TYPE CAMROL *Cam Follower Bearings*

Eliminates Relubrication

This bearing series eliminates the need for lubrication by utilizing a non-metallic bushing instead of needle rollers. Save relubrication time and inconvenience. This is ideal when relubrication is not desired and grease contamination must be avoided.

The bushing type is appropriate for:

- Light loads and slow speeds
- Not for food applications



For part nomenclature, see page 19.



Heavy-Duty CAMROL for Incidental Thrust Applications

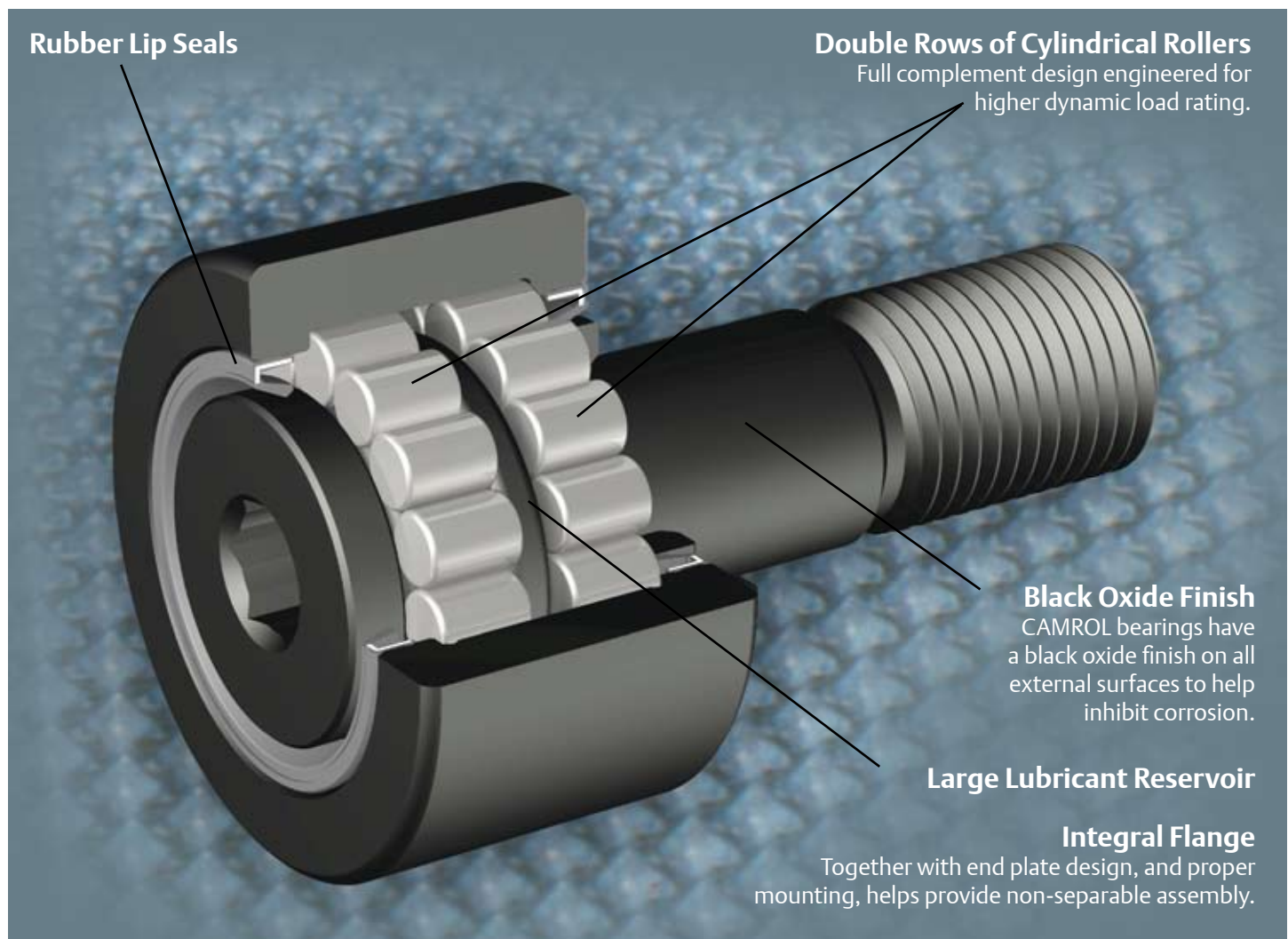
While standard needle bearing cam followers are the economical choice for most applications, incidental thrust loads make Heavy-Duty CAMROL bearings a better choice. Primary causes of incidental thrust are misalignment of housing or track, high loading causing stud deflection and rotary tracks or cams. Heavy-Duty CAMROL bearings employ a unique internal construction, consisting of two rows of cylindrical rollers designed to manage much of the thrust.

