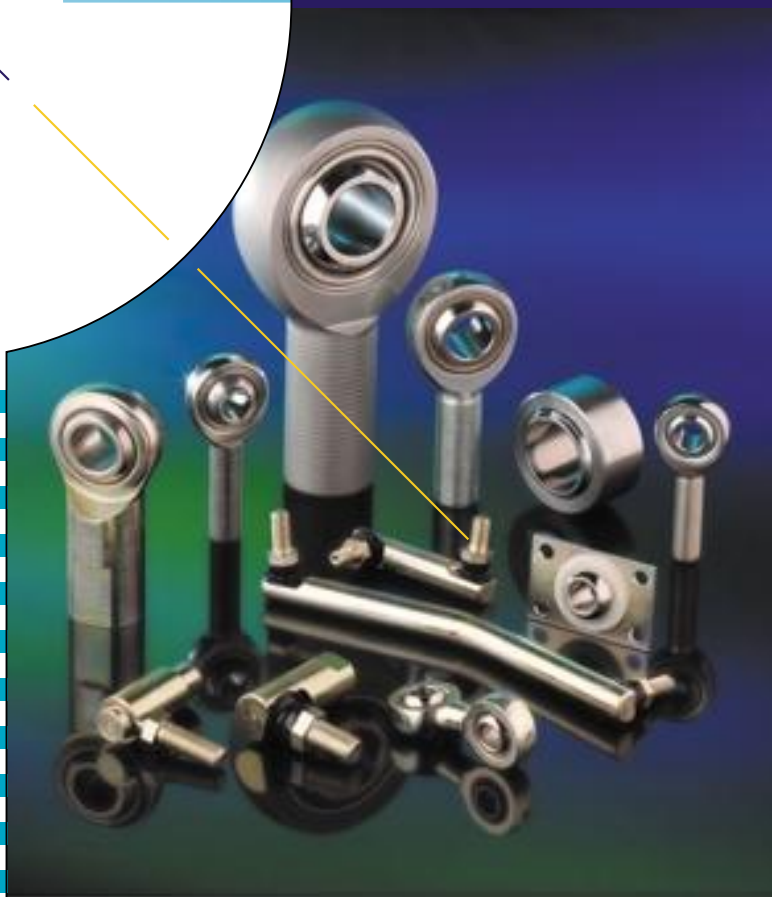
TUTHILL

LINKAGE

GROUP





Introduction

Tuthill Linkage Group (TLG) is one of the world's leading producers of rod ends, spherical bearings, ball joints, linkage assemblies and mechanical control components. Through diversification, strategic acquisitions, and internal growth, Tuthill Linkage Group has evolved into a multinational manufacturing and marketing organization with four manufacturing facilities in the United States and the United Kingdom. Sales offices and branches are strategically located around the globe.

Elk Grove Village, IL



TLG manufactures a wide range of linkage solutions through its four product companies: Superior Linkage, J.J. Tourek, National Rod Ends, and Tuthill Controls Ltd. With over 125 years of combined manufacturing experience, together they produce rod ends, ball joints, spherical bearings and linkages for an equally wide variety of applications. From agriculture to transportation, from racing cars to lawn and garden equipment, and from construction equipment to printing machinery TLG can provide cost effective, performance engineered solutions to the most demanding motion transfer needs. You may also visit our web site at www.tuthill.com.





Mendota Heights, MN



New Haven, IN



Reading, UK



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*A trademark of E.I. DuPont de Nemours & Co., Inc.

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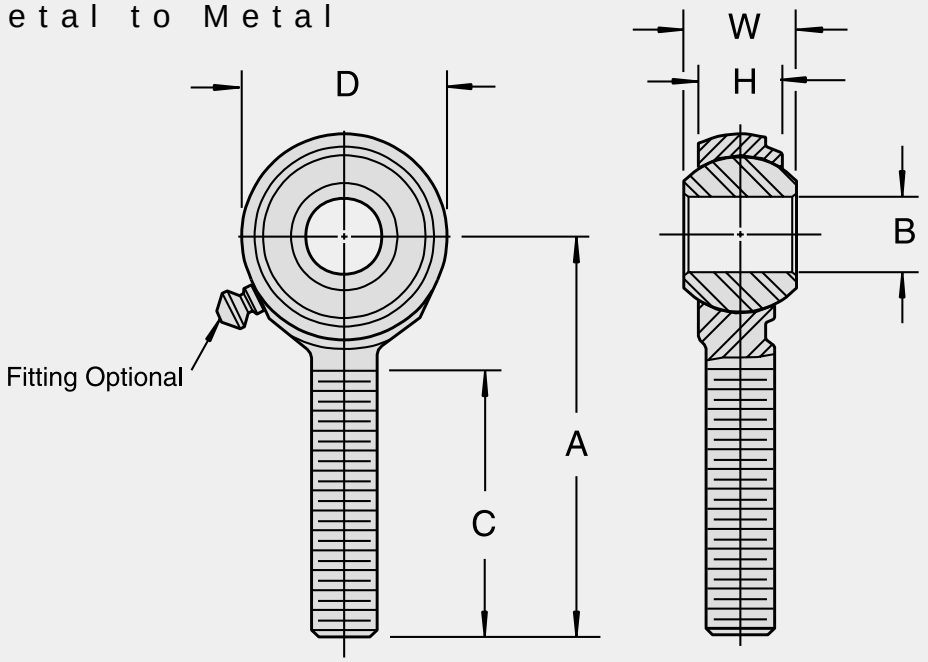
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*A trademark of E.I. DuPont de Nemours & Co., Inc.

EM

Commercial, 2-Piece Metal to Metal





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	REF	C ± .060	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM4	**EML4**	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2,510	.043
EM5	**EML5**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	3,430	.073
EM6	**EML6**	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	5,520	.110
EM8	**EML8**	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	8,690	.240
EM10	**EML10**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	10,300	.368

MATERIALS

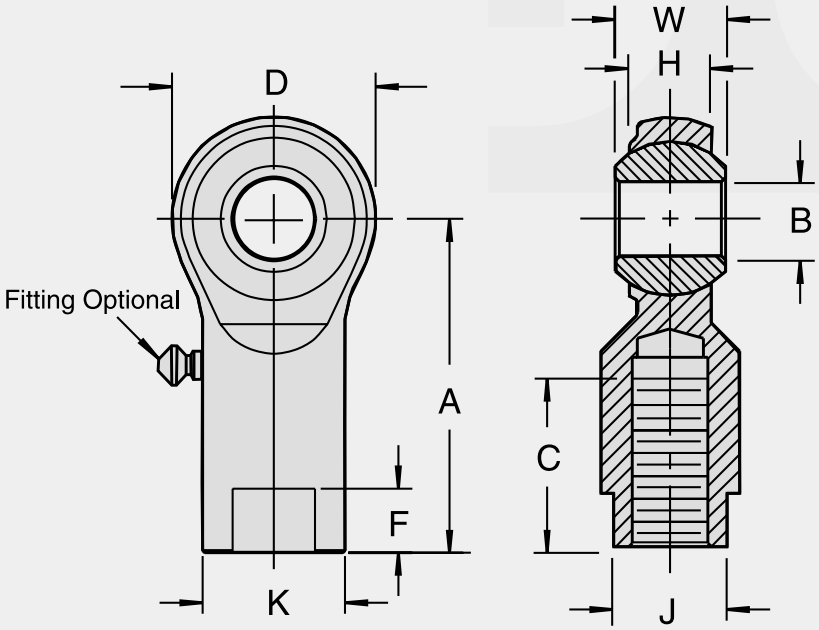
Ball	Body
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix.
   Example: EM8Z
2. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66).
   Specify by adding “S” to suffix.
   Example: EM8S

EF

Commercial, 2-Piece Metal to Metal





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	K ± .015	J ± .015	F ± .030	REF	C ± .060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
EF4	**EFL4**	.2500	.375	.281	1.312	.750	.469	.375	.250	.516	.687	1/4-28	3,470	.062
EF5	**EFL5**	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.687	5/16-24	4,680	.081
EF6	**EFL6**	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.812	3/8-24	5,520	.152
EF8	**EFL8**	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	9,460	.324
EF10	**EFL10**	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.406	5/8-18	10,300	.473

MATERIALS

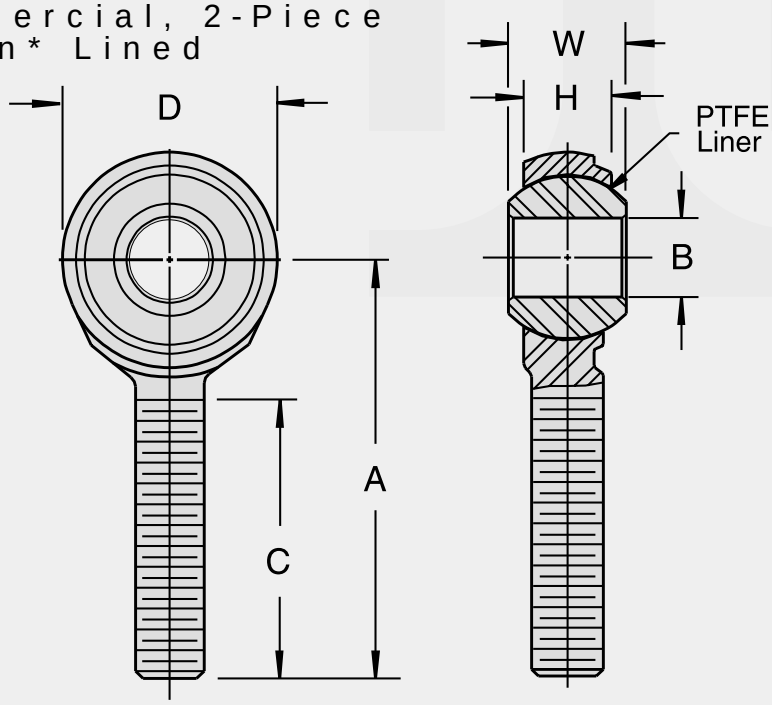
Ball	Body
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix.
   Example: EF8Z
2. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66).
   Specify by adding “S” to suffix.
   Example: EF8S

EM-T

Commercial, 2-Piece
Teflon* Lined





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	REF	C ± .060	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM4T	**EML4T**	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2400	.042
EM5T	**EML5T**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	3100	.071
EM6T	**EML6T**	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	3800	.108
EM8T	**EML8T**	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	7900	.237
EM10T	**EML10T**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	8300	.365

MATERIALS

Ball	Body	Liner
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

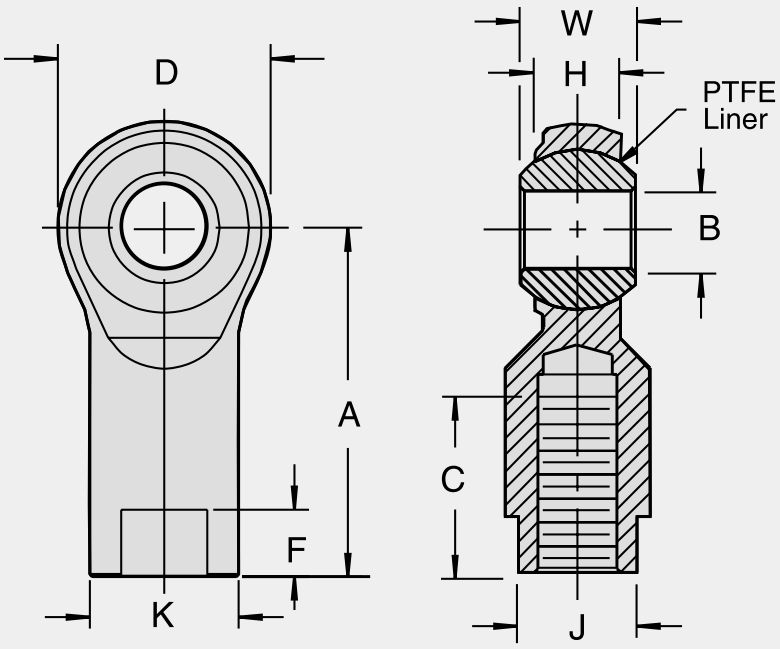
*A trademark of E.I. DuPont de Nemours & Co., Inc.

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: EM8TS

EF-T

Commercial, 2-Piece
Teflon* Lined





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	K ± .015	J ± .015	F ± .030	REF	C ± .060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
EF4T	**EFL4T**	.2500	.375	.281	1.312	.750	.469	.375	.250	.516	.687	1/4-28	2700	.059
EF5T	**EFL5T**	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.687	5/16-24	3900	.079
EF6T	**EFL6T**	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.812	3/8-24	4600	.151
EF8T	**EFL8T**	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	8500	.320
EF10T	**EFL10T**	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.406	5/8-18	8900	.465

MATERIALS

Ball	Body	Liner
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

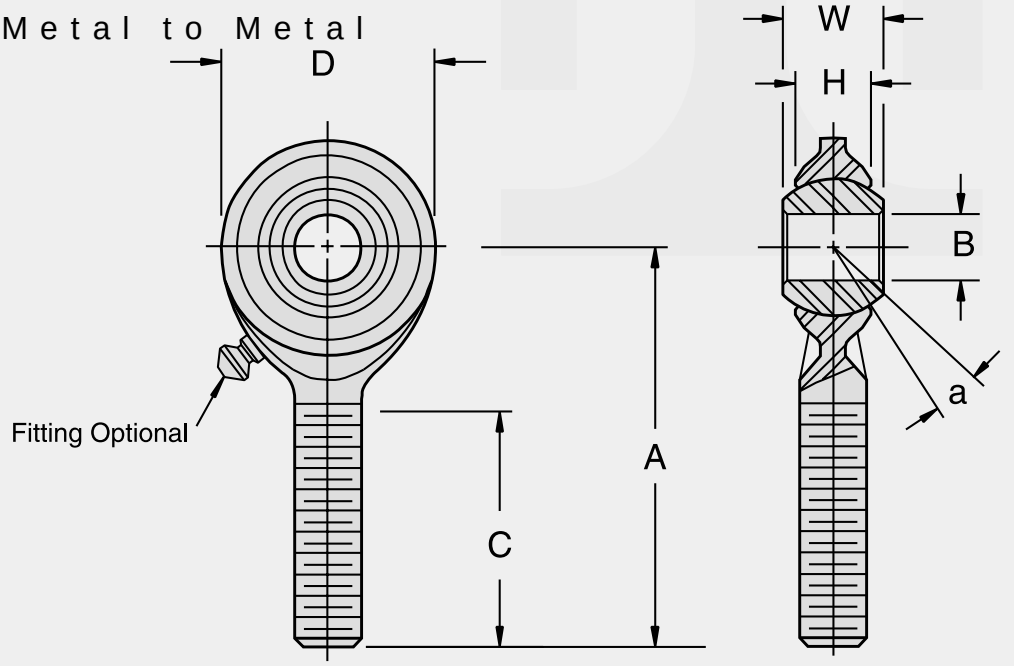
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: EF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MSM

Precision, 2-Piece,
Metal to Metal





Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSM3*	**MSML3***	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	1,170	.03
MSM4*	**MSML4***	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	2,157	.04
MSM5*	**MSML5***	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	3,469	.07
MSM6	**MSML6**	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	4,916	.11
MSM7	**MSML7**	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	6,162	.15
MSM8	**MSML8**	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	8,075	.24
MSM10	**MSML10**	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	9,509	.36
MSM12	**MSML12**	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	18	13,831	.57

MATERIALS

Ball	Body
52100 Steel	Low Carbon Steel
Rc 56 Min.	Zinc Plated
Hard Chrome Plated	Clear Chromate Treated

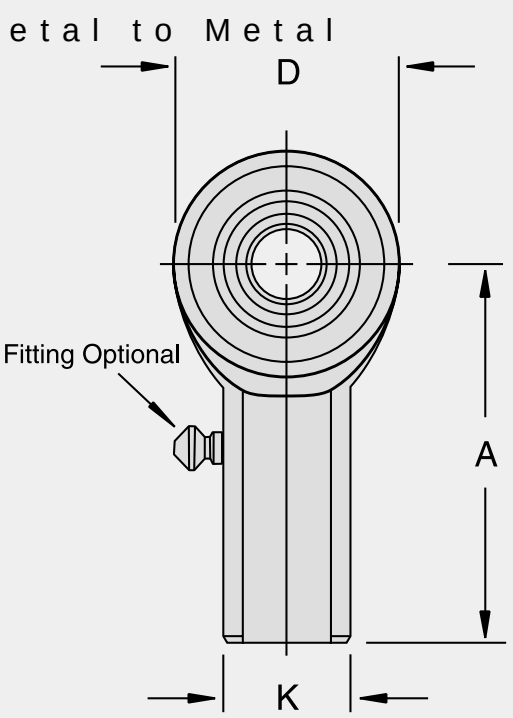
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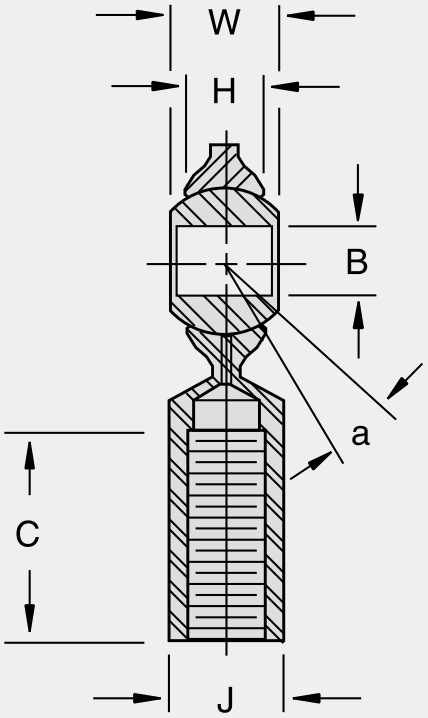
1. For standard zerk lubrication fitting add “Z” to suffix.
   Example: MSM8Z
2. This series is also available in a studded configuration.
   (Refer to chart on page 66). Specify by adding “S” to suffix.
   Example: MSM8S

*Lubrication fittings are not supplied on these units

MSF

Precision, 2-Piece,
Metal to Metal







Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSF3*	**MSFL3***	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	2,028	.04
MSF4	**MSFL4**	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	3,114	.05
MSF5	**MSFL5**	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	3,721	.08
MSF6	**MSFL6**	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	4,929	.13
MSF7	**MSFL7**	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	6,215	.18
MSF8	**MSFL8**	.5000	.625	.453	2.125	1.312	.875	.750	.937	1.062	1/2-20	17	8,779	.29
MSF10	**MSFL10**	.6250	.750	.484	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	22	9,509	.43
MSF12	**MSFL12**	.7500	.875	.593	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	18	13,831	.65

MATERIALS

Ball	Body
52100 Steel	Low Carbon Steel
Rc 56 Min.	Zinc Plated
Hard Chrome Plated	Clear Chromate Treated

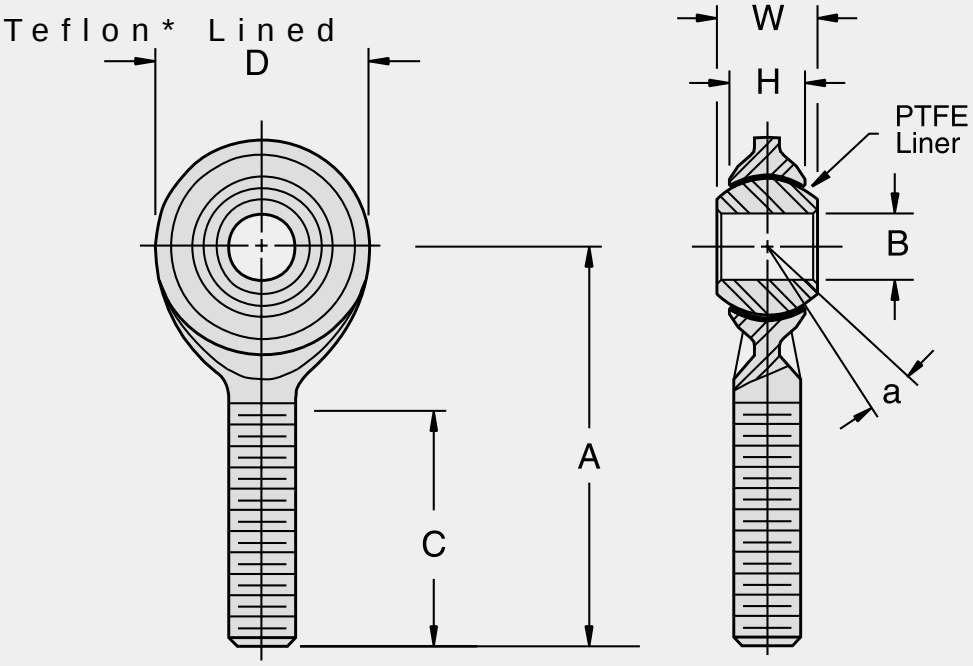
NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix.
   Example: MSF8Z
2. This series is also available in a studded configuration.
   (Refer to chart on page 66). Specify by adding “S” to suffix.
   Example: MSF8S

*Lubrication fittings are not supplied on these units

MSM-T

Precision, 2-Piece,
Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A +.015	D ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSM3T	**MSML3T**	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	894	.03
MSM4T	**MSML4T**	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	1,792	.04
MSM5T	**MSML5T**	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	2,844	.07
MSM6T	**MSML6T**	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	4,124	.11
MSM7T	**MSML7T**	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	5,262	.15
MSM8T	**MSML8T**	.5000	.625	.453	2.438	1.312	.875	1.500	1/2-20	17	7,106	.24
MSM10T	**MSML10T**	.6250	.750	.484	2.625	1.500	1.062	1.625	5/8-18	22	8,282	.36
MSM12T	**MSML12T**	.7500	.875	.593	2.875	1.750	1.250	1.750	3/4-16	18	12,295	.57

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Permanently bonded to body I.D.

