

Heim rod ends and spherical plain bearings are intended for linkage applications where a bearing must accommodate significant misalignment. While spherical plain bearings offer flexibility in housing and mounting design, the user bears the responsibility for housing design and the cost of housing manufacture. Rod ends offer greater mounting convenience and provide a compact, lightweight, economical design alternative to the spherical plain bearing. Heim Bearings Company offers the industry's widest selection of rod end types and sizes.

### Rod End Construction

Heim offers three basic rod end constructions. The **four piece rod end** uses race inserts, typically of brass, to provide lubricity in the bearing area. This design offers reduced internal clearance, and provides smoother operation. It is ideal for dynamic applications. The **two piece rod end** uses a rod end body which is formed around a spherical ball. The comparatively heavy cross section of the rod end body in the two piece design provides high strength. This makes the two piece rod end ideal for highly loaded, static applications where high strength is required. The **cartridge type rod end** consists of a spherical plain bearing mounted in a rod end body. This design allows the optimum selection of materials for ball, race and rod end body. The cartridge type rod end can also accommodate a PTFE liner for self-lubrication. This design is best suited for aircraft and military applications where material selection is a primary design consideration.

### Self-lubricating Rods Ends

Heim produces metal-to-metal rod ends and self-lubricating rod ends. All metal-to-metal rod ends, including brass insert four piece types, require regular lubrication. This can be accomplished by splash or immersion oil lubrication, or by greasing through optional lubricators (grease fittings). Self-lubricating types are used where relubrication is not practical, or in applications where relubrication is not desirable, such as on food processing machinery or in clean environments. Heim self-lubricating rod ends are available with bonded PTFE fabric liners, or with molded, engineered thermoplastic race inserts.



### Rod End Grades

Heim rod ends are offered in four grades: precision, commercial, aircraft, and military. **Precision** rod ends are manufactured to tight tolerances for applications requiring improved linkage accuracy and reduced looseness. **Commercial** rod ends are produced using standard materials and manufacturing methods, and are an economical choice for industrial applications. **Aircraft** rod ends use premium materials, and have magnaflexed rod end bodies. Originally intended for aircraft applications, aircraft rod ends are used in many industrial applications where a high degree of reliability is required. **Military** rod ends are produced in strict accordance with all applicable military specifications and are typically used in military and commercial aviation applications, or when Mil-Spec approval is required.

*Precision Rod Ends* Grade HM and HF four piece precision rod ends use brass race

inserts for lubricity and clearance control. They are produced to tight tolerances for applications requiring a more precise rod end; for example, a linkage where positioning accuracy is essential. These rod end bodies and balls are plated for corrosion resistance. Series BHM, HFX G and HMX G four piece precision extra capacity rod ends are the high strength series intended for more heavily loaded, static and dynamic industrial applications. These rod ends have heat treated bodies for increased strength and aluminum bronze race inserts for high bearing capacity. The rod end bodies are protective coated for corrosion resistance and the balls are chrome plated for superior wear and corrosion resistance. Series BHM (male) and series HFX G (female) have common thread sizes. Series HMX G (male) have oversized shanks for additional shank strength.

- Series HM and HF: pages 6-7
- Series BHM, HFX G and HMX G: pages 8-9

## HEIM UNIBAL® ROD ENDS

### ROD END QUICK SELECTION GUIDE

Series Size Range	Product Features	Customer Benefits	Common Applications
HM, HF 3/16" to 1"	Precision Grade Brass Inserts Four Piece Construction	Low Friction, Long Dynamic Life, Smooth Feel, Good Conformity	Control Linkages, For Reduced Play, Accelerator Linkages
BHM, HFX G, HMX G 1/4" to 3/4"	Precision Grade Aluminum Bronze Inserts, High Strength Body, Four Piece Construction	High Capacity Version	Heavy Duty Applications
HM C, HF C 3/16" to 3/4"	Commercial Grade Brass Inserts Four Piece Construction	Low Friction, Long Dynamic Life, Smooth Feel, Good Conformity	Packaging Machine Linkages
M CR, F CR 3/16" to 3/4"	Commercial Grade Two Piece Construction	High Loads, Reversing Loads, Shock Loads, Cost Effective	Brake and Clutch Pedals For Heavy Machinery, Satellite Dish Controls
CMHD, CFHD 3/16" to 3/4"	Commercial Grade Self Lubricating Thermoplastic Race, Maximum Temperature 125°F	Maintenance Free	Food Processing, Paper Machinery, Bus Door Closures