Resists Contamination

Rubber lip seals are standard in Heavy-Duty CAMROL bearings. Although standard cam followers do well in most conditions, the rubber lip seals in Heavy-Duty CAMROL bearings increase protection against contamination.

Maintenance Free

Standard bearing has no relubrication feature. Seals are pointed inward for improved grease retention. The large lubricant reservoir and rubber lip seals keep more grease in the bearing for maintenance free operation.



CRES CAMROL *Cam Follower Bearings*

Corrosion-Resistant CAMROL for Food and Beverage Applications

Greater Corrosion Resistance

Whether equipment is exposed to the elements or to extreme washdown in food and beverage applications, the corrosion-resistant (CRES) CAMROL bearing series extends bearing life in wet or corrosive environments. The CRES CAMROL features 400 series stainless steel to help prevent corrosion.

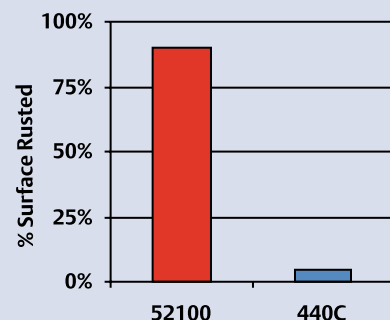
FDA Compliant Grease

CRES CAMROL bearings utilize H1 FDA compliant grease for food applications.



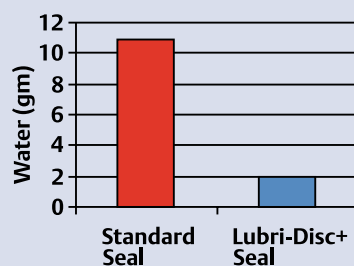
Standard cam followers rust quickly.

Rust Comparison

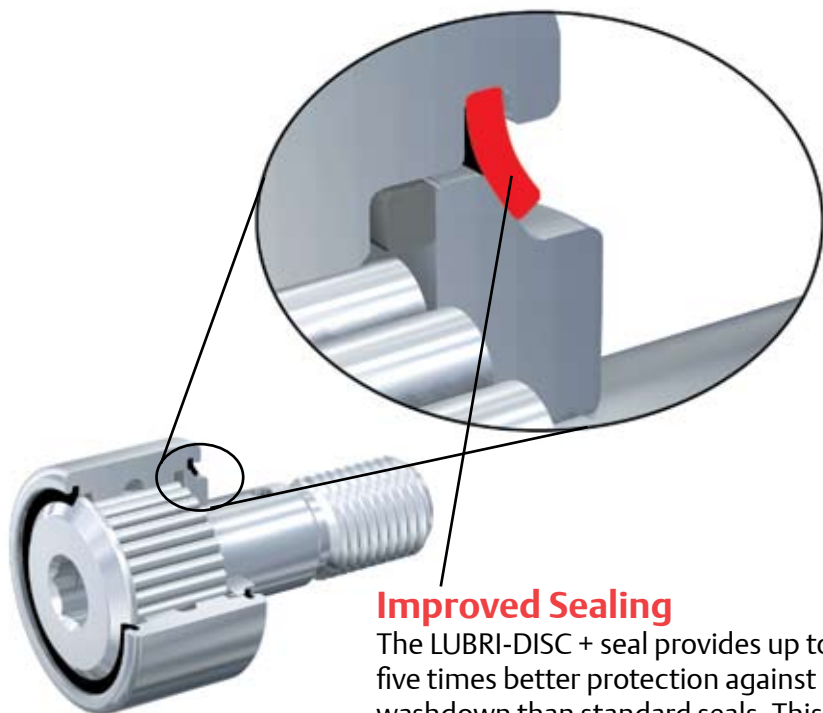


Tested per ASTM B117 salt fog test, 5% saline solution, 100°F, 100% humidity.