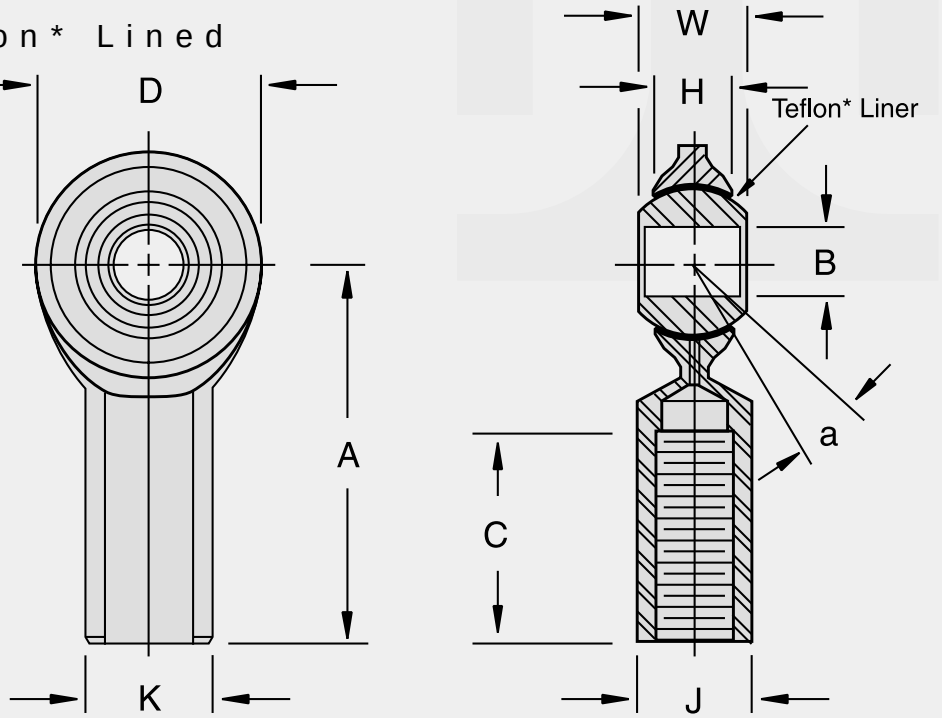
*A trademark of E.I. DuPont de Nemours & Co., Inc.

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: MSM8TS

MSF-T

Precision, 2-Piece,
Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSF3T	**MSFL3T**	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	1,549	.04
MSF4T	**MSFL4T**	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	2,587	.05
MSF5T	**MSFL5T**	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	3,051	.08
MSF6T	**MSFL6T**	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	4,135	.13
MSF7T	**MSFL7T**	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	5,307	.18
MSF8T	**MSFL8T**	.5000	.625	.453	2.125	1.312	.875	.750	.875	1.062	1/2-20	17	7,725	.29
MSF10T	**MSFL10T**	.6250	.750	.484	2.500	1.500	1.000	.875	1.062	1.375	5/8-18	22	8,282	.43
MSF12T	**MSFL12T**	.7500	.875	.593	2.875	1.750	1.125	1.000	1.250	1.562	3/4-16	18	12,295	.65

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Permanently bonded to body I.D.

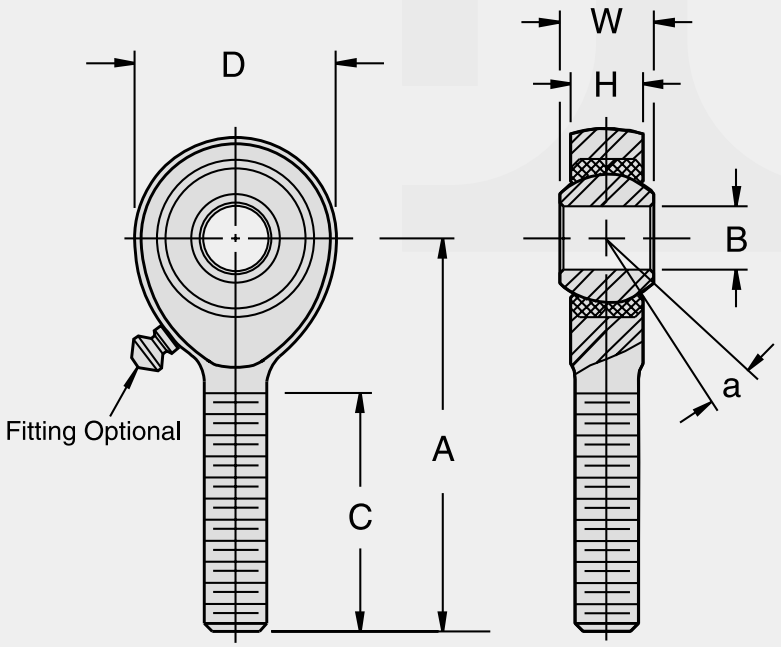
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: MSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MBM

4-Piece, Bronze Race, Oil Impregnated





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MBM3	**MBML3**	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MBM4	**MBML4**	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MBM5	**MBML5**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MBM6	**MBML6**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MBM7	**MBML7**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MBM8	**MBML8**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MBM10	**MBML10**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MBM12	**MBML12**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602

MATERIALS

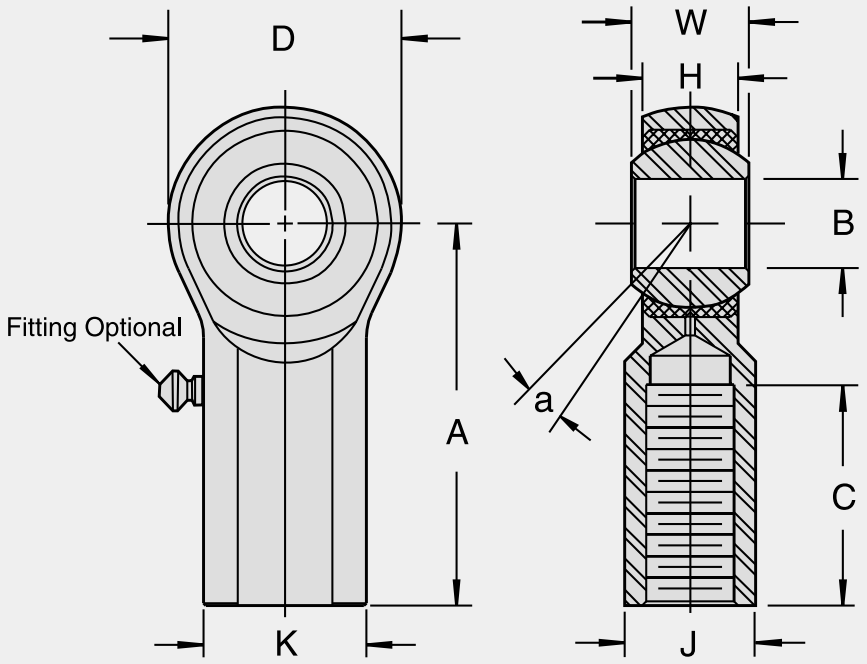
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: MBM7Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: MBM8S

MBF

4-Piece, Bronze Race, Oil Impregnated





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MBF3	**MBFL3**	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MBF4	**MBFL4**	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MBF5	**MBFL5**	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MBF6	**MBFL6**	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MBF7	**MBFL7**	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MBF8	**MBFL8**	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MBF10	**MBFL10**	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MBF12	**MBFL12**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723

MATERIALS

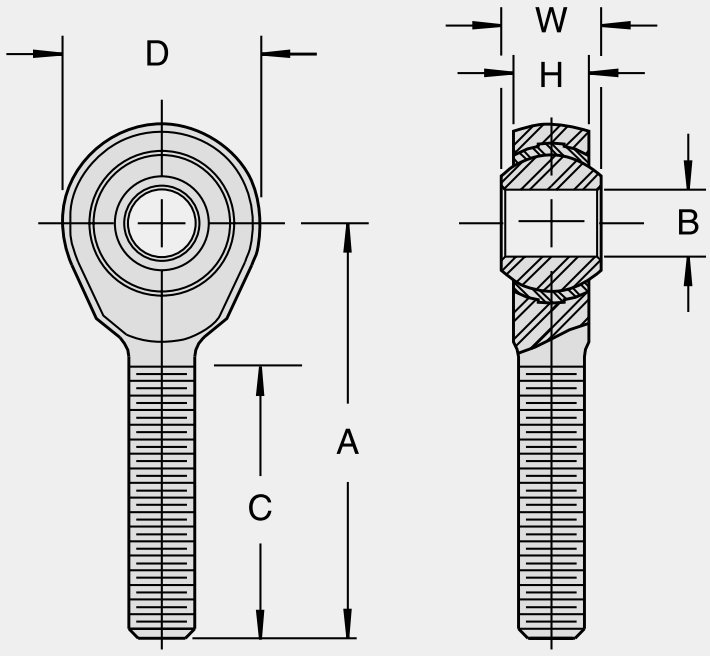
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: MBF7Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: MBF8S

SPM

Molded Race, Self Lubricating





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	REF	C ± .060	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
SPM3	**SPML3**	.1900	.312	.250	1.250	.625	.438	.750	10-32	1210	.023
SPM4	**SPML4**	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2470	.040
SPM5	**SPML5**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	2740	.071
SPM6	**SPML6**	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	4210	.107
SPM7	**SPML7**	.4375	.562	.437	2.125	1.125	.812	1.312	7/16-20	5350	.148
SPM8	**SPML8**	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	6430	.232
SPM10	**SPML10**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	8300	.364
SPM12	**SPML12**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	10900	.568

MATERIALS

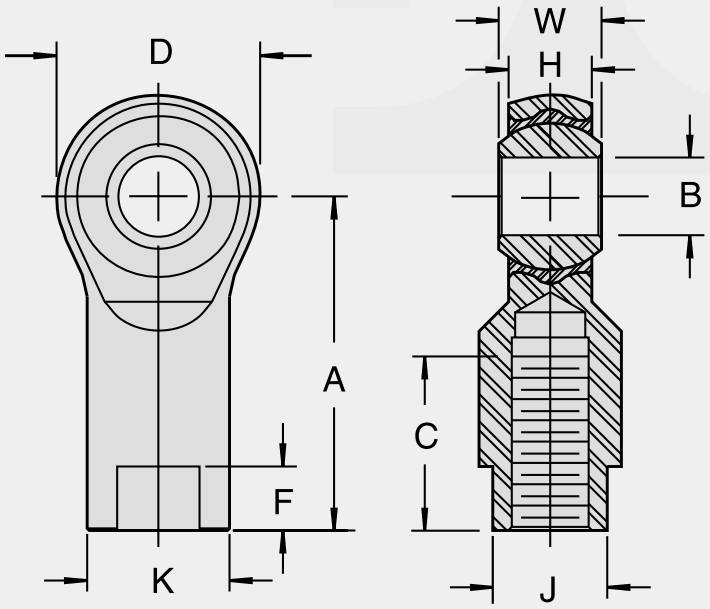
Ball	Body	Race
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Self Lubricating Reinforced Nylon

NOTES:

1. This series features a molded race compound designed to provide low friction, low moisture absorbing properties and high wear resistance.
2. This series is also available in a studded configuration. (Refer to chart in this catalog, on page 66) Specify by adding “S” to suffix.
   Example: SPM8S

SPF

Molded Race, Self Lubricating





Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ± .015	K ± .015	J ± .015	F ± .030	REF	C ± .060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
SPF3	**SPFL3**	.1900	.312	.250	1.062	.625	.406	.312	.406	.438	.562	10-32	1210	.036
SPF4	**SPFL4**	.2500	.375	.281	1.312	.750	.469	.375	.281	.516	.750	1/4-28	2470	.059
SPF5	**SPFL5**	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.750	5/16-24	2740	.077
SPF6	**SPFL6**	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.937	3/8-24	4100	.146
SPF7	**SPFL7**	.4375	.562	.437	1.812	1.125	.750	.625	.625	.812	1.031	7/16-20	5350	.192
SPF8	**SPFL8**	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	6430	.313
SPF10	**SPFL10**	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.500	5/8-18	8300	.464
SPF12	**SPFL12**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.000	1.312	1.562	3/4-16	10900	.672

MATERIALS

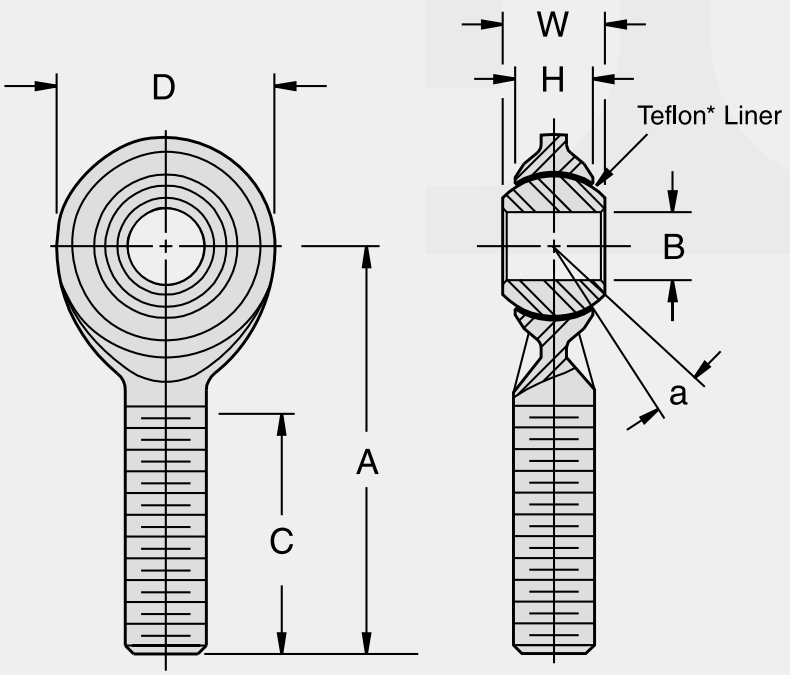
Ball	Body	Race
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Self Lubricating Reinforced Nylon

NOTES:

1. This series features a molded race compound designed to provide low friction, low moisture absorbing properties and high wear resistance.
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix.
   Example: SPF8S

SSM-T

2-Piece, Stainless Steel, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSM3T	**SSML3T**	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	900	.03
SSM4T	**SSML4T**	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	1,350	.04
SSM5T	**SSML5T**	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	2,000	.07
SSM6T	**SSML6T**	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	3,000	.11
SSM7T	**SSML7T**	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	3,750	.15
SSM8T	**SSML8T**	.5000	.625	.453	2.438	1.312	.875	1.500	1/2-20	17	4,650	.24
SSM10T	**SSML10T**	.6250	.750	.484	2.625	1.500	1.062	1.625	5/8-18	22	5,850	.36
SSM12T	**SSML12T**	.7500	.875	.593	2.875	1.750	1.250	1.750	3/4-16	18	7,500	.57

MATERIALS

Ball	Body	Liner
440C Stainless Steel Heat Treated	Type 303 Stainless Steel	Teflon* Permanently Bonded to Body I.D.

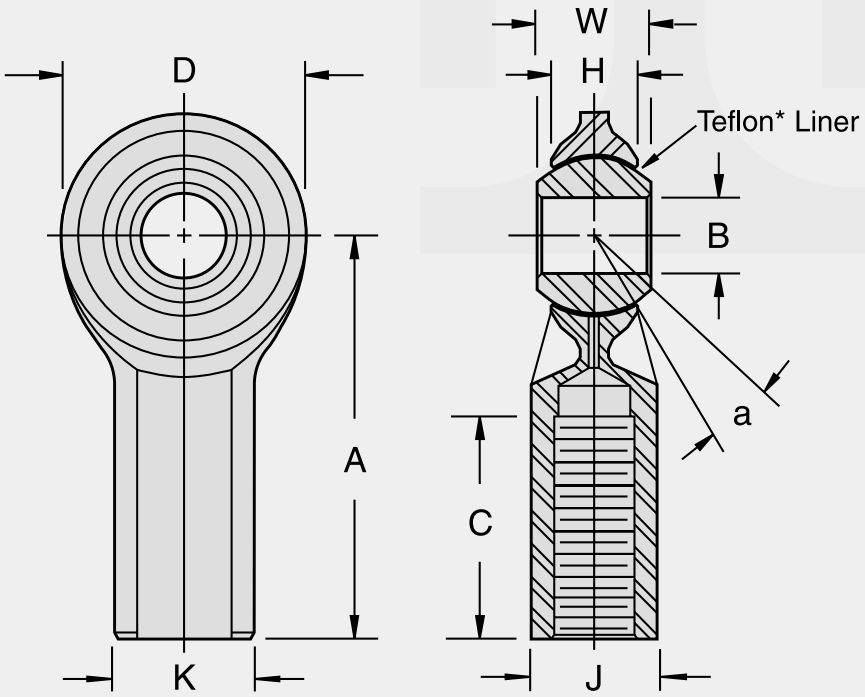
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: SSM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSF-T

2-Piece, Stainless Steel, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSF3T	**SSFL3T**	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	900	.04
SSF4T	**SSFL4T**	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	1,350	.05
SSF5T	**SSFL5T**	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	2,000	.08
SSF6T	**SSFL6T**	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	3,000	.13
SSF7T	**SSFL7T**	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	3,750	.18
SSF8T	**SSFL8T**	.5000	.625	.453	2.125	1.312	.875	.750	.875	1.062	1/2-20	17	4,650	.29
SSF10T	**SSFL10T**	.6250	.750	.484	2.500	1.500	1.000	.875	1.062	1.375	5/8-18	22	5,850	.43
SSF12T	**SSFL12T**	.7500	.875	.593	2.875	1.750	1.125	1.000	1.250	1.562	3/4-16	18	7,500	.65

MATERIALS

Ball	Body	Liner
440c Steel Stainless Steel Heat Treated	Type 303 Stainless Steel	Teflon* Permanently Bonded to Body I.D.