HEIM SERIES	PAGE	LOADING					PRECISION RESISTANCE	SELF-LUBRICATING MIL-SPEC MIL-541035	MAXIMUM TEMPERATURE	SIZE RANGE	RACE MATERIAL	DESIGN
		STATIC	OSCILLATING REVERSING	SHOCK	PRECISION RESISTANCE	SELF-LUBRICATING						
COMMERCIAL AND PRECISION	HM HF	4-7	⊖	⊖	⊖	⊖	⊖		250°F	3/16" to 1"	BRASS	FOUR PIECE
	BHM HFX G HMX G	4-7	●	●	●	✓	⊖		250°F	1/4" to 3/4"	ALUMINUM BRONZE	
	HM C HF C	8-11	⊖	⊖	⊖	⊖	⊖		250°F	3/16" to 3/4"	BRASS	
	M CR F CR	8-11	⊖	⊖	⊖	⊖	⊖		250°F	3/16" to 3/4"	STEEL	
	CMHD CFHD	12-13	⊖	⊖	⊖	⊖	✓		125°F	3/16" to 3/4"	THERMO- PLASTIC	TWO PIECE
AIRCRAFT AND MILITARY	HM M HF M	14-17	⊖	⊖	⊖	✓	⊖		250°F	1/8" to 1"	BRASS	FOUR PIECE
	M M F M	14-17	⊖	⊖	⊖	✓	⊖		250°F	3/16" to 1/4"	BRASS	
	HME M HFE M	18-19	⊖	⊖	⊖	✓	✓		250°F	3/16" to 1"	PTFE	
	ME FE	20-23	●	●	●	●	✓		350°F	3/16" to 1"	PTFE	CARTRIDGE

*Commercial Rod Ends* Series HM C and HF C four piece commercial rod ends use Heim's classic brass race insert design for lubricity and clearance control. These rod ends are preferred for dynamic applications. Heim commercial rod ends have zinc plated bodies and nickel plated balls for corrosion resistance. Series M CR and F CR two piece commercial rod ends offer high strength for heavy static loads. Heim's unique manufacturing process for two piece rod ends yields the industry's best conformity between ball and body for maximum bearing capacity.

- Series HM C and HF C: pages 10-11
- Series M CR and F CR: pages 12-13

Series CMHD & CFHD self-lubricating commercial rod ends use an engineered thermoplastic race for applications where relubrication is not practical or desirable. The rod end body and ball are plated for corrosion resistance. This series is also available in stainless steel for superior corrosion resistance.

- Series CMHD and CFHD: page 15

*Aircraft Rod Ends* Series HM M and HF M four piece aircraft rod ends have magnaflexed rod end bodies for a high degree of assurance of rod end integrity. The bearing surface is a chrome plated ball on brass race inserts. This series was originally intended for general aviation applications and is also used in many industrial applications where rod end reliability is critical. Series M M and F M special purpose aircraft rod ends use materials and construction identical to series HM M and HF M but have different dimensions. Series HME M and HFE M self lubricating aircraft rod ends use Heim's UNIFLON® PTFE liner and cartridge type construction. The Heim UNIFLON® PTFE liner is approved to SAE-AS81820 (formerly MIL-B-18820).

- Series HM M and HF M: pages 16-17
- Series M M and F M: pages 18-19
- Series HME M and HFE M: pages 20-21

*Military Rod Ends* Series ME and FE mil-spec rod ends use Heim's Type E UNIFLON® PTFE liner and cartridge type construction. Rod end bodies are made from 4340 alloy

steel, heat treated to SAE-AMS-H-6875 (formerly MIL-H-6875), and are cadmium plated. The outer races are made from heat treated 17-4PH stainless steel (ASM 5643). The balls are made from heat treated 440C stainless steel (AMS 5630). The Heim UNIFLON® PTFE liner is approved to SAE-AS81820 (formerly MIL-B-81820). The ME and FE series mil-spec aircraft rod ends are approved to SAE-AS81935 (formerly MIL-B-81935). These premium rod ends are primarily intended for use in commercial and military aviation applications.

- Series ME: pages 22-23
- Series FE: pages 24-25

**Metric Rod Ends** Series SM, SMG, SF and SFG four piece, precision, metric rod ends use brass race inserts for lubricity and clearance control. They are produced to tight tolerances for applications where a precision rod end is required in a metric size. The two piece construction offers the added benefit of high strength for high loads. Heim also offers a wide variety of other metric rod ends. Contact Heim for availability and specifications.

- Series SMG and SFG: Pages 26-27

### Optional Rod End Features

Heim rod ends are available with male and female threaded shanks. Standard rod ends have right hand threads. Left hand threads are available as an option. Lubricators are standard on selected series and are available as an option on all other series. Shank keyways are optionally available on most series to engage lock washer tangs. A wide range of other optional features includes plain shanks and special plating.