Water Spray Comparison



In a test originally performed to meet exacting aerospace standards, CRES Camrol bearings were tested with a high pressure spray aimed at the bearing face. This graph shows how each seal held-up – the Lubri-Disc + seal featured in CRES Camrol bearings was the obvious winner.



Improved Sealing

The LUBRI-DISC + seal provides up to five times better protection against washdown than standard seals. This seal is featured in CRES CAMROL bearings 1" OD and larger.

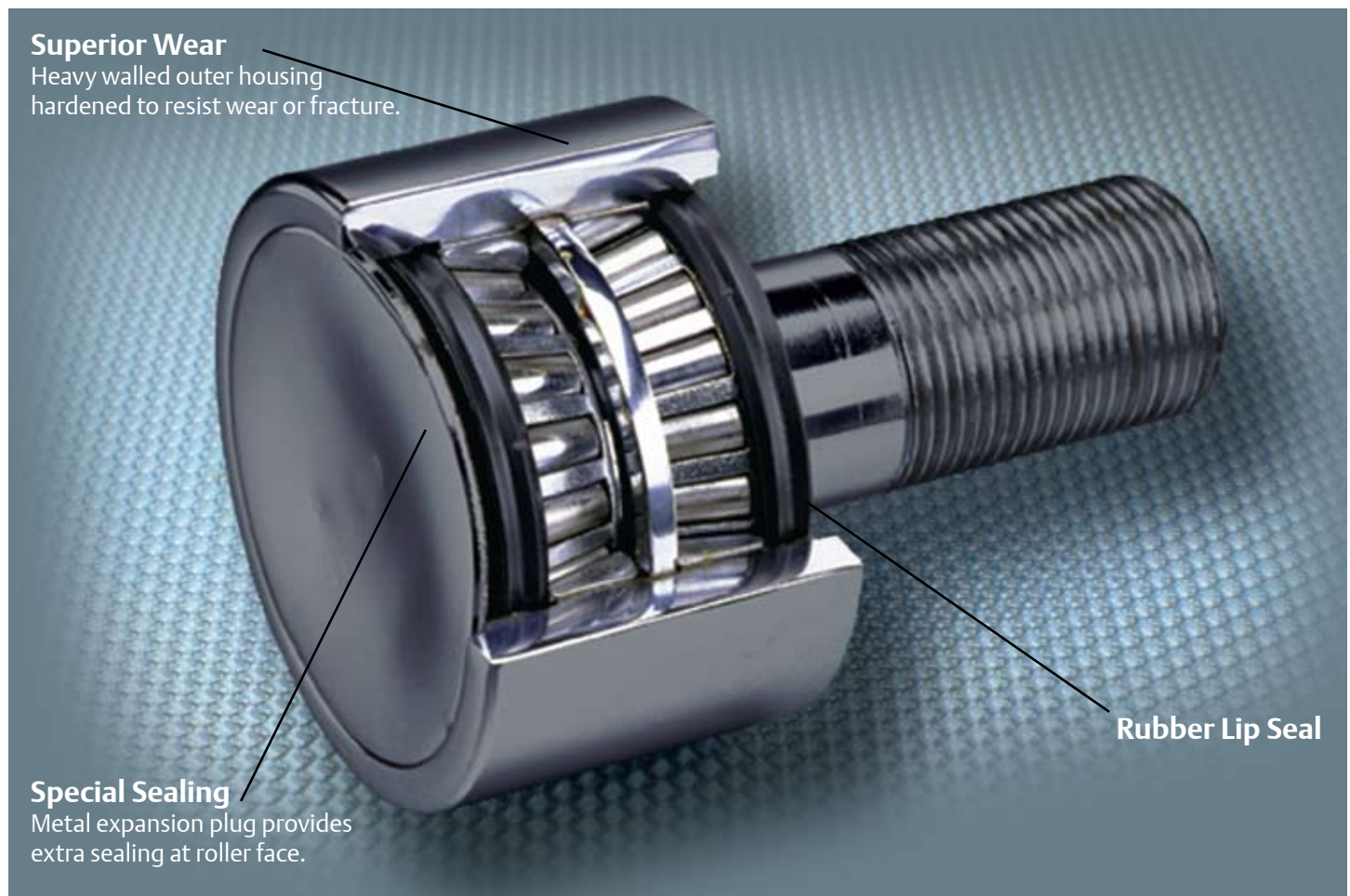
For part nomenclature, see page 19.