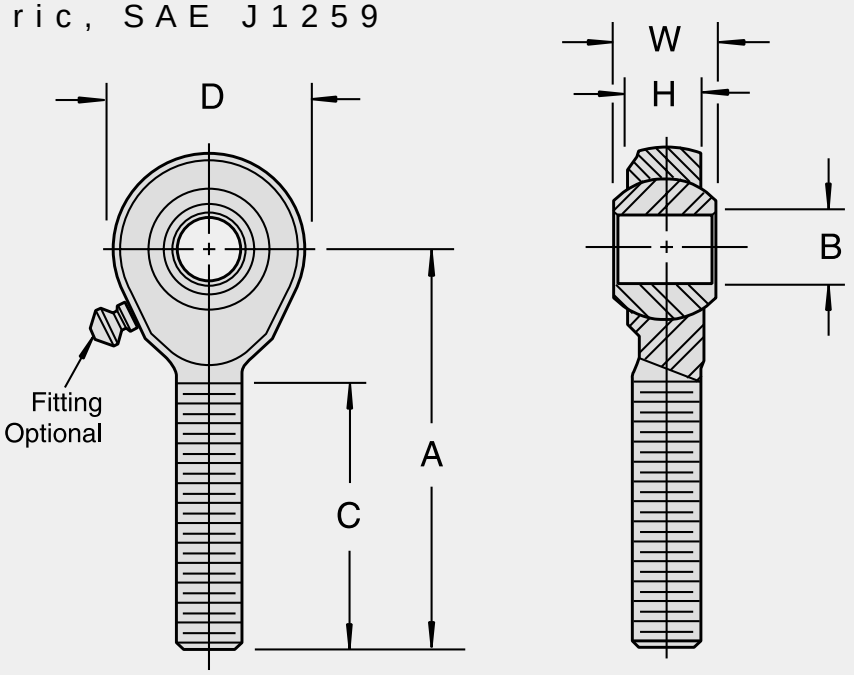
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: SSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

EM-M

Commercial, 2-Piece, Metal to Metal, Metric, SAE J1259





Part Number	B +.07 -.00	W ± 0.15	H REF	A + 1.5 - 0.8	D ± 13	REF	C ± 1.5		Ultimate Radial Static Load Capacity (Newtons)	Weight (Grams)
Right Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM5M	5.0	8	6.0	32.0	15.7	11.1	19	M5x.8	7,384	12
EM6M	6.0	9	6.7	35.7	18.9	13.1	21	M6x1.0	10,097	19
EM8M	8.0	12	9.0	41.7	25.1	15.8	24	M8x1.25	20,950	41
EM10M	10.0	14	10.5	47.6	28.3	19.2	29	M10x1.5	27,489	65
EM12M	12.0	16	12.0	55.0	33.2	22.3	32	M12x1.75	32,604	104
EM14M	14.0	19	13.5	60.0	34.7	25.4	35	M14x2.0	37,586	136
EM16M	16.0	21	15.0	66.7	37.9	28.5	40	M16x2.0	42,478	213

MATERIALS

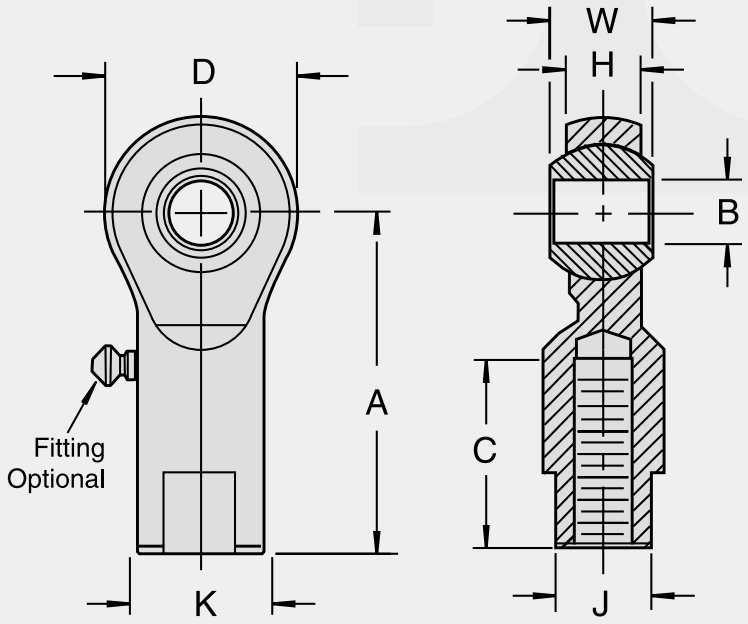
Ball	Body	Liner (optional)
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: EM8MS
2. Teflon fabric liner optional. Specify by adding “T” to suffix. Example: EM8MT

EF-M

Commercial, 2-Piece, Metal to Metal, Metric, SAE J1259





Part Number	B +.07 -.00	W ± 0.15	H REF	A + 1.5 - 0.8	D ±. 13	K ± 0.38	J ± 0.38	REF	C ± 1.5		Ultimate Radial Static Load	
Right Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Ball Diameter	Thread Length	Thread Size	Capacity (Newtons)	Weight (Grams)
EF5M	5.0/5.07	8	6.0	26.0	15.7	11	8.9	11.1	9.0	M5x.8	10,542	20
EF6M	6.0/6.07	9	6.7	29.7	18.9	13	9.9	13.1	12.0	M6x1.0	14,412	31
EF8M	8.0/8.07	12	9.0	35.7	25.1	16	12.4	15.8	16.0	M8x1.25	29,935	61
EF10M	10.0/10.07	14	10.5	42.8	28.3	19	14.9	19.2	19.5	M10x1.5	34,383	98
EF12M	12.0/12.07	16	12.0	49.0	33.2	22	17.4	22.3	21.0	M12x175	40,788	145
EF14M	14.0/14.07	19	13.5	57.0	34.7	25	20.0	25.4	25.4	M14x2.0	41,766	211
EF16M	16.0/16.07	21	15.0	64.0	37.9	27	22.0	28.5	27.0	M16x2.0	47,238	214

MATERIALS

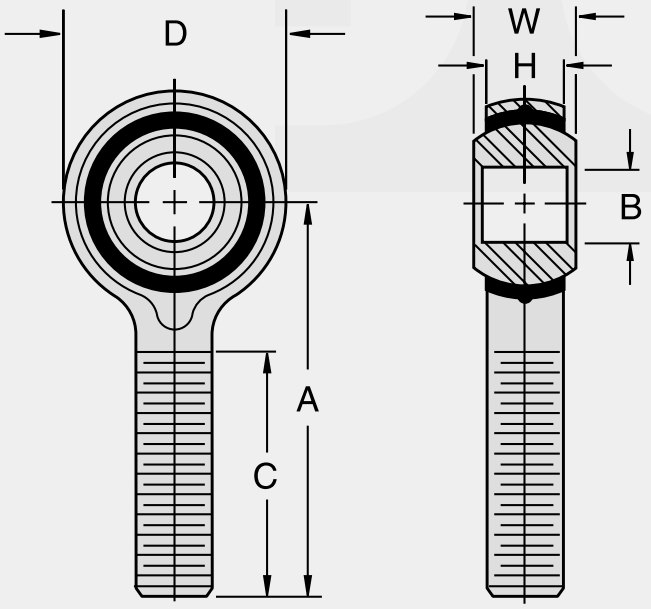
Ball	Body	Liner (optional)
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: EF8MS
2. Teflon liner optional. Specify by adding “T” to suffix. Example: EF8MT

MJ-M

Metric Molded Race Male Rod Ends





Part Number		B +.063 -.013	W ± 0.13	H ± 0.05	A ± 0.25	C + 0 - 1	D ± 0.13		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size			
MJ3M	**MLJ3M**	3	6	4.50	27	15	12	M3x0.5	3,038	9.0	10
MJ5M	**MLJ5M**	5	8	6.00	33	20	16	M5x0.8	5,338	11.1	15
MJ6M	**MLJ6M**	6	9	6.75	36	22	18	M6x1.0	7,722	13.1	20
MJ8M	**MLJ8M**	8	12	9.00	42	25	22	M8x1.25	12,775	15.8	35
MJ10M	**MLJ10M**	10	14	10.50	48	29	26	M10x1.5	16,960	19.2	50
MJ12M	**MLJ12M**	12	16	12.00	54	33	30	M12x1.75	22,898	22.3	65
MJ14M	**MLJ14M**	14	19	13.50	60	36	34	M14x2.0	28,948	25.4	100
MJ16M	**MLJ16M**	16	21	15.00	66	40	38	M16x2.0	37,127	28.5	179
MJ18MC	**MLJ18MC**	18	23	16.50	72	43	46	M18x1.5	45,730	31.7	209
MJ20MC	**MLJ20MC**	20	25	18.00	78	46	50	M20x1.5	55,235	34.9	289
MJ22MC	**MLJ22MC**	22	28	20.00	84	50	56	M22x1.5	66,289	38.1	323

MATERIALS

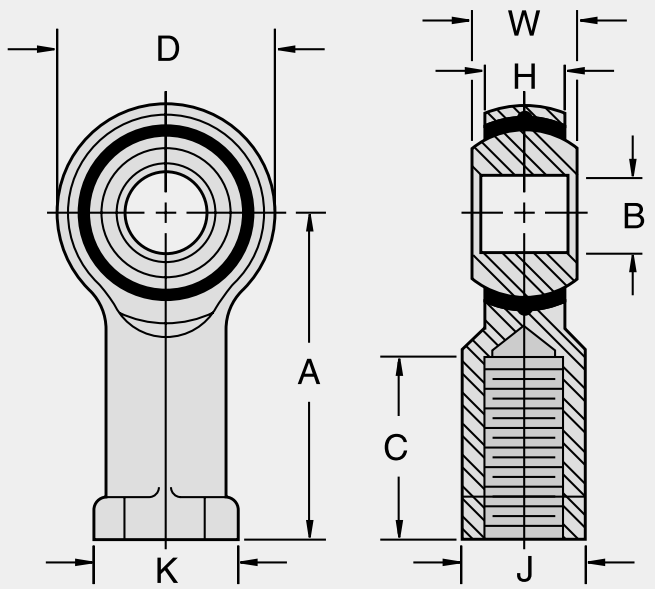
Ball	Body	Race
Low Carbon Steel Case Hardened Nickel Plated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Plastic Self Lubricating

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: MJ8MS

FJ-M

Metric Molded Race Female Rod Ends





Part Number		B +.063 -.013	W ± 0.13	H ± 0.05	A ± 0.25	C + 0 - 1	D ± 0.13	K ± 0.2	J + 0 - 0.2		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	W.F. Diameter	W.F. Width	Thread Size			
FJ3M	**FLJ3M**	3	6	4.50	21	10	12	8	6.50	M3x0.5	3,038	9.0	14
FJ5M	**FLJ5M**	5	8	6.00	27	14	16	11	9.00	M5x0.8	5,338	11.1	20
FJ6M	**FLJ6M**	6	9	6.75	30	14	18	13	11.00	M6x1.0	7,722	13.1	30
FJ8M	**FLJ8M**	8	12	9.00	36	17	22	16	14.00	M8x1.25	12,775	15.8	39
FJ10M	**FLJ10M**	10	14	10.50	43	21	26	19	17.00	M10x1.5	16,960	19.2	75
FJ10MC	**FLJ10MC**	10	14	10.50	43	21	26	19	17.00	M10x1.25	16,960	19.2	75
FJ12M	**FLJ12M**	12	16	12.00	50	24	30	22	19.00	M12x175	22,898	22.3	124
FJ12MC	**FLJ12MC**	12	16	12.00	50	24	30	22	19.00	M12x1.5	22,898	22.3	124
FJ14M	**FLJ14M**	14	19	13.50	57	37	34	25	22.00	M14x2.0	28,948	25.4	174
FJ16M	**FLJ16M**	16	21	15.00	64	33	38	27	22.00	M16x2.0	37,127	28.5	229
FJ16MC	**FLJ16MC**	16	21	15.00	64	33	38	27	22.00	M16x1.5	37,127	28.5	229
FJ18MC	**FLJ18MC**	18	23	16.50	71	35	46	31	27.00	M18x1.5	45,730	31.7	309
FJ20M	**FLJ20M**	20	25	18.00	77	32	50	34	32.00	M20x1.5	55,235	34.9	358
FJ22M	**FLJ22M**	22	28	20.00	84	36	56	37	32.00	M22x1.5	66,289	38.1	423

MATERIALS

Ball	Body	Race
Low Carbon Steel Case Hardened Nickel Plated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Plastic Self Lubricating

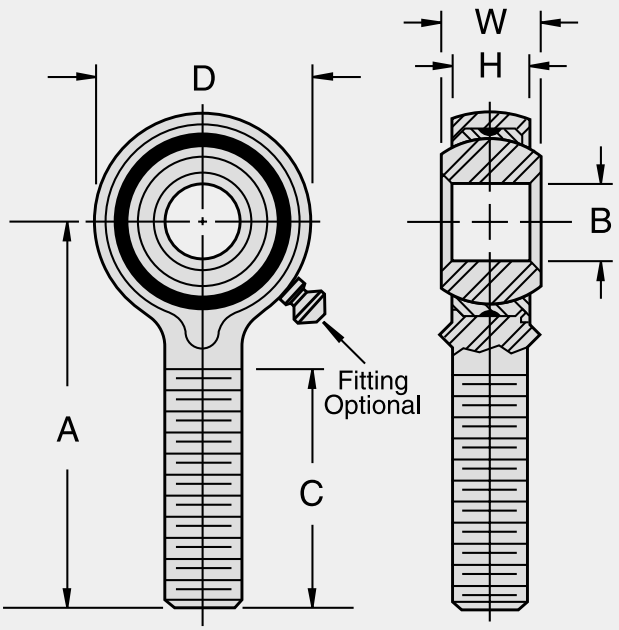
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: FJ8MS

TUTHILL Linkage Group

DBM

Metric Bronze Race Male Rod Ends to DIN 648





Part Number		B +.063 -.013	W ± 0.13	H ± 0.05	A ± 0.25	C +0 -1	D ± 0.13		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size			
DBM5	**DBML5**	5	8	6.00	33	20	18	M5x0.8	3,000	13	15
DBM6	**DBML6**	6	9	6.75	36	22	20	M6x1.0	4,000	16	20
DBM8	**DBML8**	8	12	9.00	42	25	24	M8x1.25	8,000	19	35
DBM10	**DBML10**	10	14	10.50	48	29	28	M10x1.25	13,000	22	50
DBM12	**DBML12**	12	16	12.00	54	33	32	M12x1.25	17,000	26	65
DBM14	**DBML14**	14	19	13.50	60	36	36	M14x1.5	24,000	29	100
DBM16	**DBML16**	16	21	15.00	66	40	42	M16x1.5	28,500	32	179
DBM20	**DBML20**	20	25	18.00	78	47	50	M20x1.5	42,000	40	289

MATERIALS

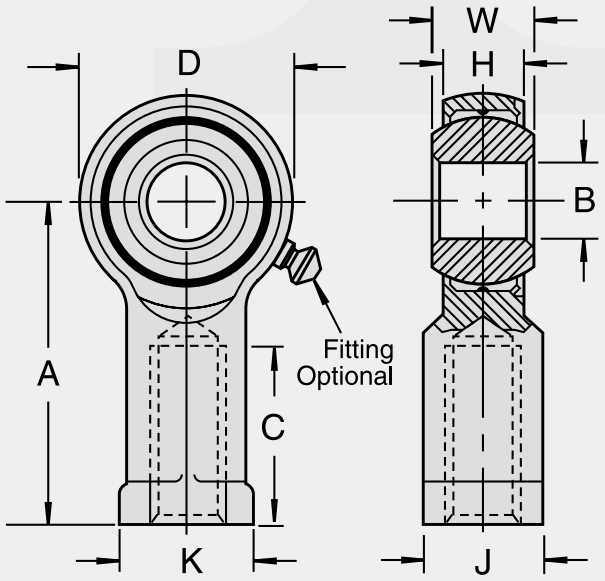
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: DBM7Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: DBM8S

DBF

Metric Bronze Race Female Rod Ends to DIN 648





Part Number		B +.063 -.013	W ± 0.13	H ± 0.05	A ± 0.25	C + 0 - 1	D ± 0.13		K ± 0.2	J + 0 - 0.2	Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight Approx. (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size	W.F. Diameter	W.F. Width			
DBF5	**DBFL5**	5	8	6.00	27	10	18	M5x0.8	11	9	6,000	13	15
DBF6	**DBFL6**	6	9	6.75	30	12	20	M6x1.0	13	11	7,000	16	19
DBF8	**DBFL8**	8	12	9.00	36	16	24	M8x1.25	16	14	12,000	19	30
DBF10	**DBFL10**	10	14	10.50	43	20	28	M10x1.25	19	17	14,500	22	40
DBF12	**DBFL12**	12	16	12.00	50	22	32	M12x1.25	22	19	17,000	26	75
DBF14	**DBFL14**	14	19	13.50	57	22	36	M14x1.5	25	22	24,000	29	124
DBF16	**DBFL16**	16	21	15.00	64	28	42	M16x1.5	27	22	28,500	32	174
DBF20	**DBFL20**	20	25	18.00	77	33	50	M20x1.5	34	32	45,000	40	358

MATERIALS

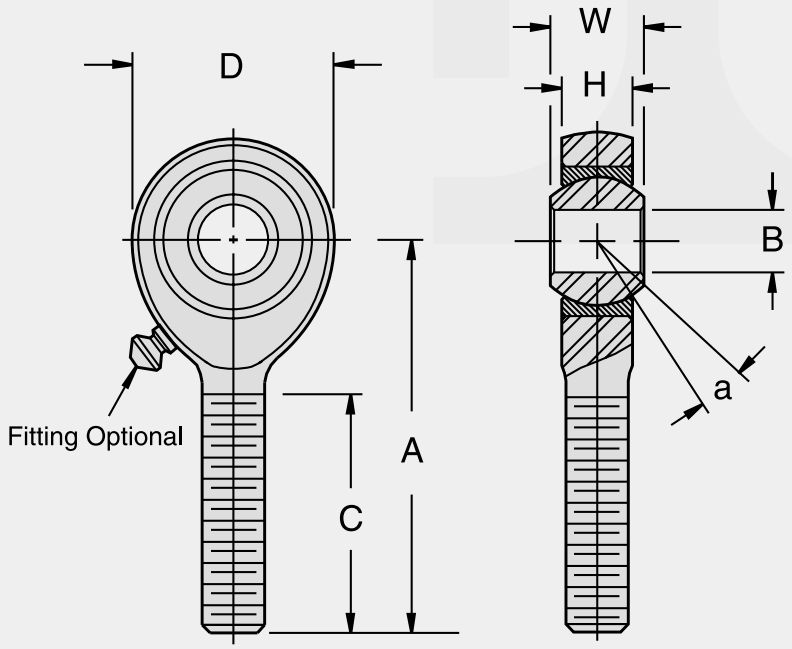
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: DBF7Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: DBF8S

MTSM

3-Piece, Metal to Metal





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSM3	**MTSML3**	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MTSM4	**MTSML4**	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MTSM5	**MTSML5**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MTSM6	**MTSML6**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MTSM7	**MTSML7**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MTSM8	**MTSML8**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MTSM10	**MTSML10**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MTSM12	**MTSML12**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602
MTSM16	**MTSML16**	1.0000	1.375	1.000	4.125	2.750	1.875	2.125	1 1/4-12	14	43,541	2.127

MATERIALS

Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Mild Steel Zinc Plated Clear Chromate Treated	Mild Steel Zinc Plated Clear Chromate Treated

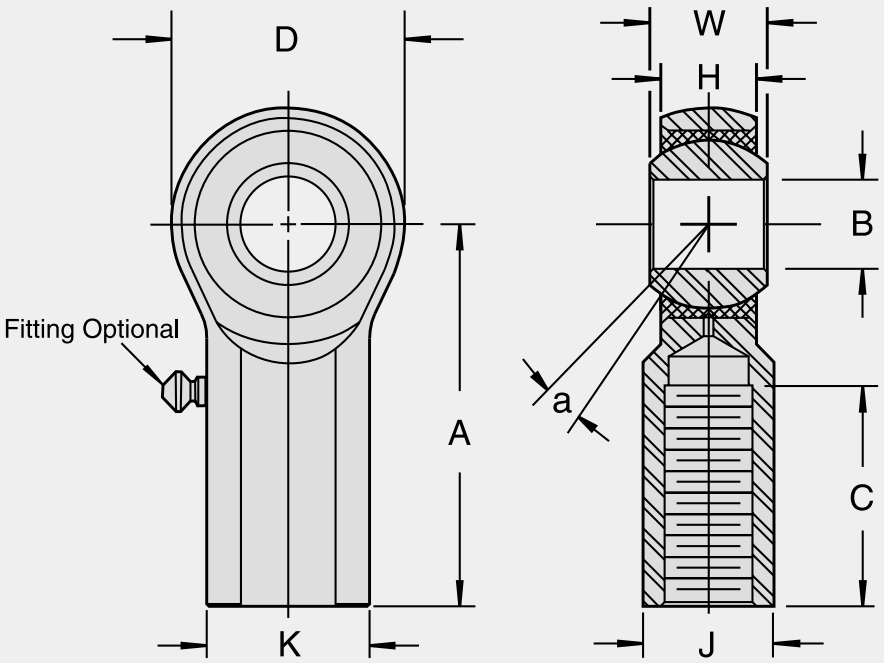
NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: MTSM8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: MTSM8S
3. Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

*MTSM16 and MTSML16 rod ends are supplied with low carbon steel black oxide coated races and are not available in a studded configuration.

MTSF

3-Piece, Metal to Metal





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSF3	**MTSFL3**	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MTSF4	**MTSFL4**	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MTSF5	**MTSFL5**	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MTSF6	**MTSFL6**	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MTSF7	**MTSFL7**	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MTSF8	**MTSFL8**	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MTSF10	**MTSFL10**	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MTSF12	**MTSFL12**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723
MTSF16	**MTSFL16**	1.0000	1.375	1.000	4.125	2.750	1.625	1.500	1.875	2.125	1 1/4-12	14	43,541	2.125

MATERIALS

Ball	Body	Race
52100 Steel	Low Carbon Steel	Low Carbon Steel
Rc 56 Min.	Zinc Plated	Zinc Plated
Hard Chrome Plated	Clear Chromate	Clear Chromate
	Treated	Treated

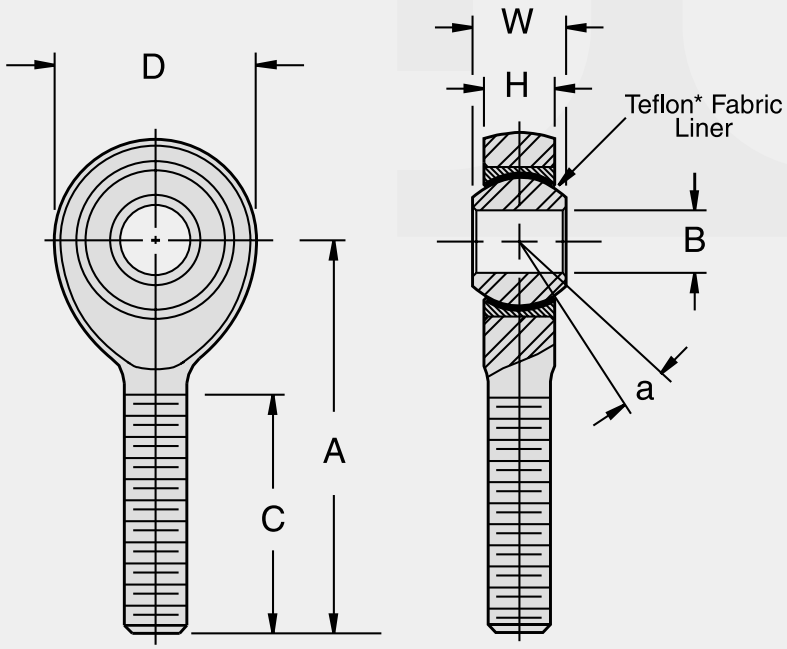
NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: MTSF8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog page 66) Specify by adding “S” to suffix. Example: MTSF8S
3. Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

*MTSF16 and MTSFL16 rod ends are supplied with low carbon steel black oxide coated races and are not available in a studded configuration.

MTSM-T

3-Piece, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSM3T	**MTSML3T**	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MTSM4T	**MTSML4T**	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MTSM5T	**MTSML5T**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MTSM6T	**MTSML6T**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MTSM7T	**MTSML7T**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MTSM8T	**MTSML8T**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MTSM10T	**MTSML10T**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MTSM12T	**MTSML12T**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

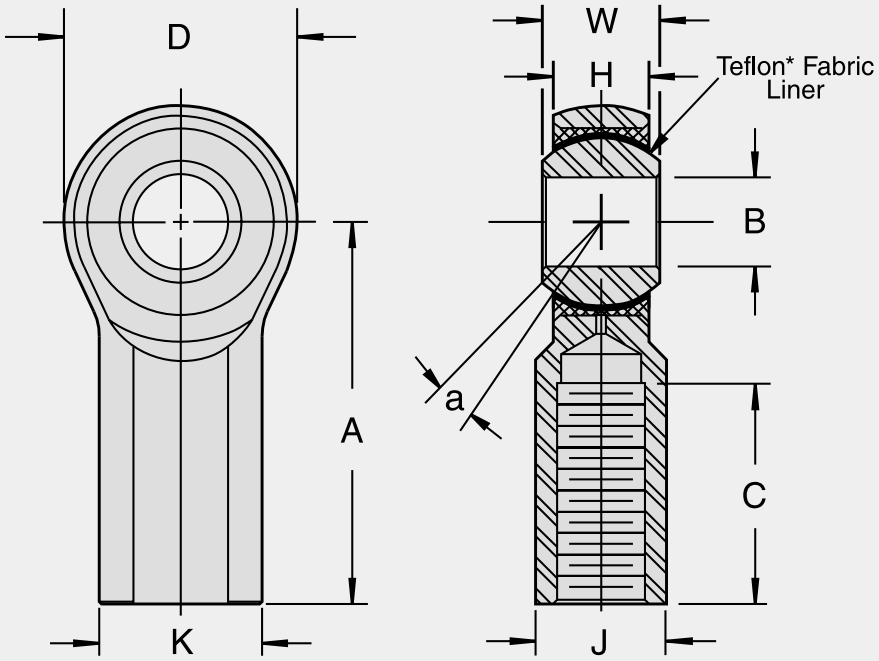
*A trademark of E.I. DuPont de Nemours & Co., Inc.

NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: MTSM8TS

MTSF-T

3-Piece, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSF3T	**MTSFL3T**	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MTSF4T	**MTSFL4T**	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MTSF5T	**MTSFL5T**	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MTSF6T	**MTSFL6T**	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MTSF7T	**MTSFL7T**	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MTSF8T	**MTSFL8T**	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MTSF10T	**MTSFL10T**	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MTSF12T	**MTSFL12T**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

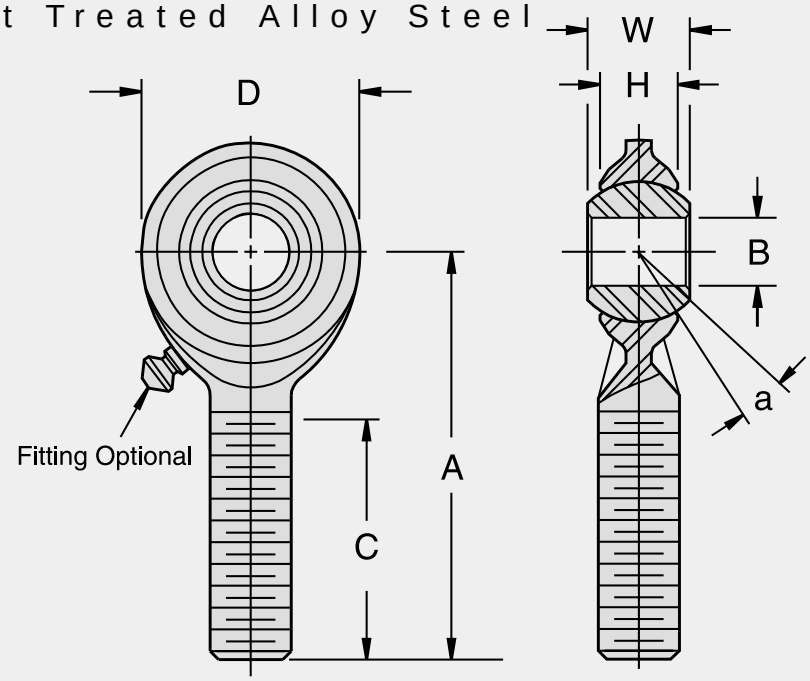
NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: MTSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MAX

2-Piece, Metal to Metal, Heat Treated Alloy Steel





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MAX8	**MAXL8**	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	16,646	.36
MAX10	**MAXL10**	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	17,415	.57
MAX12	**MAXL12**	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	18	24,038	.57

MATERIALS

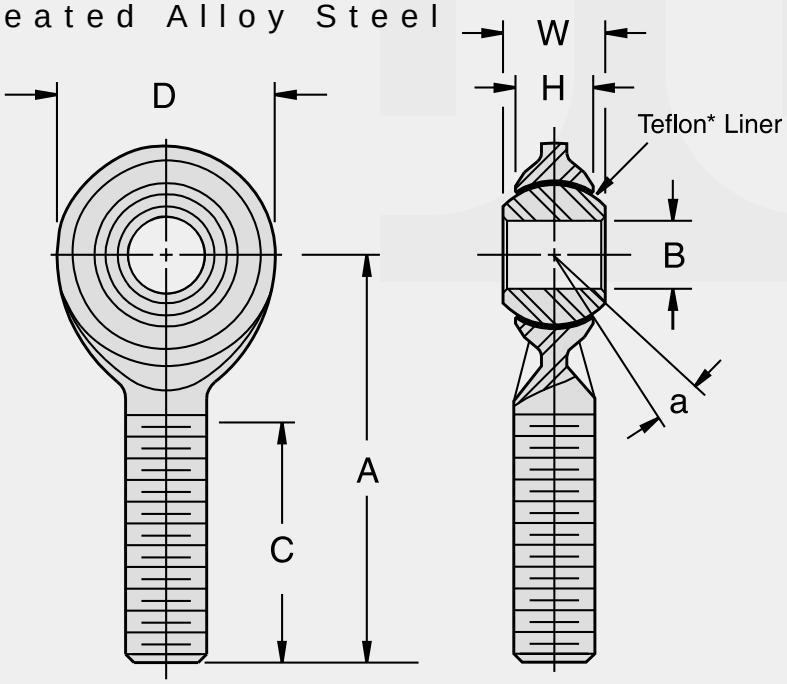
Ball	Body
52100 Steel	Alloy Steel
Rc 56 Min.	Heat Treated
Hard Chrome Plated	Black Oxide Coated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: MAX8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: MAX8S

MAX-T

2-Piece, Teflon* Lined,
Heat Treated Alloy Steel





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MAX8T	**MAXL8T**	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	16,646	.36
MAX10T	**MAXL10T**	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	17,415	.57
MAX12T	**MAXL12T**	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	17	24,038	.57

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Black Oxide Coated	Teflon* Permanently Bonded to Body I.D.

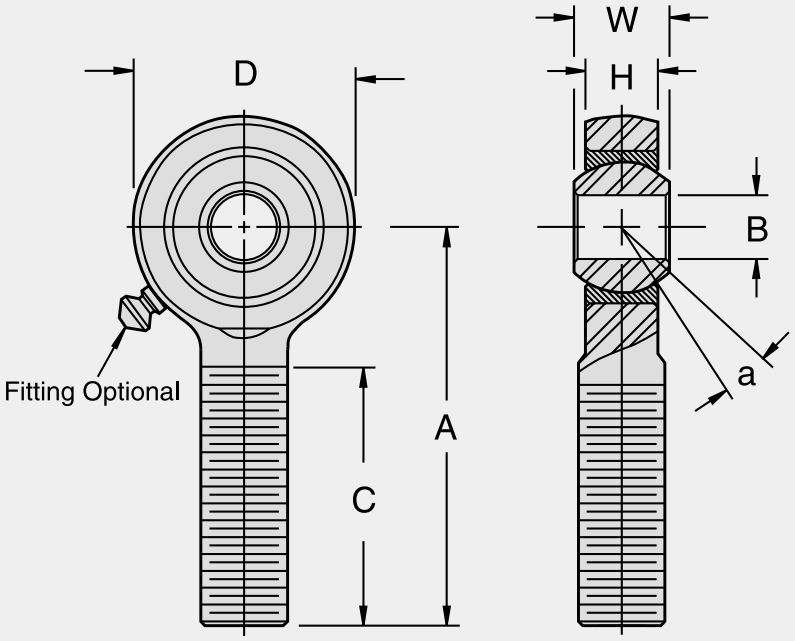
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding “S” to suffix. Example: MAX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

KCA

3-Piece, Aluminum, Metal to Metal





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCA6	**KCAL6**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	4,110	.057
KCA7	**KCAL7**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,429	.094
KCA8	**KCAL8**	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	10,155	.130
KCA10	**KCAL10**	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	16,211	.187
KCA12	**KCAL12**	.7500	.875	.687	3.000	2.000	1.312	1.750	3/4-16	14	23,392	.300

MATERIALS

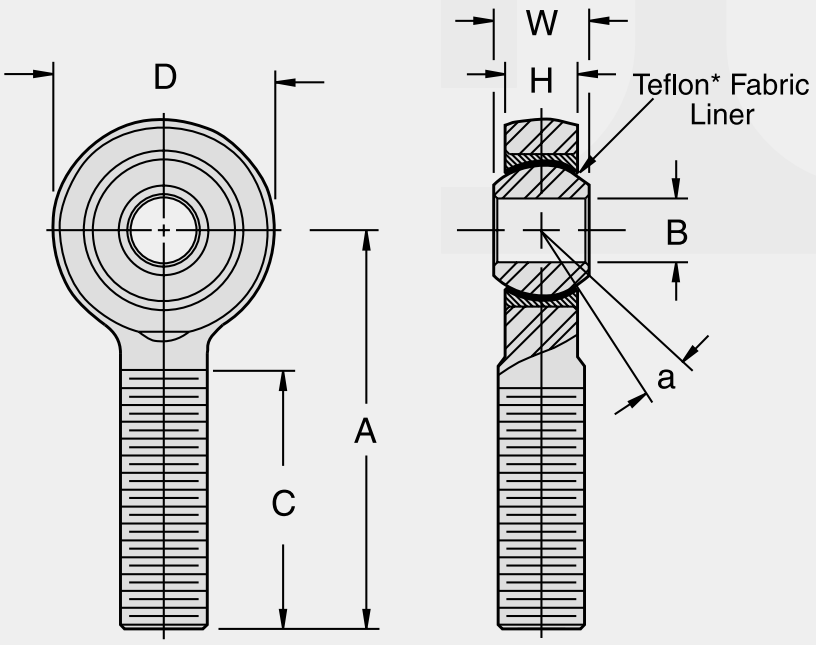
Ball	Body	Race
52100 Steel	7075-T6	Low Carbon Steel
Rc 56 Min.	High Strength	Zinc Plated
Hard Chrome Plated	Aluminum	Clear Chromate
	Black Anodized	Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: KCA8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: KCA8S
3. Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

KCA-T

3-Piece, Aluminum, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCA6T	**KCAL6T**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	4,110	.057
KCA7T	**KCAL7T**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,429	.094
KCA8T	**KCAL8T**	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	10,155	.130
KCA10T	**KCAL10T**	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	16,211	.187
KCA12T	**KCAL12T**	.7500	.875	.687	3.000	2.000	1.312	1.750	3/4-16	14	23,392	.300

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Aluminum Black Anodized	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

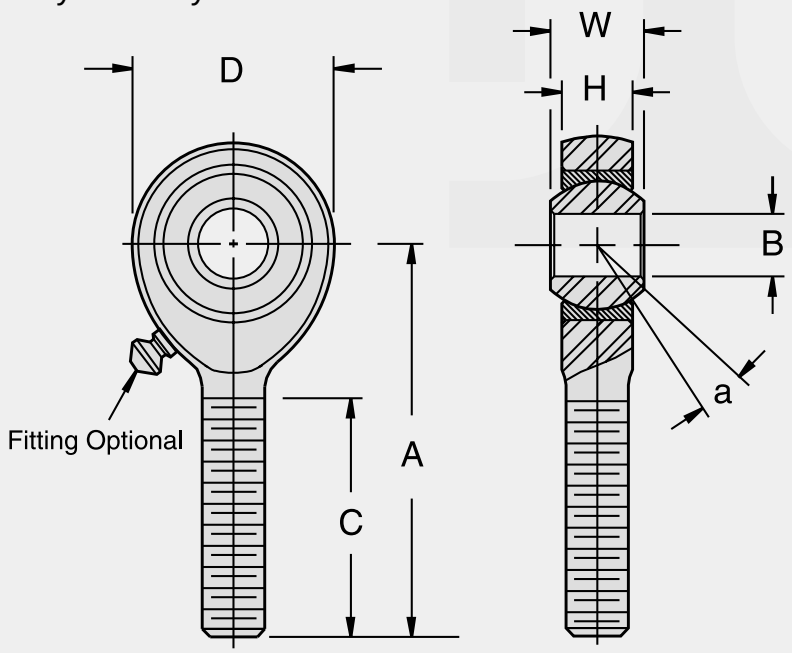
NOTES:

1. This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66)
Specify by adding “S” to suffix.
Example: KCA8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

TSMX

3-Piece, Metal to Metal, Heavy Duty





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSMX3	**TSMXL3**	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	2,851	.028
TSMX4	**TSMXL4**	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	5,260	.043
TSMX5	**TSMXL5**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	7,639	.072
TSMX6	**TSMXL6**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
TSMX7	**TSMXL7**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	10,285	.160
TSMX8	**TSMXL8**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
TSMX10	**TSMXL10**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
TSMX12	**TSMXL12**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS

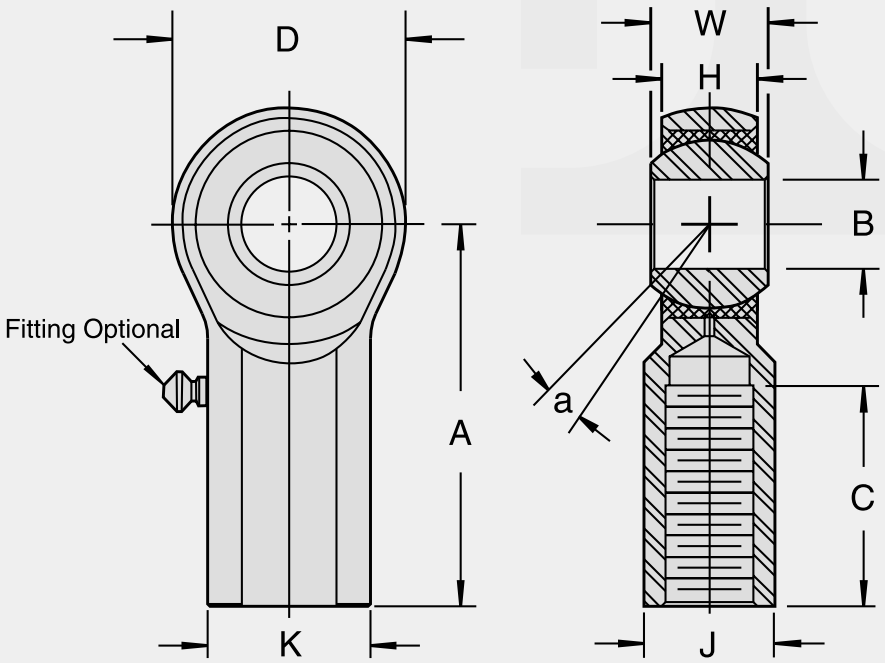
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: TSMX8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: TSMX8S

TSFX

3-Piece, Metal to Metal, Heavy Duty





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSFX3	**TSFXL3**	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	3,733	.038
TSFX4	**TSFXL4**	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	6,190	.059
TSFX5	**TSFXL5**	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	7,639	.092
TSFX6	**TSFXL6**	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	9,544	.152
TSFX7	**TSFXL7**	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	10,285	.198
TSFX8	**TSFXL8**	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	15,336	.329
TSFX10	**TSFXL10**	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	17,955	.477
TSFX12	**TSFXL12**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	28,081	.723

MATERIALS

Ball	Body	Race
52100 Steel	Heat Treated	Heat Treated
Rc 56 Min.	Alloy Steel	Alloy Steel
Hard Chrome Plated	Zinc Plated	Zinc Plated
	Clear Chromate	Clear Chromate
	Treated	Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: TSFX8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: TSFX8S

Custom Designed Products

Tuthill Linkage Group (TLG) is more than a source for standard linkage products. TLG also designs and produces a wide range of specialized rod ends, ball joints and linkage assemblies. Each of these products is carefully engineered to meet the exact requirements of a particular application and manufactured to high quality standards to provide a cost-effective solution.



TLG rod ends and ball joints are combined with solid rods, solid-threaded rods, tubing, trunnions, clevises, hexagon fittings and nearly any other linkage component to create complete assemblies that are ready for installation.
High quality steering, shift and throttle linkages, control rod assemblies, draft and valve controls, activating linkages, cable shift controls and more can be economically created using TLG products.

As shown in the illustration, a wide variety of design modifications have been used to make TLG products meet unusual design requirements.

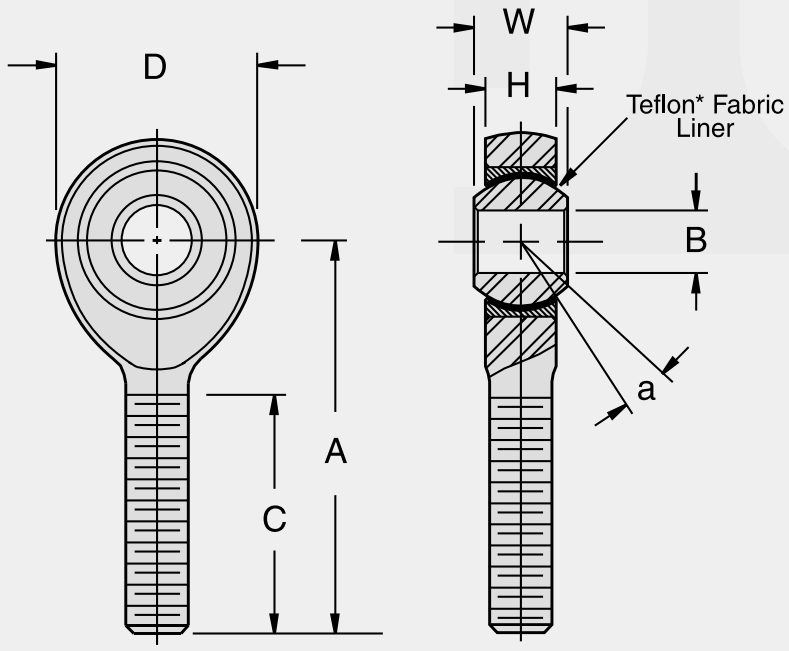
In addition to special products, TLG also provides special application assistance. With extensive experience in linkage design, TLG engineers will help you and your design group make the correct choice of linkage products to get the best possible results at the lowest possible cost. And the earlier they're involved in your project, the more help they can provide.