TRAKROL *Cam Follower Bearings*



TRAKROL Bearings for Thrust and Contamination

TRAKROL bearings feature a different design than CAMROL bearings to allow for heavier thrust loads. Smaller sizes (<3" OD or point diameter) use ball bearing inserts and larger sizes use tapered roller bearings to accept thrust loads.



Superior Wear

Heavy walled outer housing hardened to resist wear or fracture.

Special Sealing

Metal expansion plug provides extra sealing at roller face.

Rubber Lip Seal

Resists Contamination

Rubber lip seals help keep out contamination on the stud side of the bearing and a metal end plug seal helps protect the roller face.

Thrust Applications

Tapered roller bearing or ball bearing inserts allow for the heavier thrust capabilities of the TRAKROL bearing.

Maintenance Free

A large grease reservoir allows for longer life without relubrication.

Wide Selection

- Three OD types (plain, flanged and V-groove)
- Stud and yoke types
- Eccentric stud option available

Note: TRAKROL bearings are not always dimensionally interchangeable with CAMROL.



PCF Series



VCF Series



FCF Series

Yoke TRAKROL Bearings

Yoke TRAKROL bearings are designed for yoke (straddle) mounting on a shaft and utilize tapered roller bearings.

Available in three configurations.



VCYR Series

FCYR Series

PCYR Series

For part nomenclature, see page 19.

A History of Innovation... a Future in Helping You Stay Competitive

Precision Manufacturing

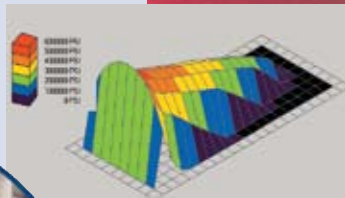
Because there are no industry-wide standards for tolerances on cam follower bearings, McGill has set its own demanding tolerances for CAMROL bearings. McGill uses statistical process control to help provide cam followers that are manufactured according to these exacting standards.

McGill was one of the first bearing manufacturers to receive ISO 9001 certification. ISO certification and the process it encompasses help McGill design and manufacture bearings to uniform quality standards. While others have tried to imitate the McGill design, only McGill has the precision, quality and performance that leads the industry.

Advanced Tools

McGill engineers use a wide variety of tools, such as computer analysis and sophisticated laboratory testing, to anticipate and design new solutions.

As applications push the limits of bearing performance, McGill engineers analyze and help prevent problems through failure analysis. Physical analysis, including scanning electron microscopy and internal and third party testing facilities, are available to help understand and diagnose problems, leading to cost effective solutions.



Engineering Excellence

Leveraging experience gained from developing high performance aerospace and industrial applications. McGill routinely designs and manufactures bearings up to Class 5 precision levels with exotic materials or coatings.

As developers of the first cam follower bearing, McGill's engineering team leads the industry in cam follower design. Extreme operating environments, changing size requirements, high temperature differentials, and caustic chemicals – McGill engineers respond with a complete selection of standard offerings and customized bearing solutions for your application challenges.



Professional Timely Service

McGill is known for a commitment to customer service:

- Inventories optimized to achieve excellent service fill rates
- Standard box, bulk and special packaging available to meet your needs
- Trained personnel to help solve problems quickly and accurately
- A comprehensive distribution network and a focus on quick delivery, enabling us to serve you efficiently
- A technical customer service group for technical issues and a general customer service group for all other concerns so you always have the right resources to help you resolve issues

McGill Needle Bearings

McGill machined race needle bearings are manufactured from bearing quality steel and available with multiple seal configurations. McGill needle bearings have a lubrication groove with radial holes on both the inner and outer rings for relubrication through the housing or shaft. Custom designs, lubricants and diametrical matching (-DS Suffix) are available.