TSMX-T

3-Piece, Teflon* Lined, Heavy Duty





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSMX3T	**TSMXL3T**	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	2,851	.028
TSMX4T	**TSMXL4T**	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	5,260	.043
TSMX5T	**TSMXL5T**	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	7,639	.072
TSMX6T	**TSMXL6T**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
TSMX7T	**TSMXL7T**	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	10,285	.160
TSMX8T	**TSMXL8T**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
TSMX10T	**TSMXL10T**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
TSMX12T	**TSMXL12T**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

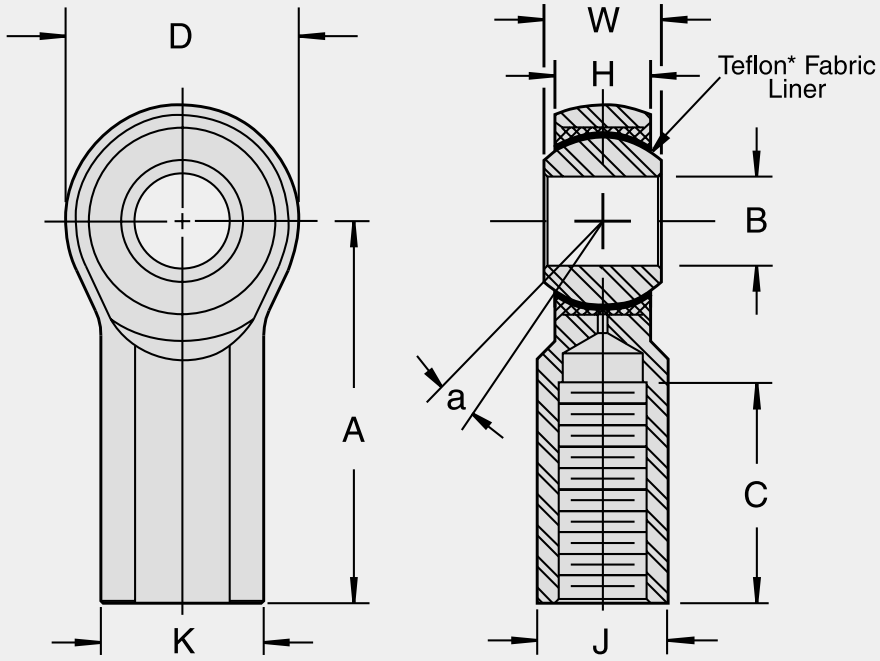
NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: TSMX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

TSFX-T

3-Piece, Teflon* Lined, Heavy Duty





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSFX3T	**TSFXL3T**	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	3,733	.038
TSFX4T	**TSFXL4T**	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	6,190	.059
TSFX5T	**TSFXL5T**	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	7,639	.092
TSFX6T	**TSFXL6T**	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	9,544	.152
TSFX7T	**TSFXL7T**	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	10,285	.198
TSFX8T	**TSFXL8T**	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	15,336	.329
TSFX10T	**TSFXL10T**	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	17,955	.477
TSFX12T	**TSFXL12T**	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	28,081	.723

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

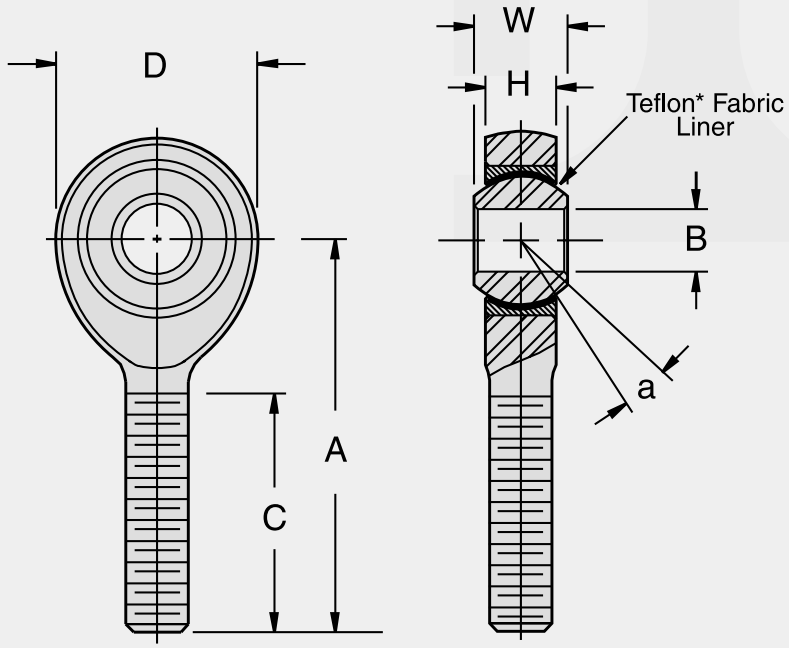
NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding "S" to suffix.
   Example: TSFX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

NSMX-T

3-Piece, Heavy Duty,
Teflon* Lined, Nickel Plated





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
NSMX6T	**NSMXL6T**	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
NSMX8T	**NSMXL8T**	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
NSMX10T	**NSMXL10T**	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
NSMX12T	**NSMXL12T**	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Bright Electroless Nickel Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

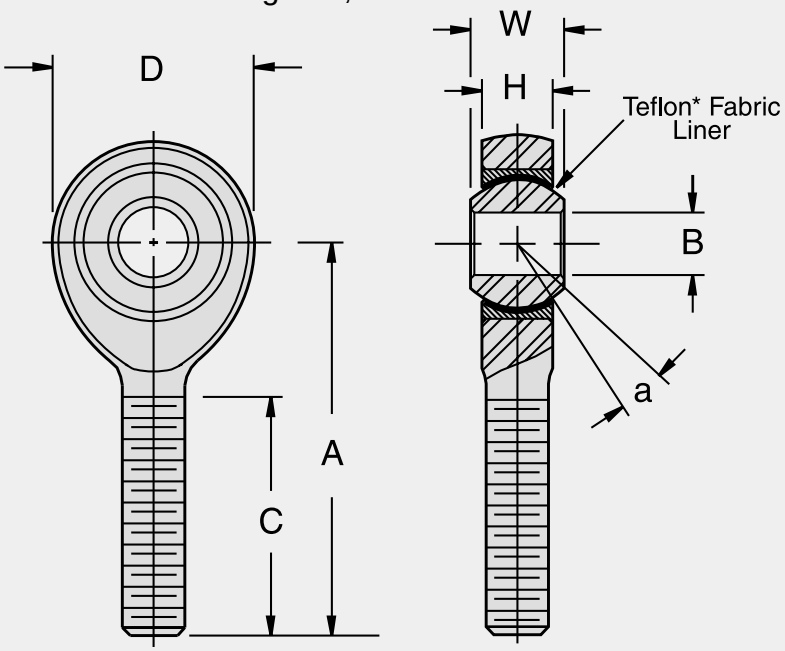
NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: NSMX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

UMAX-T

3-Piece, Nickel Plated,
Ultimate Strength, Teflon* Lined





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
UMAX8T	**UMAXL8T**	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	23,632	.34
UMAX10T	**UMAXL10T**	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	34,728	.52
UMAX12T	**UMAXL12T**	.7500	.875	.687	3.187	2.000	1.312	1.750	3/4-16	14	48,384	.80

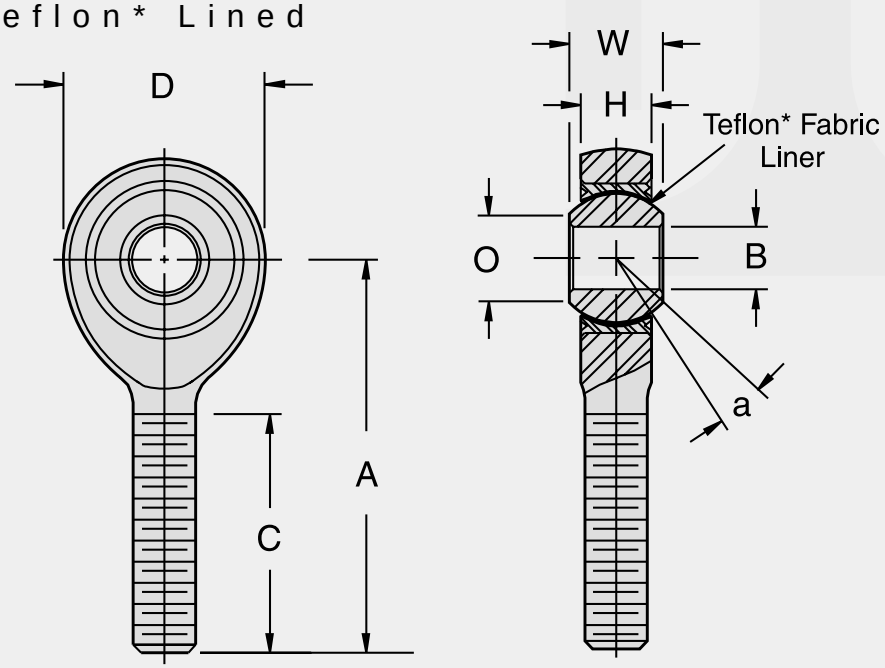
MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Bright Electroless Nickel Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSAM-T

3-Piece, Stainless Steel, Teflon* Lined





Part Number		B +.0000 -.0005	W +.000 -.002	H ±.005	O REF	A ±.010	D ±.010	REF	C ±.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Ball Face Diameter	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSAM3T	**SSAML3T**	.1900	.437	.337	.337	1.562	.806	.531	.968	5/16-24	15	2,360	.072
SSAM4T	**SSAML4T**	.2500	.437	.337	.337	1.562	.806	.531	.968	5/16-24	15	4,860	.072
SSAM5T	**SSAML5T**	.3125	.437	.327	.327	1.875	.900	.593	1.187	5/16-24	14	7,180	.087
SSAM6T	**SSAML6T**	.3750	.500	.416	.416	1.938	1.025	.687	1.187	3/8-24	8	8,550	.136
SSAM7T	**SSAML7T**	.4375	.562	.452	.452	2.125	1.150	.781	1.281	7/16-20	10	12,000	.183
SSAM8T	**SSAML8T**	.5000	.625	.515	.515	2.438	1.337	.875	1.468	1/2-20	9	19,500	.278
SSAM10T	**SSAML10T**	.6250	.750	.577	.577	2.625	1.525	1.062	1.562	5/8-18	12	21,900	.424
SSAM12T	**SSAML12T**	.7500	.875	.640	.640	2.875	1.775	1.250	1.687	3/4-16	13	29,300	.639

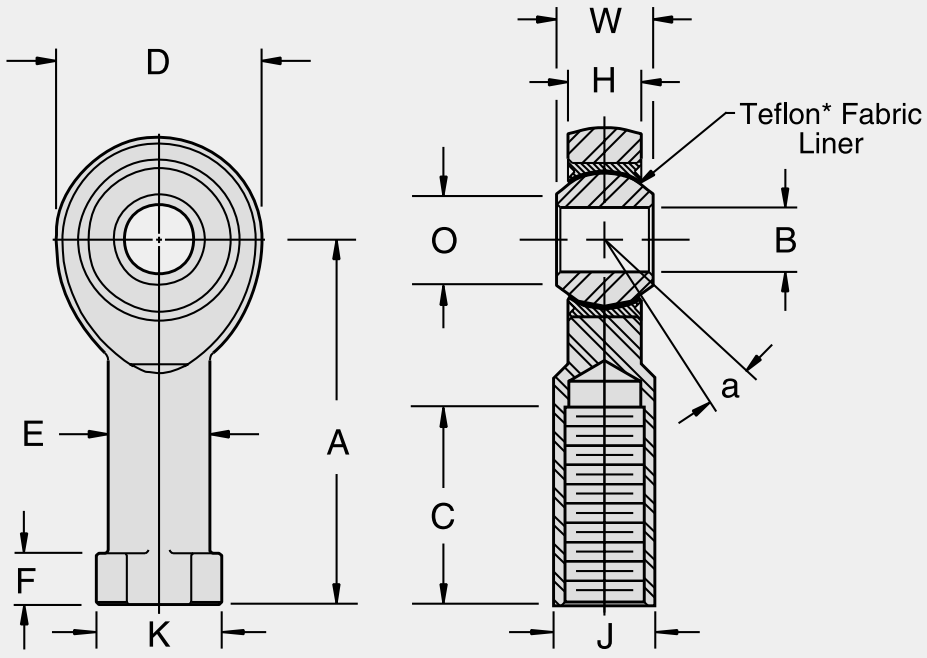
MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSAF-T

3-Piece, Stainless Steel, Teflon* Lined





Part Number		B +.0000 -.0005	W +.000 -.002	H ±.005	A ±.010	D ±.010	O REF	E ±.010	K REF	J +.002 -.010	F +.010 -.062	REF	C +.062 -.031	UNF-3B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	C.L. Length	Head Diameter	Face Diameter	Shank Diameter	W.F. Diameter	W.F. Width	W.F. Length	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSAF3T	**SSAFL3T**	.1900	.437	.337	1.375	.806	.337	.422	.500	.437	.188	.531	.750	5/16-24	15	2,360	.080
SSAF4T	**SSAFL4T**	.2500	.437	.337	1.469	.806	.337	.422	.500	.437	.188	.531	.750	5/16-24	15	4,860	.084
SSAF5T	**SSAFL5T**	.3125	.437	.327	1.625	.900	.327	.485	.580	.500	.250	.593	.875	5/16-24	14	7,180	.102
SSAF6T	**SSAFL6T**	.3750	.500	.416	1.812	1.025	.416	.547	.660	.562	.250	.687	1.000	3/8-24	8	8,550	.161
SSAF7T	**SSAFL7T**	.4375	.562	.452	2.000	1.150	.452	.610	.720	.625	.250	.781	1.125	7/16-20	10	12,000	.212
SSAF8T	**SSAFL8T**	.5000	.625	.515	2.250	1.337	.515	.735	.880	.750	.250	.875	1.250	1/2-20	9	19,500	.325
SSAF10T	**SSAFL10T**	.6250	.750	.577	2.250	1.525	577	.860	1.020	.875	.375	1.062	1.375	5/8-18	12	21,900	.481
SSAF12T	**SSAFL12T**	.7500	.875	.640	2.875	1.775	640	.985	1.160	1.000	.375	1.250	1.625	3/4-16	13	29,300	.673

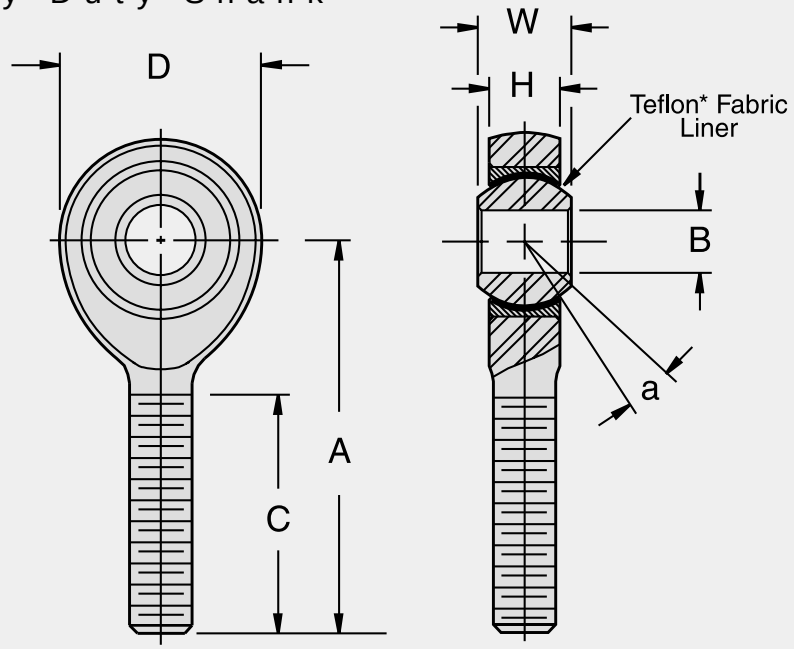
MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSHM-T

3-Piece, Stainless Steel, Teflon* Lined, Heavy Duty Shank





Part Number		B +.0000 -.0005	W +.000 -.002	A ±.010	D ±.010	REF	C MIN	UNF-3A	H ±.005	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Housing Width	Misalign. Angle		
SSHM4T	**SSHML4T**	.2500	.375	1.562	.806	.531	.968	5/16-24	.375	5	7,550	.067
SSHM5T	**SSHML5T**	.3125	.437	1.875	.900	.593	1.187	3/8-24	.401	14	9,200	.095
SSHM6T	**SSHML6T**	.3750	.500	1.938	1.025	.687	1.187	7/16-20	.471	9	10,900	.140
SSHM7T	**SSHML7T**	.4375	.562	2.125	1.150	.781	1.281	1/2-20	.542	10	14,050	.210
SSHM8T	**SSHML8T**	.5000	.625	2.438	1.337	.875	1.468	5/8-18	.612	9	23,400	.330
SSHM10T	**SSHML10T**	.6250	.750	2.625	1.525	1.062	1.562	3/4-16	.752	12	26,050	.480
SSHM12T	**SSHML12T**	.7500	.875	2.875	1.775	1.250	1.687	7/8-14	.892	13	34,500	.730

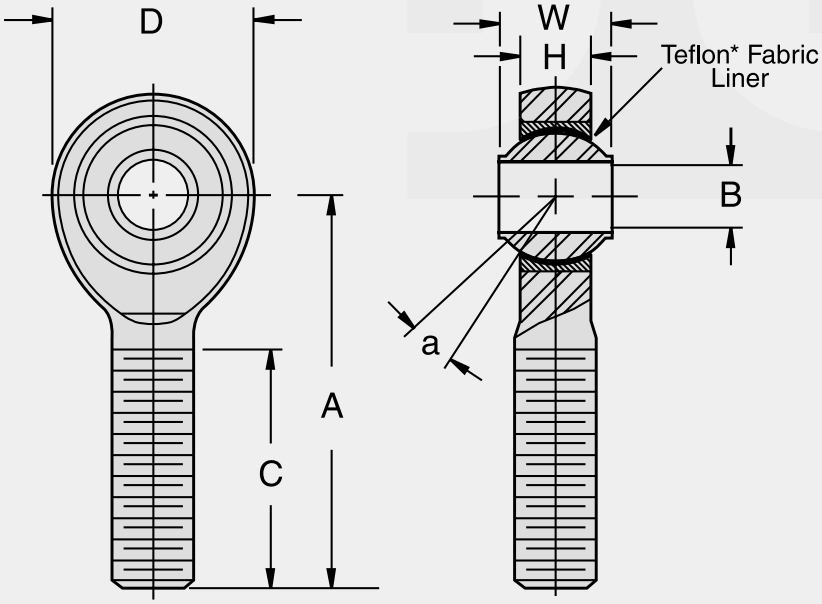
MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSHMY-T

High Misalignment, 3-Piece, Stainless Steel, Teflon* Lined, Heavy Duty Shank





Part Number		B +.0015 -.0005	W +.000 -.005	A ±.010	D ±.010	REF	C +.062 -.031	UNF-3A	H ±.005	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Housing Width	Misalign. Angle		
SSHMY4T	**SSHMYL4T**	.2500	.593	1.938	1.000	.593	1.250	3/8-24	.265	23	8,650	.11
SSHMY5T	**SSHMYL5T**	.3125	.813	2.125	1.125	.781	1.375	7/16-20	.355	22	9,050	.16
SSHMY6T	**SSHMYL6T**	.3750	.813	2.125	1.125	.781	1.375	7/16-20	.355	22	9,050	.15
SSHMY7T	**SSHMYL7T**	.4375	.875	2.438	1.312	.875	1.500	1/2-20	.355	21	14,100	.25
SSHMY8T	**SSHMYL8T**	.5000	.937	2.625	1.500	1.000	1.625	5/8-18	.411	19	19,800	.39
SSHMY10T	**SSHMYL10T**	.6250	1.200	2.875	1.750	1.250	1.750	3/4-16	.577	19	26,500	.62
SSHMY12T	**SSHMYL12T**	.7500	1.280	3.375	2.000	1.375	1.875	7/8-14	.630	18	34,200	.90

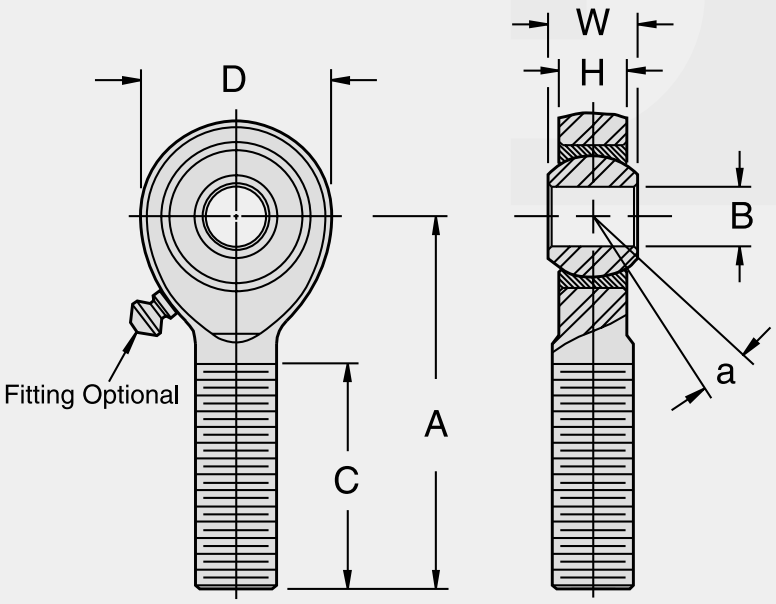
MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

KCAX

3-Piece, Aluminum, Metal to Metal, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCAX5	**KCAXL5**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,589	.06
KCAX6	**KCAXL6**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,539	.10
KCAX7	**KCAXL7**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	10,101	.14
KCAX8	**KCAXL8**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	13,447	.20
KCAX10	**KCAXL10**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	17,393	.32

MATERIALS

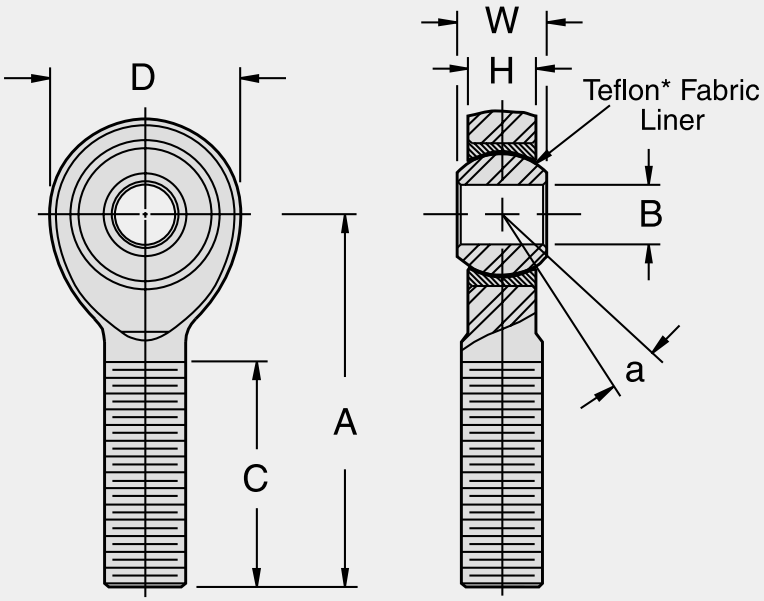
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Black Anodized	Low Carbon Steel Heat Trerated Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: KCAX8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: KCAX8S