MR 32 Shown

CAGEROL®

Bearings are available in two series.
Standard width MR 5/8" to 9 1/4" bore sizes
Narrow width MR-N 5/8" to 6 1/2" bore sizes

- Steel cage construction allowing for higher-speed operation, while providing roller guidance and a lubricant reservoir.
 - Crowned rollers, available on most sizes, reduce end stresses.
 - Available with optional inner ring (MI) which provides a hardened raceway for the rollers when used with an unhardened shaft.

GUIDEROL®

Bearings are available in two series.
Standard width GR sizes 5/8" to 9 1/4" bore sizes
Narrow width GR-N sizes 5/8" to 6 1/2" bore sizes

- Full complement needle bearing allowing for higher static load rating, rigidity, and shock resistance.
- Available with optional inner ring (MI) which provides a hardened raceway for the rollers when used with an unhardened shaft.



GR 32 SS with Inner Ring Shown

McGill Spherical Roller Bearings

McGill Spherical Bearings single row of spherical rollers provides a wide variety of advantages. The bearing design allows for higher capacities, higher-limiting speeds, longer life under more misalignment and protection from contaminant within the same envelope of ordinary two-row designs.



SB-22207-W33-SS Shown

SPHERE-ROL®

Bearings are available in two series (tapered bore optional):
22200 series - 20mm to 150mm bore sizes
22300 series - 40mm to 100mm bore sizes

- Sealed SPHERE-ROL bearing dimensions meet ABMA/ISO specifications. Choose from three seal types:
 - NYLAPLATE® seal
 - NYLAPLATE® high temperature seal
 - LAMBDA® seal
- Dimensionally interchangeable with conventional double row spherical roller bearings.
- Spherical rollers increase dynamic load capacity and misalignment of conventional double row spherical roller bearings.