KCAX-T

3-Piece, Aluminum, Teflon* Lined, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCAX5T	**KCAXL5T**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,589	.06
KCAX6T	**KCAXL6T**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,539	.10
KCAX7T	**KCAXL7T**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	10,101	.14
KCAX8T	**KCAXL8T**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	13,447	.20
KCAX10T	**KCAXL10T**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	17,393	.32

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Aluminum Black Anodized	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

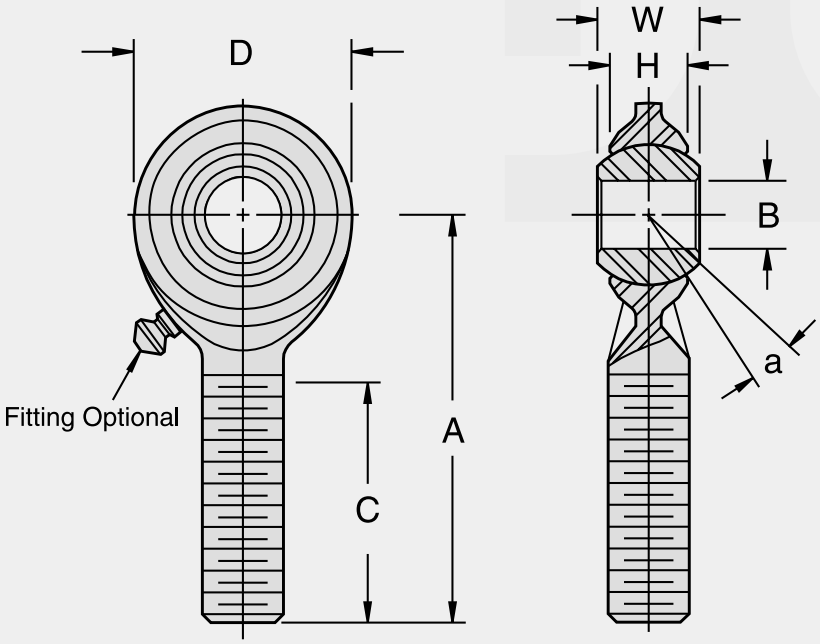
NOTES:

1. This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66)
Specify by adding “S” to suffix.
Example: KCAX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

XMAX

2-Piece, Metal to Metal, Heavy Duty Shank, Heat Treated Alloy Steel





Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
XMAX8	**XMAXL8**	.5000	.625	.453	2.625	1.500	.937	1.625	5/8-18	22	19,232	.30
XMAX10	**XMAXL10**	.6250	.750	.484	2.875	1.750	1.125	1.750	3/4-16	18	26,400	.48

MATERIALS

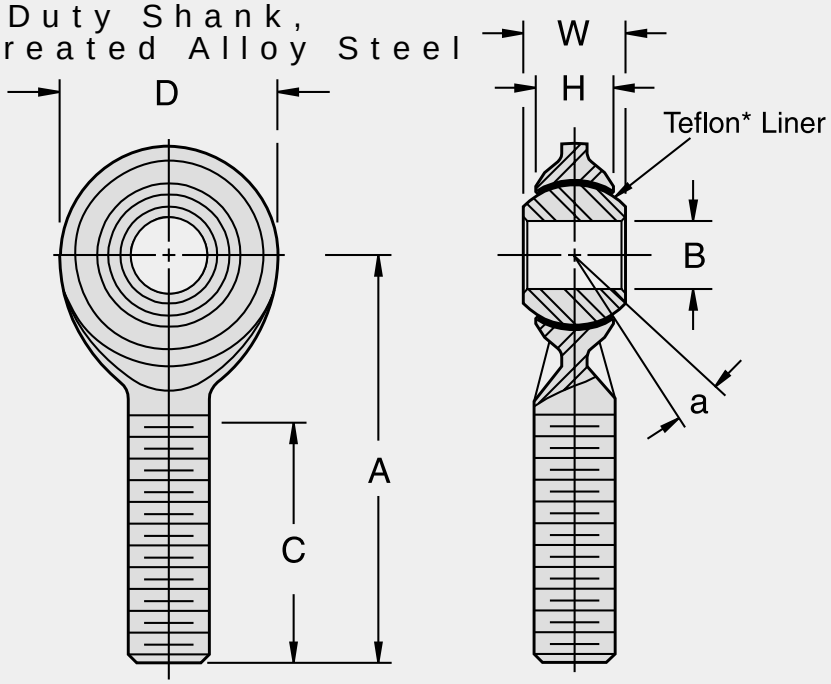
Ball	Body
52100 Steel	Alloy Steel
Rc 56 Min.	Heat Treated
Hard Chrome Plated	Black Oxide Coated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix.
   Example: XMAX8Z
2. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66).
   Specify by adding “S” to suffix.
   Example: XMAX8S

XMAX-T

2-Piece, Teflon* Lined,
Heavy Duty Shank,
Heat Treated Alloy Steel





Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
XMAX8T	**XAMXL8T**	.5000	.625	.453	2.625	1.500	.875	1.625	5/8-18	22	19,232	.30
XMAX10T	**XMAXL10T**	.6250	.750	.484	2.875	1.750	1.062	1.750	3/4-16	18	26,400	.48

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Black Oxide Coated	Teflon* Permanently Bonded to Body I.D.

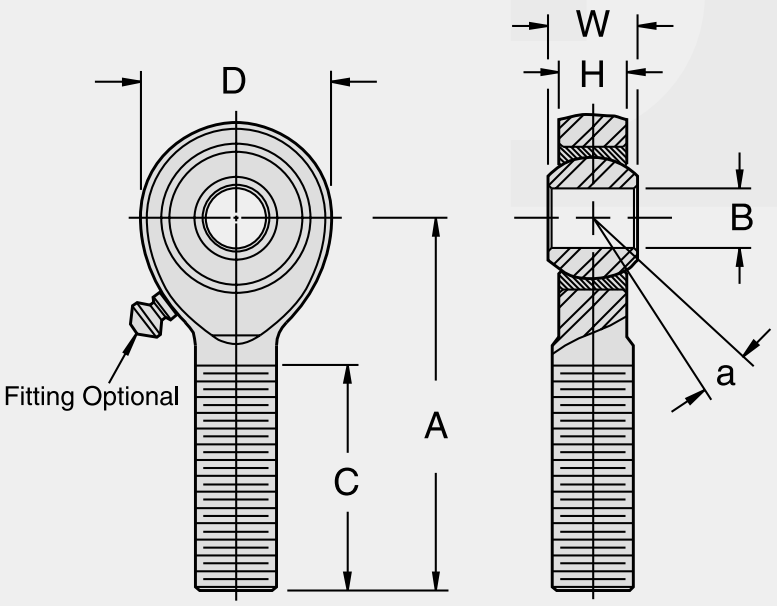
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: XMAX8TS

*A trademark of E.I. DuPont de Nemours & Co., inc.

RM

3-Piece, Metal to Metal, Extra Strength, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RM3	**RML3**	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	2,158	.043
RM4	**RML4**	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	3,467	.072
RM5	**RML5**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,323	.112
RM6	**RML6**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,180	.160
RM7	**RML7**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	9,620	.249
RM8	**RML8**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	12,807	.382
RM10	**RML10**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	16,565	.602
RM12	**RML12**	.7500	.875	.687	3.375	2.000	1.312	1.875	7/8-14	12	22,803	.920

MATERIALS

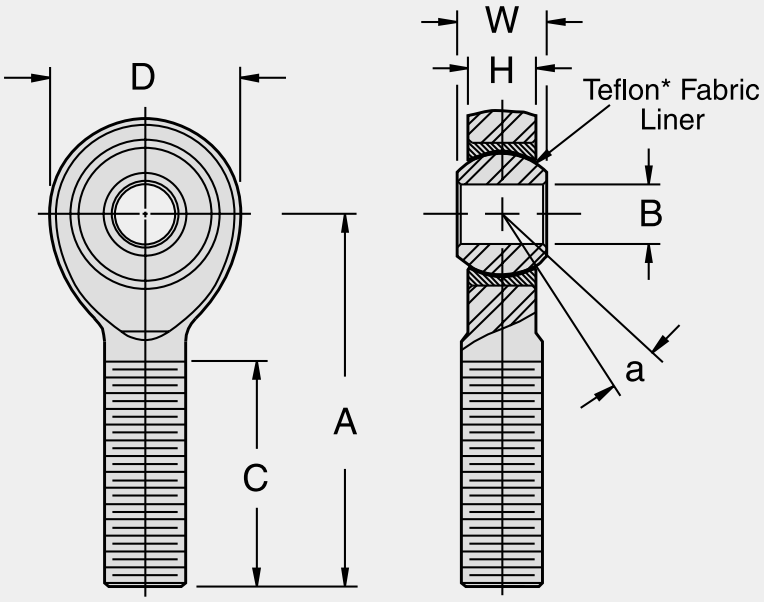
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: RM8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: RM8S

RM-T

3-Piece, Teflon* Lined, Extra Strength, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RM3T	**RML3T**	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	2,158	.043
RM4T	**RML4T**	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	3,467	.072
RM5T	**RML5T**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,323	.112
RM6T	**RML6T**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,180	.160
RM7T	**RML7T**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	9,620	.249
RM8T	**RML8T**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	12,807	.382
RM10T	**RML10T**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	16,565	.602
RM12T	**RML12T**	.7500	.875	.687	3.375	2.000	1.312	1.875	7/8-14	12	22,803	.920

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

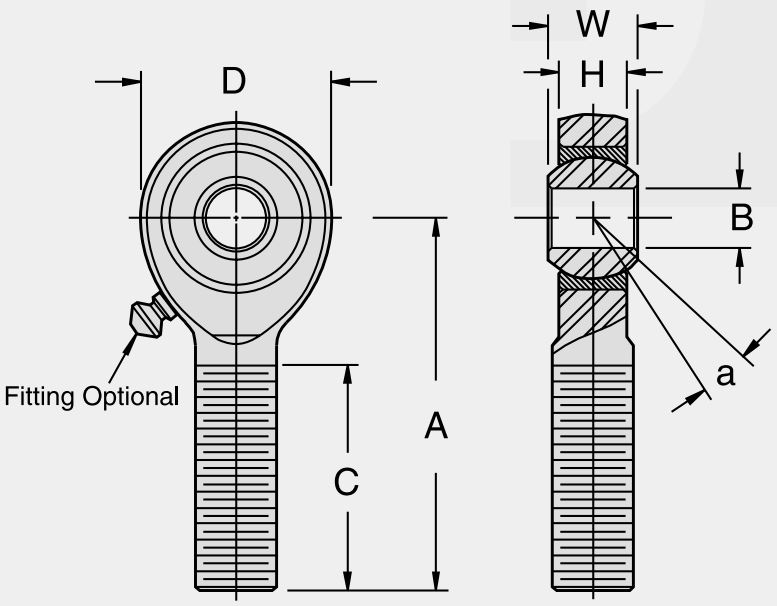
NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: RM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

RMX

3-Piece, Metal to Metal, Alloy Steel, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RMX3	**RMXL3**	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	5,260	.043
RMX4	**RMXL4**	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	8,452	.072
RMX5	**RMXL5**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	12,978	.112
RMX6	**RMXL6**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	17,508	.160
RMX7	**RMXL7**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	23,452	.249
RMX8	**RMXL8**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	31,390	.382
RMX10	**RMXL10**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	40,572	.602

MATERIALS

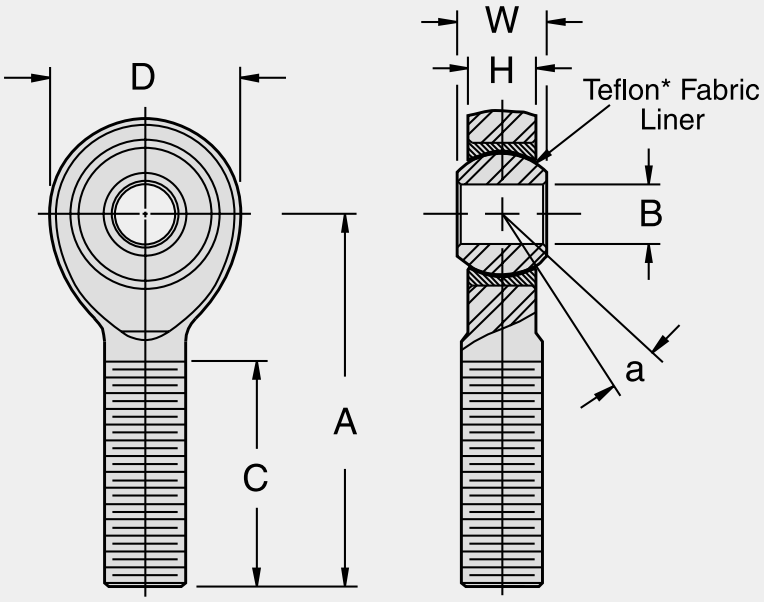
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add “Z” to suffix. Example: RMX8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding “S” to suffix. Example: RMX8S

RMX-T

3-Piece, Teflon* Lined, Alloy Steel, Heavy Duty Shank





Part Number		B +.0025 -.0005	W +.000 -.005	H ±.005	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RMX3T	**RMXL3T**	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	5,260	.043
RMX4T	**RMXL4T**	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	8,452	.072
RMX5T	**RMXL5T**	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	12,978	.112
RMX6T	**RMXL6T**	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	17,508	.160
RMX7T	**RMXL7T**	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	23,452	.249
RMX8T	**RMXL8T**	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	31,390	.382
RMX10T	**RMXL10T**	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	40,572	.602

MATERIALS

Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Steel Alloy Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

NOTES:

1. This series is also available in a studded configuration.
   (Refer to chart in this catalog on page 66)
   Specify by adding “S” to suffix.
   Example: RMX8TS

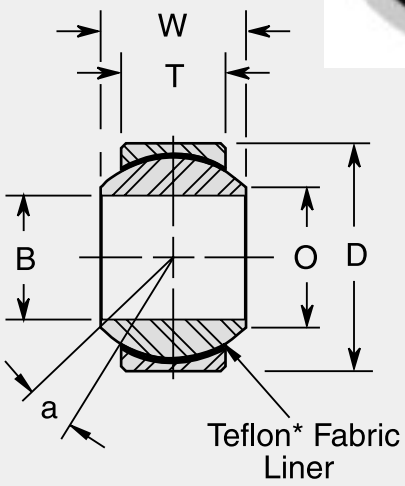
*A trademark of E.I. DuPont de Nemours & Co., Inc.

WSSB, WSSB-V

Stainless Steel, Swaged Race, Teflon* Lined

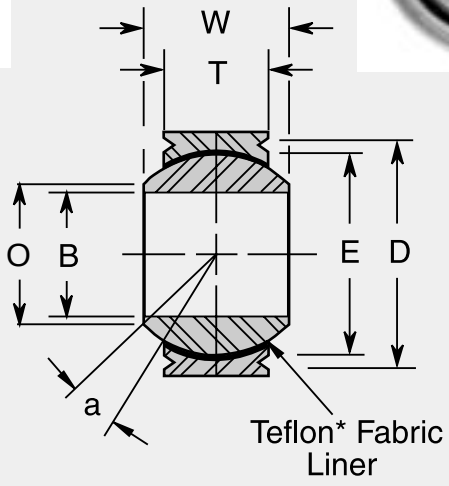
WSSB





WSSB-V





Part Number		B +.0000 -.0005	D +.0000 -.0005	W +.000 -.002	T ±.005	E +.000 -.010	O REF	REF	a°	Static Radial Limit Load (Pounds)	Static Axial Limit Load (Pounds)	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)
		Ball Bore	Outside Diameter	Ball Width	Race Width	"V" Groove Diameter	Ball Flat Diameter	Ball Diameter	Misalign. Angle				
WSSB3	**WSSB3V**	.1900	.6250	.437	.327	.565	.301	.531	15	9,000	1,770	3,770	.031
WSSB4	**WSSB4V**	.2500	.6250	.437	.327	.565	.301	.531	15	9,000	1,770	3,770	.031
WSSB5	**WSSB5V**	.3125	.6875	.437	.317	.627	.401	.593	14	9,400	1,640	4,650	.035
WSSB6	**WSSB6V**	.3750	.8125	.500	.406	.714	.471	.687	8	13,700	2,630	6,390	.060
WSSB7	**WSSB7V**	.4375	.9375	.562	.442	.839	.542	.781	10	20,700	3,650	9,390	.080
WSSB8	**WSSB8V**	.5000	1.0000	.625	.505	.902	.612	.875	9	27,500	4,970	12,150	.100
WSSB10	**WSSB10V**	.6250	1.1875	.750	.567	1.089	.752	1.062	12	39,000	6,130	16,700	.160
WSSB12	**WSSB12V**	.7500	1.3750	.875	.630	1.253	.892	1.250	13	52,300	7,730	22,100	.240
WSSB14	**WSSB14V**	.8750	1.6250	.875	.755	1.503	1.061	1.375	6	67,300	10,800	28,200	.350
WSSB16	**WSSB16V**	10000	2.1250	1.375	1.005	2.003	1.275	1.875	12	137,000	19,300	53,700	.970

MATERIALS

Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n WSBT(3-16) or WSBT(3-16)V in place of part numbers in table.

*A trademark of E.I. DuPont de Nemours & Co.

NSSB, NSSB-V

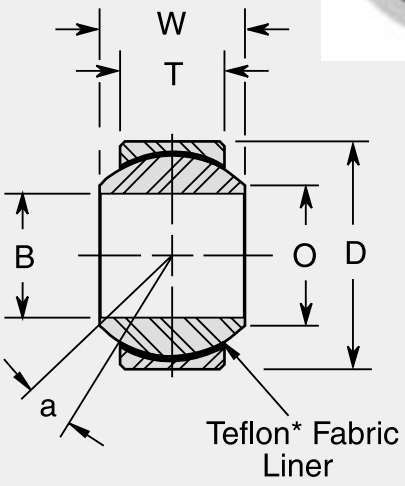
Stainless Steel, Swaged Race, Teflon* Lined

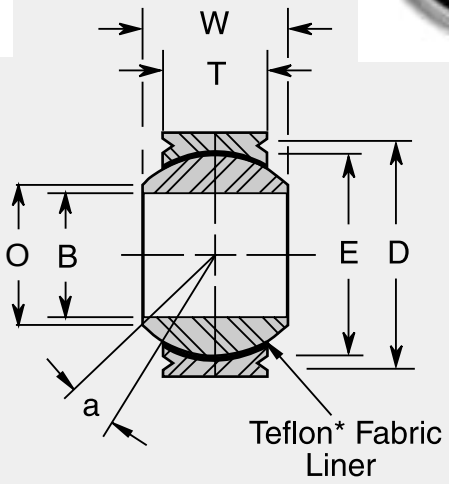
NSSB



NSSB-V







Part Number		B +.0000 -.0005 Ball Bore	D +.0000 -.0005 Outside Diameter	W +.000 -.005 Ball Width	T ±.005 Race Width	E +.000 -.010 "V"Groove Diameter	O REF Ball Flat Diameter	REF Ball Diameter	a° Misalign Angle	Static Radial Limit Load (Pounds)	Static Axial Limit Load	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)
NSSB3	**NSSB3V**	.1900	.5625	.281	.218	.502	.293	.406	10	3,975	150	1,500	.020
NSSB4	**NSSB4V**	.2500	.6562	.343	.250	.596	.364	.500	10	6,040	430	2,320	.020
NSSB5	**NSSB5V**	.3125	.7500	.375	.281	.652	.419	.562	10	8,750	700	3,430	.030
NSSB6	**NSSB6V**	.3750	.8125	.406	.312	.714	.515	.656	9	10,540	1,100	4,200	.040
NSSB7	**NSSB7V**	.4375	.9062	.437	.343	.808	.570	.718	8	13,200	1,400	5,700	.050
NSSB8	**NSSB8V**	.5000	1.0000	.500	.390	.878	.641	.813	8	17,900	2,100	7,900	.070
NSSB10	**NSSB10V**	.6250	1.1875	.625	.500	1.065	.739	.968	8	30,500	4,720	13,400	.120
NSSB12	**NSSB12V**	.7500	1.4375	.750	.593	1.315	.920	1.187	8	46,400	6,750	19,700	.210
NSSB14	**NSSB14V**	.8750	1.5625	.875	.703	1.440	.978	1.312	8	62,200	9,350	26,100	.270
NSSB16	**NSSB16V**	1.0000	1.7500	1.000	.797	1.628	1.118	1.500	9	82,200	12,160	34,100	.390

MATERIALS

*Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

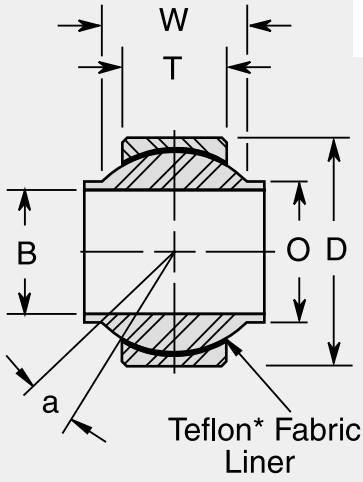
This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n NSBT(3-16) or NSBT(3-16)V in place of part numbers in table.

YSSB, YSSB-V

High Misalignment Teflon* Lined Series

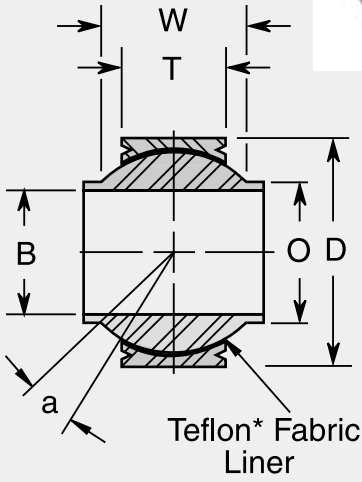
YSSB





YSSB-V





Part Number		B +.0000 -.0005 Ball Bore	D +.0000 -.0005 Outside Diameter	W +.000 -.002 Ball Width	T ±.005 Race Width	O +.000 -.010 Shoulder Diameter	REF Ball Diameter	a° Misalign Angle	Static Radial Limit Load (Pounds)	Static Axial Limit Load (Pounds)	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)
YSSB4	**YSSB4V**	.2500	.7400	.593	.255	.390	.593	24	7,100	450	3,800	.036
YSSB5	**YSSB5V**	.3125	.6875	.625	.255	.418	.593	20	9,000	450	3,800	.025
YSSB6	**YSSB6V**	.3750	.9060	.813	.345	.512	.781	23	16,000	2,000	7,200	.068
YSSB7	**YSSB7V**	.4375	1.0000	.875	.345	.618	.875	22	19,300	2,000	8,100	.095
YSSB8	**YSSB8V**	.5000	1.1250	.937	.401	.730	1.000	20	26,100	3,200	10,900	.159
YSSB10	**YSSB10V**	.6250	1.3750	1.200	.567	.856	1.250	20	44,500	7,000	20,000	.245
YSSB12	**YSSB12V**	.7500	1.5625	1.280	.620	.970	1.375	18	54,800	8,700	24,200	.315

MATERIALS

*Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

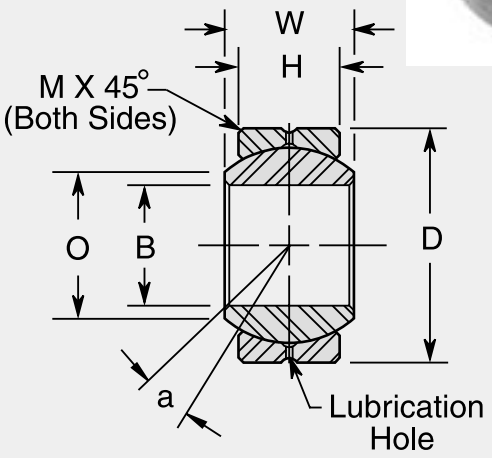
* This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n YSBT(4-12) or YSBT(4-12)V in place of part numbers in table.

COM, COM-T

Low Carbon Steel, Metal to Metal/Teflon* Lined

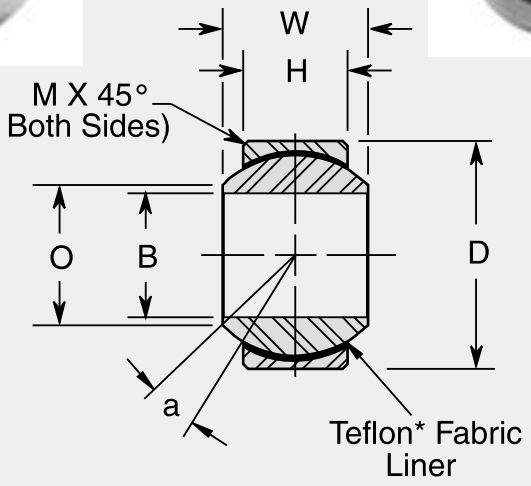
COM





COM-T





Part Number		B +.0015 -.0005 Ball Bore	D +.0000 -.0007 Outside Diameter	H ±.005 Race Width	W ±.005 Ball Width	O REF Ball Flat Diameter	M REF O.D. Chamfer	REF Ball Diameter	a° Misalign Angle	Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
COM3	**COM3T**	.1900	.5625	.218	.281	.293	.015	.406	11.0	3,250	.014
COM4	**COM4T**	.2500	.6562	.250	.343	.364	.022	.500	13.5	4,950	.022
COM5	**COM5T**	.3125	.7500	.281	.375	.419	.032	.562	12.0	6,475	.030
COM6	**COM6T**	.3750	.8125	.312	.406	.516	.032	.656	10.0	8,400	.038
COM7	**COM7T**	.4375	.9062	.343	.437	.569	.032	.687	13.0	10,200	.048
COM8	**COM8T**	.5000	1.0000	.390	.500	.640	.032	.781	9.5	13,250	.065
COM10	**COM10T**	.6250	1.1875	.500	.625	.780	.032	.968	8.5	21,280	.110
COM12	**COM12T**	.7500	1.4375	.593	.750	.920	.044	1.187	9.0	31,920	.204
COM14	**COM14T**	.8750	1.5625	.703	.875	.980	.044	1.312	9.5	41,960	.263
COM16	**COM16T**	1.0000	1.7500	.797	1.000	1.118	.044	1.500	10.0	55,200	.386

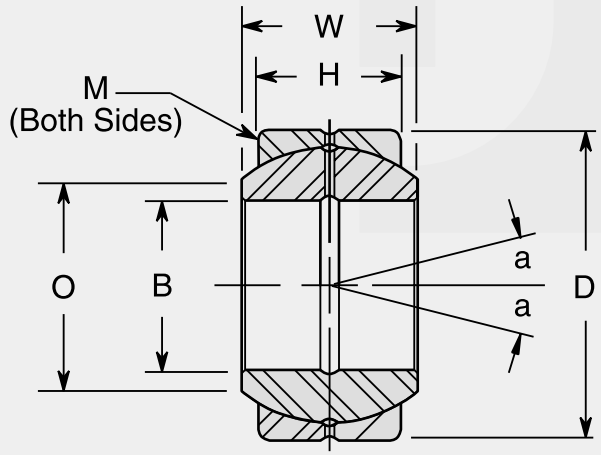
MATERIALS

Ball	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Oil Coated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

GEZ

Metal to Metal, Fractured Race





Part Number	B +.0000 -.0005 Ball Bore	D +.0000 -.0005 Outside Diameter	H +.000 -.005 Race Width	W +.000 -.005 Ball Width	O REF Ball Flat Diameter	M Min. Race Fillet	REF Ball Diameter	a° Misalign Angle	Maximum Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
GEZ12ES	.5000	.8750	.375	.437	.551	.032	.709	6.0	9,330	.044
GEZ15ES	.6250	1.0625	.469	.547	.703	.040	.906	6.0	14,726	.079
GEZ19ES	.7500	1.2500	.562	.656	.844	.040	1.083	6.0	21,358	.126
GEZ22ES	.8750	1.4375	.656	.765	.974	.040	1.260	6.0	28,552	.193
GEZ25ES	1.0000	1.6250	.750	.875	1.103	.040	1.417	6.0	37,320	.276
GEZ31ES	1.2500	2.0000	.937	1.093	1.382	.040	1.772	6.0	58,543	.516
GEZ34ES	1.3750	2.1875	1.031	1.187	1.516	.040	1.929	6.0	69,694	.770
GEZ38ES	1.5000	2.4375	1.125	1.312	1.703	.040	2.165	6.0	84,308	.934
GEZ44ES	1.7500	2.8125	1.312	1.531	1.984	.040	2.520	6.0	114,658	1.430
GEZ50ES	2.0000	3.1875	1.500	1.750	2.266	.048	2.874	6.0	150,629	2.070
GEZ63ES	2.5000	3.9375	1.875	2.187	2.833	.048	3.583	6.0	236,061	4.090
GEZ69ES	2.7500	4.3750	2.062	2.406	3.110	.048	3.937	6.0	281,025	5.380
GEZ76ES	3.0000	4.7500	2.250	2.625	3.406	.048	4.331	6.0	337,230	6.870

MATERIALS

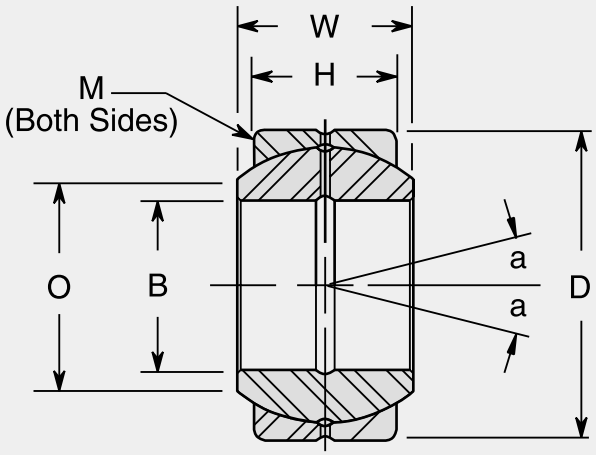
Ball	Race
Carbon Chromium Steel Hardened, Ground and Phosphated. Sliding Surface Treated with MoS_2	Carbon Chromium Steel, Fractured, Hardened, Ground and Phosphated. Sliding surface treated with MoS_2

NOTES:

1. Dimension precision for GEZ series spherical bearings is before splitting the outer race and before coating inner and outer components.

GE

Metal to Metal, Fractured Race Metric





Part Number	B +.0000 -.0127 Ball Bore	D +.0000 -.0177 Outside Diameter	H +.000 -.127 Race Width	W +.000 -.127 Ball Width	O REF Ball Flat Diameter	M Min. Race Fillet	REF Ball Diameter	a° Misalign Angle	Maximum Radial Static Load Capacity (Newtons)	Approx. Weight (Kilograms)
GE30ES	30	47	18	22	34	0.6	40.7	6	310,000	0.16
GE40ES	40	62	22	28	45	1.0	53.0	7	500,000	0.32
GE45ES	45	68	25	32	50	1.0	60.0	7	640,000	0.46
GE50ES	50	75	28	35	55	1.0	66.0	6	780,000	0.56

MATERIALS

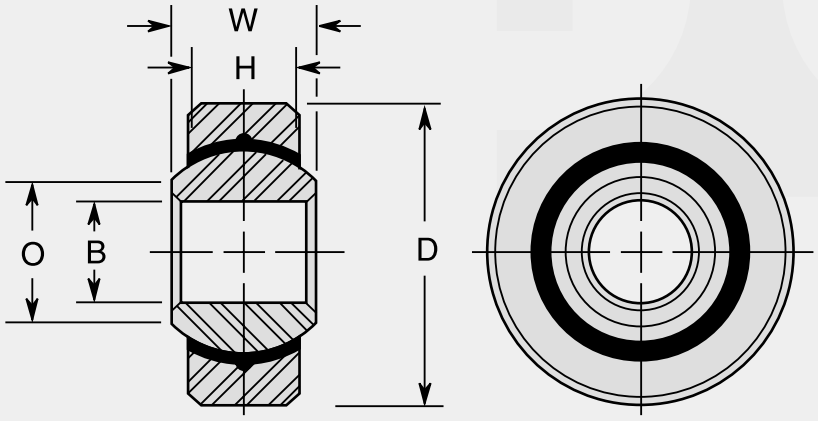
Ball	Race
Carbon Chromium Steel Hardened, Ground and Phosphated. Sliding Surface Treated with MoS_2	Carbon Chromium Steel, Fractured, Hardened, Ground and Phosphated. Sliding surface treated with MoS_2

NOTES:

1. Dimension precision for GE series spherical bearings is before splitting the outer race and before coating inner and outer components.

J, JM

Metric/Inch Molded Race Spherical Bearings





INCHES Part Number	B +.0020 -.0005 Ball Bore	D +.0 -.0005 Outside Diameter	H +.0 -.005 Race Width	W ± .0005 Ball Width	O REF Ball Flat Diameter	Ultimate Radial Static Load Capacity (Pounds)
J03	.1900	.5625	.218	.281	.293	1,102
J04	.2500	.6562	.250	.343	.364	1,607
J05	.3125	.7500	.281	.375	.419	2,700
J06	.3750	.8125	.343	.406	.475	2,943
J07	.4375	.9062	.312	.437	.530	3,619
J08	.5000	1.0000	.390	.500	.600	4,328
J10	.6250	1.1875	.500	.625	.739	6,800

MILLIMETERS Part Number	B +.063 -.013 Ball Bore	D +.0 -.013 Outside Diameter	H + 0 - 0.1 Race Width	W ± .013 Ball Width	O REF Ball Flat Diameter	Ultimate Radial Static Load Capacity (Newtons)
J03M	3	12	4.50	6	5.20	3,040
J05M	5	16	6.00	8	7.50	5,340
J06M	6	18	6.75	9	9.30	7.720
J08M	8	22	9.00	12	10.40	12,775
J10M	10	26	10.50	14	12.90	16,960
J12M	12	30	12.00	16	15.40	22,900
J14M	14	34	13.50	19	16.80	28,950
J16M	16	38	15.00	21	19.30	37,130

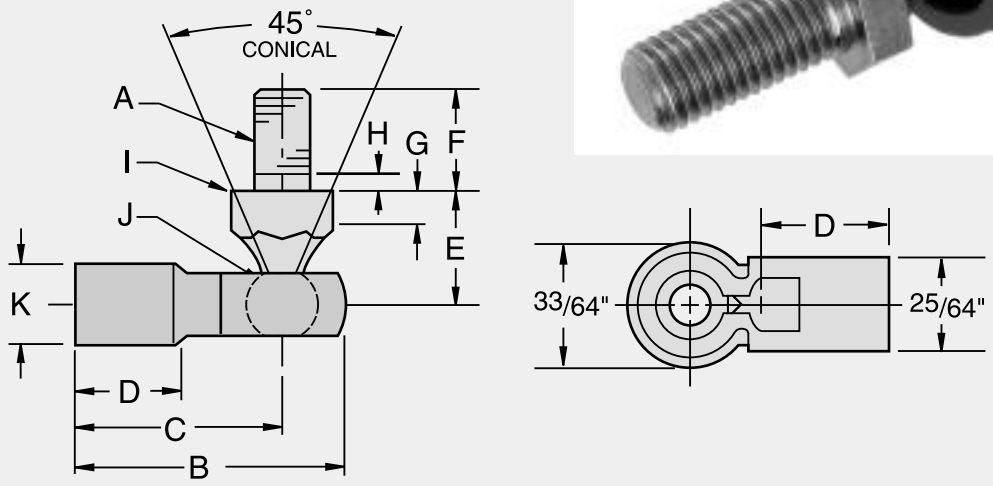
MATERIALS

Ball	Race	Liner
Low Carbon Steel Case Hardened Nickel Plated	Low Carbon Steel	Self Lubricated Thermo Plastic

P

Hard Plastic Body with Steel Ball Stud





Part Number	A UNF	B ± .030	C ± .030	D REF 7/8	E ± .020	F ± .020	G REF	H REF	I REF	J REF	K REF	Ball Diameter REF
P103S	10-32	7/8	21/32	7/16	7/16	7/16	1/8	1/16	5/16	.125	5/16	.229
P103L	10-32	1-7/64	7/8	19/32	7/16	7/16	1/8	1/16	3/8	.156	5/16	.309
P107	1/4-28	1-7/64	7/8	3/8	7/16	9/16	1/8	1/16	3/8	.156	5/16	.309
P103BL*	10-32	–	–	–	7/16	7/16	1/8	1/16	3/8	.156	–	.309
P103HL**	10-32	1-7/64	7/8	19/32	–	–	–	–	–	–	5/16	–

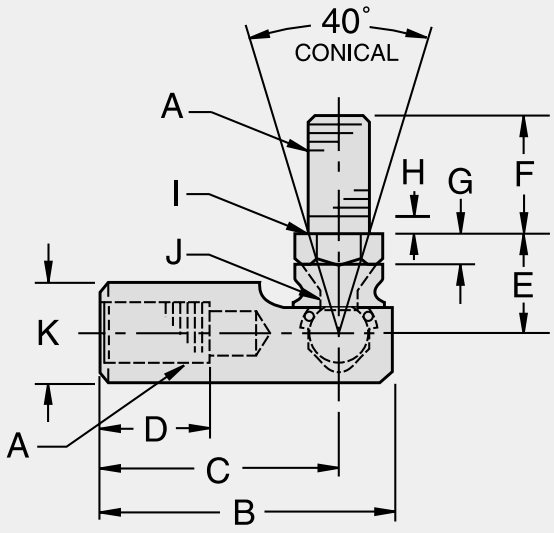
* Ball Stud only
** Body only

MATERIALS

Ball Stud	Body
Low Carbon Steel	Plastic
Zinc Plated	Hard Thermo-Molded
Yellow Dichromate Treated	Wear-Resistant

SR-G

Ball Joint with Rubber Grommet,
SAE J490/Type G/Style 4





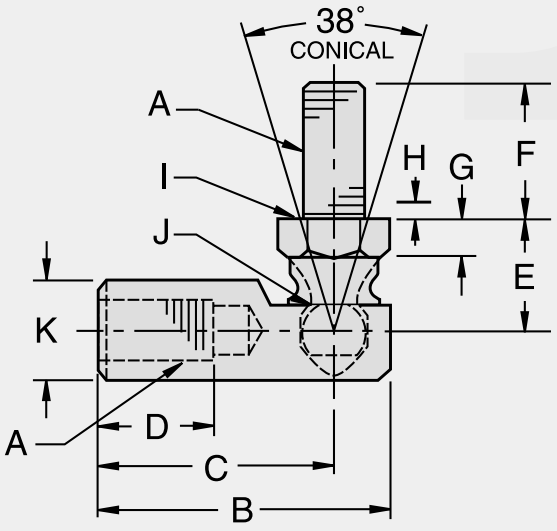
Part Number		A	B	C	D	E	F	G	H	I	J	K	W.F.	W.F.	Tensile & Shear Strength	Force to Remove Ball Stud
Right Hand	Left Hand	UNF	± .020	± .020	MIN	± .020	± .020	REF	REF	REF	REF	REF	Width	Length	(Pounds)	(Pounds)
SR103G	**SR103GLH**	10-32	1-7/32	31/32	15/32	15/32	7/16	1/8	1/16	3/8	.217	7/16	3/8	9/32	420	1,400
SR107G	**SR107GLH**	1/4-28	1-7/32	31/32	17/32	15/32	9/16	1/8	1/16	3/8	.217	7/16	3/8	9/32	882	1,400
SR108G	**SR108GLH**	5/16-24	1-13/32	1-1/8	9/16	17/32	11/16	5/32	3/32	7/16	.232	1/2	7/16	9/32	1,375	1,575
SR109G	**SR109GLH**	3/8-24	1-11/16	1-3/8	3/4	11/16	7/8	3/16	3/32	1/2	.284	5/8	1/2	5/16	1,675	1,700
SR111G	**SR111GLH**	1/2-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.382	3/4	5/8	3/8	2,637	2,855
SR112G	**SR112GLH**	5/8-18	2-37/64	2-1/16	1	1	1-1/8	5/16	1/8	3/4	.417	7/8	3/4	1/2	2,920	3,135

MATERIALS

Ball Stud	Body	Retaining Ring
Low Carbon Steel Heat Treated Zinc Plated Yellow Dichromate Treated	Low Carbon Steel Heat Treated Zinc Plated Yellow Dichromate Treated	Galvanized Music Wire Stress Relieved

R-G

Ball Joint with Rubber Grommet,
SAE J490/Type G/Style 2





Part Number		A	B	C	D	E	F	G	H	I	J	K	W.F.	W.F.	Tensile & Shear Strength	Force to Remove Ball Stud
Right Hand	Left Hand	UNF	± .020	± .020	MIN	± .020	± .020	REF	REF	REF	REF	REF	Width	Length	(Pounds)	(Pounds)
R103G	**R103GLH**	10-32	1-1/16	7/8	7/16	7/16	7/16	1/8	1/16	5/16	.172	3/8	5/16	7/32	295	690
R107G	**R107GLH**	1/4-28	1-7/32	31/32	1/2	15/32	9/16	1/8	3/32	3/8	.193	7/16	3/8	9/32	882	1,005
R108G	**R108GLH**	5/16-24	1-13/32	1-1/8	9/16	17/32	11/16	5/32	3/32	7/16	.232	1/2	7/16	9/32	1,587	1,282
R109G	**R109GLH**	3/8-24	1-11/16	1-3/8	3/4	11/16	7/8	3/16	3/32	1/2	.287	5/8	1/2	5/16	2,437	1,900
I3-316	**F58-11G**	3/8-24	1-11/16	1-3/8	3/4	11/16	5/8	3/16	3/32	1/2	.287	5/8	1/2	5/16	2,437	1,900
R110G	**R110GLH**	7/16-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.412	3/4	5/8	3/8	3,390	2,700
R111G	**R111GLH**	1/2-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.412	3/4	5/8	3/8	3,390	2,700

MATERIALS

Ball Stud	Body
Low Carbon Steel	Low Carbon Steel
Heat Treated	Zinc Plated
Zinc Plated	Yellow Dichromate Treated
Yellow Dichromate Treated	

NOTE:

1. **This series is also available in male to male and female to female configuration. Consult factory.**