Cam Follower Nomenclature Chart

Series	Type	Internal Construction	Size Specification	Seal	Mounting Method	O.D. Configuration
Camrol Bearings						
CF	Standard Stud	Full Complement Needle Rollers	Roller Diameter in Inches	Unsealed	Screwdriver Slot	Cylindrical
CF-S				Lubri-Disc		Crowned
CCF-S				Hex Hole	Unsealed	Cylindrical
CF-B					Lubri-Disc	Crowned
CF-SB					Unsealed	Cylindrical
CCF-SB	Eccentric Stud			Lubri-Disc	Crowned	
CFE-B				Unsealed	Cylindrical	
CFE-SB				Lubri-Disc	Crowned	
CCFE-SB	Heavy Stud			Unsealed	Screwdriver Slot	Cylindrical
CFH				Lubri-Disc	Crowned	
CFH-S		Hex Hole	Unsealed	Cylindrical		
CCFH-S			Lubri-Disc	Crowned		
CFH-B			Unsealed	Cylindrical		
CCFH-SB	Yoke	Lubri-Disc	Yoke	Cylindrical		
CYR		Unsealed	Cylindrical			
CYR-S		Lubri-Disc	Crowned			
CCYR-S						
Bushing Camrol Bearings						
BCF-S	Standard Stud	Bushing	Roller Diameter in Inches	Lubri-Disc	Screwdriver Slot	Cylindrical
BCF-SB					Hex Hole	Crowned
BCCF-SB					Yoke	Cylindrical
BCYR-S	Yoke					
CRES Camrol Bearings						
CF-SB CR	Standard Stud	Full Complement Needle Rollers	Roller Diameter in Inches	Lubri-Disc or Lubri-Disc +	Hex Hole	Cylindrical
CFE-SB CR	Eccentric Stud					
CYR-S CR	Yoke				Yoke	
Heavy-Duty Camrol Bearings						
CFD	Standard Stud	Double Row Cylindrical Rollers	Roller Diameter in Inches	Rubber Lip	Hex Hole	Cylindrical
CCFD					Crowned	
CYRD	Yoke				Yoke	Cylindrical
CCYRD		Crowned				
Special-Duty Camrol Bearings						
SDCF	Standard Stud	Caged Needle Rollers	Roller Diameter in Inches	End Plug and Lubri-Disc +	Hex Hole	Cylindrical
Metric Camrol Bearings						
MCF	Standard Stud	Full Complement Needle Rollers	Roller Diameter in Millimeters	Unsealed	Screwdriver Slot	Crowned
MCF-S				Lubri-Disc		Cylindrical
MCF-SX		Caged Needle Rollers		Unsealed		Crowned
MCFR				Lubri-Disc	Cylindrical	
MCFR-S					Hex Hole	Crowned
MCFR-SX		Cylindrical				
MCF-SB		Full Complement Needle Rollers		Crowned		
MCF-SBX				Cylindrical		
MCFR-SB		Caged Needle Rollers		Crowned		
MCFR-SBX				Cylindrical		
MCFE-SB	Eccentric Stud	Full Complement Needle Rollers	Crowned			
MCFRE-SB		Caged Needle Rollers				
MCYR	Yoke	Full Complement Needle Rollers	Bore Diameter in Millimeters	Unsealed	Yoke	Crowned
MCYR-S				Lubri-Disc		Cylindrical
MCYR-SX		Caged Needle Rollers		Unsealed		Crowned
MCYRR				Lubri-Disc	Cylindrical	
MCYRR-S						
MCYRR-SX						
Metric Heavy-Duty Camrol Bearings						
MCFD	Standard Stud	Double Row Cylindrical Rollers	Roller Diameter in Millimeters	Metal Shield	Screwdriver Slot	Crowned
MCFD-X			Cylindrical			
MCYRD	Yoke		Bore Diameter in Millimeters		Yoke	Crowned
MCYRD-X		Cylindrical				
Metric Special-Duty Camrol Bearings						
SDMCF	Standard Stud	Caged Needle Rollers	Roller Diameter in Millimeters	End Plug and Lubri-Disc +	Hex Hole	Cylindrical
Trakrol Bearings						
PCF	Standard Stud	Ball or Tapered Roller Bearings	Roller Diameter in Inches	Rubber Lip and End Plug	Hex Hole	Cylindrical
PCFE	Eccentric Stud					
FCF	Standard Stud		Point Diameter in Inches			V-Grove
FCFE	Eccentric Stud					
VCF	Standard Stud					
VCFE	Eccentric Stud					
PCYR	Yoke	Tapered Roller Bearings	Roller Diameter in Inches	Rubber Lip	Yoke	Cylindrical
FCYR			Point Diameter in Inches			Flanged
VCYR						V-Grove

Bearing Selection is Easy with...

EPT

EDGE Online

www.emerson-ept.com

With a full suite of user-friendly, online tools and expert technical support to help with application design and bearing installation, McGill helps you choose the right bearing type and options to save time and money.

Utilizing EPT Edge[®], Emerson's online technical support center, your engineers can receive help to specify the correct bearing size for their application parameters. This is one of the first online programs of its kind to eliminate manual computations and help prevent over or under sizing bearings for your application.

Additional eTools include:

■ **eCatalog** – an interactive electronic product database with over 100,000 part numbers to make online ordering easy and efficient

■ **Smart Interchange** – an exclusive patented online tool that provides an intelligent interchange for competitive parts (patent # 7,272,618)

■ **Media Library** – electronic catalogs, documents and installation and maintenance instructions

■ **Online CAD service** for viewing and uploading 2D and 3D CAD template drawings in a variety of formats to be integrated into your drawings.

**Contact McGill for all
your bearing needs.**

**MCGF
ID# MCC08004 • Printed in U.S.**

APPLICATION CONSIDERATIONS

The proper selection and application of power transmission products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Emerson Power Transmission Corporation and its divisions with respect to the use of products and components is given in good faith and without charge, and Emerson assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

For a copy of our Standard Terms and Conditions of Sale, Disclaimers of Warranty, Limitation of Liability and Remedy, please contact Emerson Power Transmission Customer Service at 1-800-626-2120. These terms and conditions of sale, disclaimers and limitations of liability apply to any person who may buy, acquire or use an Emerson Power Transmission Corporation product referred to herein, including any person who buys from a licensed distributor of these branded products.