S/SC

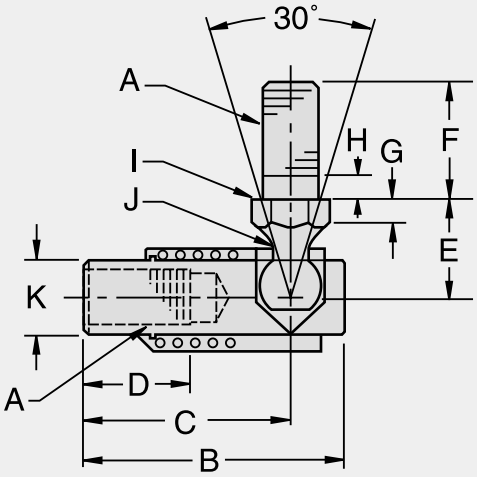
Quick Disconnect with Spring or Spring Clip



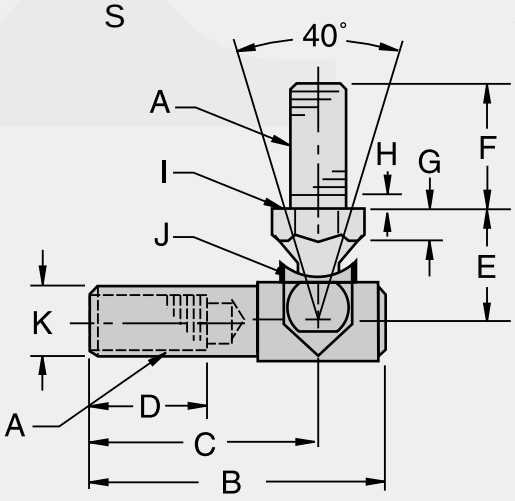
S



SC



(Type S)



(Type SC)

Part Number	A UNF	B ± .020	C ± .020	D MIN	E ± .020	F ± .020	G REF	H REF	I REF	J REF	K REF	Ball Diameter REF
S103	10-32	1-3/32	29/32	7/16	7/16	7/16	1/8	1/16	5/16	.171	5/16	.253
S107S	1/4-28	1-3/32	29/32	1/2	15/32	9/16	9/64	1/16	5/16	.171	5/16	.253
S108	5/16-24	1-9/16	1-1/4	9/16	35/64	11/16	5/32	3/32	7/16	.232	7/16	.341
S109	3/8-24	1-15/16	1-9/16	3/4	23/32	7/8	3/16	3/32	1/2	.287	9/16	.416
SC103	10-32	1-5/32	7/8	1/2	7/16	7/16	1/8	1/16	5/16	.125	5/16	.253
SC107	1/4-28	1-1/4	31/32	9/16	7/16	9/16	1/8	3/32	5/16	.125	5/16	.252

MATERIALS

Ball Stud	Shell	Body
Low Carbon Steel Heat Treated Zinc Plated Yellow Dichromate Treated	Low Carbon Steel Heat Treated Zinc Plated Yellow Dichromate Treated	Low Carbon Steel Zinc Plated Yellow Dichromate Treated

DC/DH

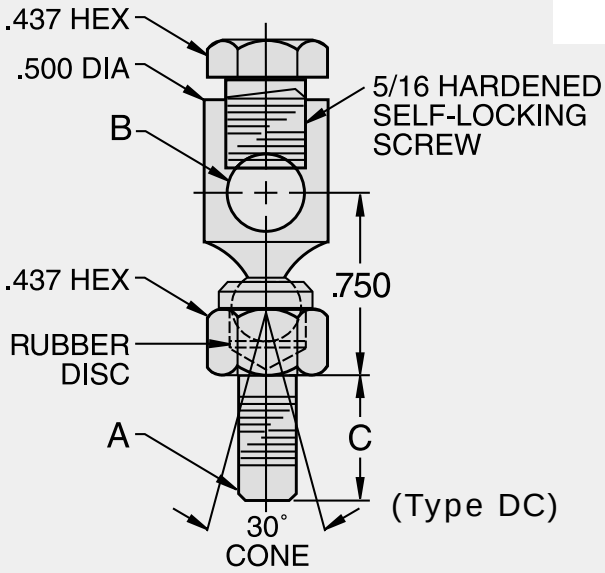
Control Swivels



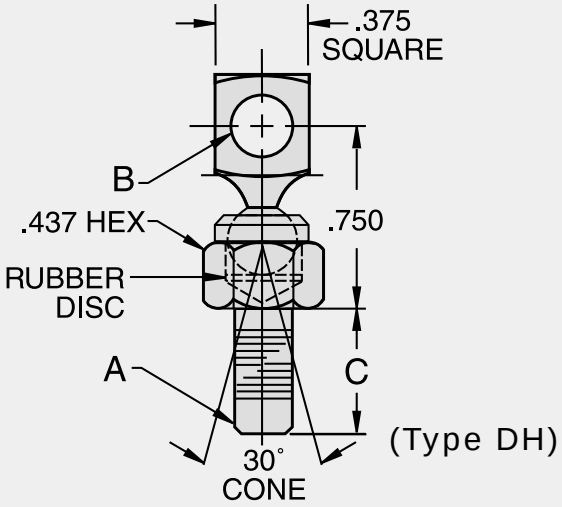
DC



DH



(Type DC)



(Type DH)

Part Number		B +.005 -.002	C ± .015	A	Weight Less Integral Nut & Washer (Pounds)	Weight With Integral Nut & Washer (Pounds
Less Integral Nut & Washer	With Integral Nut & Washer	Bore Diameter	Shank	Thread Size & Length		
DC1005F	**DC1005FN**	.328	.312	10-32 x .250	.047	.050
DC1207F	**DC1207FN**	.328	.437	1/4-28 x .328	.050	.057
DC1209F	**DC1209FN**	.328	.562	1/4-28 x .500	.052	.058
DC1207C	**DC1207CN**	.328	.437	1/4-20 x .328	.049	.056
DC1209C	**DC1209CN**	.328	.562	1/4-20 x .453	.051	.057
DC1310F	**DC1310FN**	.328	.625	5/16-24 x .516	.056	.067
DC1312F	**DC1312FN**	.328	.750	5/16-24 x .641	.059	.070
DH1209F-2		.257	.562	1/4-28 x .500	.035	
DH1207F-2		.257	.437	1/4-28 x .328	.033	

MATERIALS

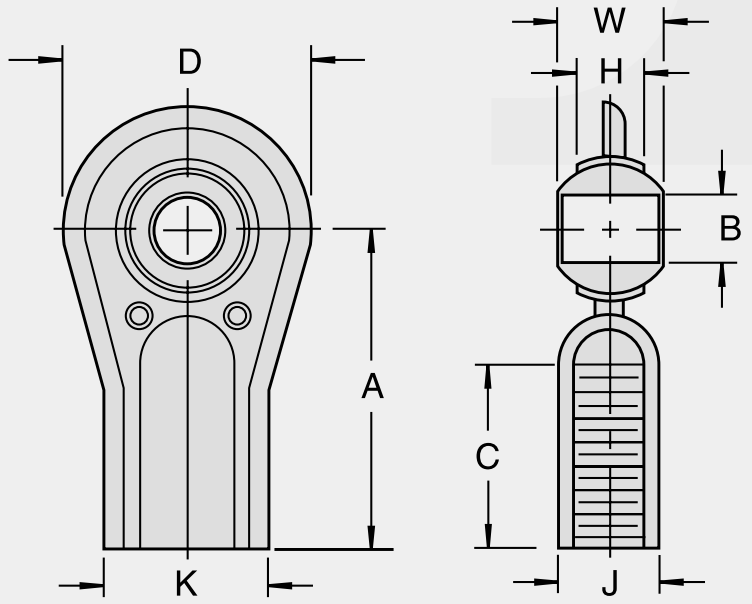
Ball Joint	Integral Lock Washer and Nut	Special Set Screws
Made of low carbon steel, zinc plated and dichromate treated for corrosion resistance. A Buna N rubber disc provides smooth, vibration-free operation.	Available as an optional extra.	Set screws used in TLG's damper control swivels are a self-locking design that provides increased holding strength. DC set screws are surface hardened for wear resistance.

NOTES:

1. These swivels can be used with either 1/4" or 5/16" diameter control rods.

FSF

Stamped Steel Housing, 2-Piece, Metal to Metal





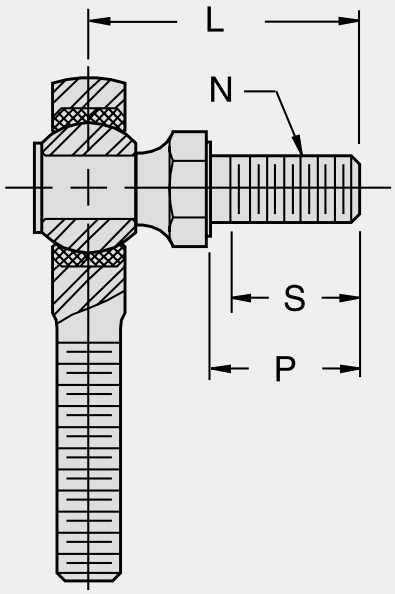
Part Number		B +.002 -.000	W ±.005	A +.062 -.031	D ± .030	K ± .030	+.000 -.002	C ± .040	UNF-2B	J ± .030	H REF
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Shank Width	Ball Diameter	Thread Length	Thread Size	Shank Thickness	Housing Width
FSF6	**FSFL6**	.375	.500	1.625	1.150	.760	.719	.812	3/8-24	.485	.375

MATERIALS

Ball	Body
Low carbon steel Case hardened Zinc plated Dichromate treated	Heavy gauge low carbon steel, zinc plated and chromate treated for corrosion resistance.

Bearing Options

Factory Installed Studs and Lubrication Fittings



Rod End Bore Size	L REF	P ± .030	S Min. Thread Length	N Thread Size UNF-2A
3/16”	.875	.438	.375	10-32
1/4”	1.032	.563	.500	1/4-28
5/16”	1.220	.688	.594	5/16-24
3/8”	1.500	.875	.781	3/8-24
7/16”	1.906	1.062	.937	7/16-20
1/2”	2.000	1.125	1.000	1/2-20
5/8”	2.500	1.500	1.375	5/8-18
3/4”	3.000	1.812	1.625	3/4-16

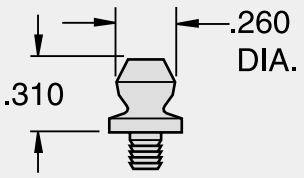
Available on designated series. To specify standard stud, add suffix “S”.
Example: MSF8S

NOTES:

1. Material: Low carbon steel, zinc plated, dichromate treated.
2. Misalignment is plus/minus 25 degrees (approx.) in any direction.

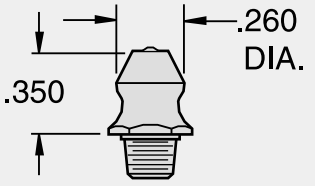


Standard zerk locations on male and female rod ends.



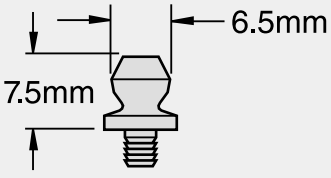
Standard Drive Fit Zerk

Specify by adding suffix “Z” to part number.
Example: MSF8Z



Standard Threaded Zerk

Specify by adding suffix “-28” to part number.
Example: MSF8Z-28



Metric Zerk

Specify by adding suffix “ZM” to part number.
Example: MSF8ZM

Technical Information

TLG's engineering staff possesses the expertise to provide advice and guidelines regarding nearly all motion transmission applications.

There are several factors pertaining to engineering application, including correct installation, that should be taken into consideration to insure optimum performance of your chosen linkage components.

1) When mounting ball studs, the hex mounting portion should be properly tightened and flat against its mating surface. Adequate countersinks, counterbores or washers may be necessary to provide a tight, flush joint.

Installation torque values for tightening must be within the capacity of the linkage component or breakage may occur from over-tightening. Consult with the TLG engineering staff, or refer to an appropriate engineering standard mounting nut torque values associated with each grade of threaded fastener. Looseness in the threaded joint or mounting surface may cause abnormal wear and early failure of the linkage component.

2) When mounting rod ends, care should be used in tightening a fastener against the ball to prevent distortion. The same torque requirements that apply to threaded fasteners also apply to securing the rod end spherical ball. The plated ball may become chipped or distorted by excessive clamping pressure, resulting in increased torque, wear, and premature failure of the rod end.

3) In applications involving vibration where loosening of the linkage components may occur, self locking nuts or lockwashers should be used to secure the components and prevent loosening. Looseness in the threaded joint or mounting surface may cause abnormal wear and early failure of the linkage component.

4) Ball joints and rod end bearings should be mounted in such a way as to best utilize the design of the joint with respect to gravitational force, for example, a ball joint should be mounted with the housing member on top of the ball stud. Mounting the housing component so that the weight of it and the linkage are hanging from the ball or ball stud could accelerate wear and lead to detachment of linkage components and sudden loss of control.

5) It is recommended that a separate stop be incorporated in the linkage system to eliminate the possibility of exceeding the misalignment capability of the ball joint or rod end bearing. An overtravel condition of this type may result in breakage and detachment of the ball joint or rod end components and sudden loss of control.

6) TLG ball joints and rod end bearings are manufactured to commercial standards. If you have questions concerning a particular product for your application, TLG can offer assistance; however, it is your responsibility to determine if the part you chose will be suitable for a specific application. *This is especially true in applications where safety is a factor.*

7) To determine a part's useful life for a particular application, you should test sample parts under actual operating conditions.

Installation of Spherical Bearing

Proper installation of the bearing is important to prevent bearing failure as well as housing damage. Under no circumstances should a tool that induces shock or impact to the bearing be used. The use of an arbor press or hydraulic press is recommended. A tool as shown below (Figure 1) is advised. All force is to be applied on bearing race face (not on ball). A lead chamfer or radius on the bearing and/or housing is vital.

Ultimate Radial Static Load Capacity (Rod Ends)

These loads are the maximum amount of force the part can sustain before complete failure. All loads listed in the catalog are based on rod ends without grease fittings. Due to the removal of material for the fitting, the load rating for such a part is substantially lower. Consult TLG engineering for assistance on these parts.

Radial Static Load Capacity (Spherical Bearings)

These loads are the maximum amount of force the part can sustain before a 2% permanent set occurs in the part. Consult TLG engineering if these numbers don't fit your application.

Static Limit Load (Spherical Bearings)

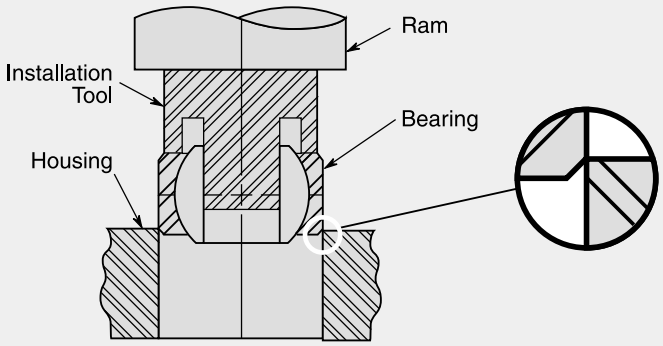
Static limit load is the allowable load that can be applied to a bearing without adversely affecting its performance capabilities.

Housing Bore for Press Fit of Spherical Bearings

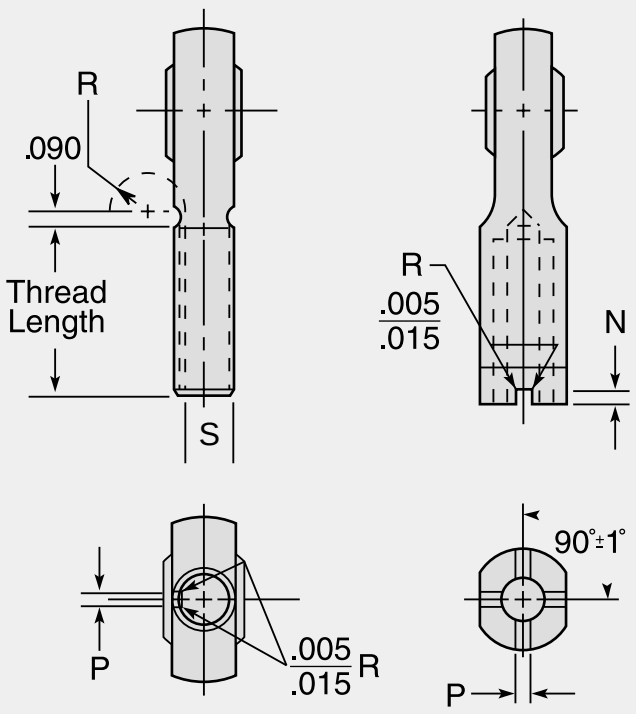
D BEARING DIAMETER +.0000 -.0005	Housing Bore STEEL MAX.	STEEL MIN.	ALUMINUM MAX.	ALUMINUM MIN.
.6250	.6245	.6241	.6244	.6239
.7500	.7495	.7491	.7494	.7489
.8750	.8745	.8741	.8744	.8739
1.0000	.9995	.9991	.9994	.9989
1.1875	1.1870	1.1865	1.1869	1.1863
1.3125	1.3120	1.3115	1.3119	1.3113
1.5625	1.5620	1.5613	1.5619	1.5611
2.2500	2.2495	2.2488	2.2494	2.2486
2.3750	2.3745	2.3738	2.3744	2.3736
2.6250	2.6245	2.6238	2.6244	2.6236
3.2500	3.2495	3.2488	3.2494	3.2486
4.0000	3.9995	3.9988	3.9994	3.9986

D BEARING DIAMETER +.0000 -.0005	Housing Bore STEEL MAX.	STEEL MIN.	ALUMINUM MAX.	ALUMINUM MIN.
.4687	.4682	.4678	.4681	.4676
.5625	.5620	.5616	.5619	.5614
.6562	.6557	.6553	.6556	.6551
.7500	.7495	.7491	.7494	.7489
.8125	.8120	.8116	.8119	.8114
.9062	.9057	.9053	.9056	.9051
1.0000	.9995	.9991	.9994	.9989
1.0937	1.0932	1.0928	1.0931	1.0926
1.1875	1.1870	1.1866	1.1869	1.1864
1.4375	1.4370	1.4366	1.4369	1.4364
1.5625	1.5620	1.5616	1.5619	1.5614
1.7500	1.7495	1.7491	1.7494	1.7489

Figure 1



Rod End Keyway (Ref NAS 559)



THREAD OD REF	Dimensions in Inches N MAX.	P MIN.	N MAX.	P MIN.
.2500	.056	.062	.201	.255
.3125	.056	.062	.260	.255
.3750	.056	.093	.311	.255
.4375	.069	.093	.370	.255
.5000	.069	.093	.436	.255
.5620	.077	.125	.478	.255
.6250	.077	.125	.541	.255
.7500	.077	.125	.663	.255
.8750	.086	.156	.777	.318
1.0000	.094	.156	.900	.318
1.1250	.094	.094	1.010	.382
1.2500	.116	.187	1.136	.382
1.3750	.116	.187	1.236	.445
1.5000	.116	.250	1.361	.445
1.6250	.129	.250	1.477	.445
1.7500	.129	.250	1.589	.508
1.8750	.129	.312	1.714	.508
2.0000	.129	.312	1.839	.508
2.1250	.129	.312	1.955	.508
2.2500	.129	.312	2.080	.508

WARNING!

Since the manufacturer is unable to determine all applications in which a part may be placed, it is the user's responsibility to determine the suitability of the part for its intended use. This is especially true where safety is a factor.

Incorrect application or installation may result in property damage, bodily injury, or death. For technical assistance, call 219-749-5105.

Calculations for Misalignment of Rod End & Spherical Bearings

B = Bore of ball

C = Chamfer on outer race

D = Head diameter or diameter of outer race

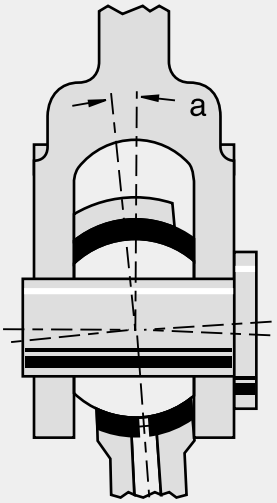
E = Ball diameter

H = Housing width

$V = \sqrt{(D - 2C)^2 + H^2}$

W = Ball width

The angle of misalignment in a rod end is controlled by the outside diameter of the head. The maximum degree of misalignment is obtained when the head contacts the side of the fork or clevis in which it is mounted.

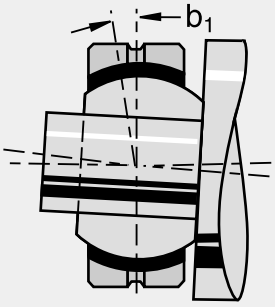


Rod End Angle:

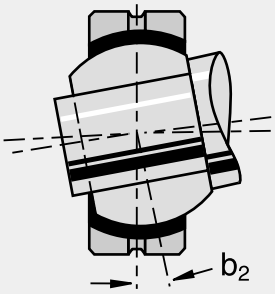
$$a = SIN^{-1}\frac{W}{D} - SIN^{-1}\frac{H}{D}$$

The angle of misalignment in a spherical bearing is calculated somewhat differently from that of the rod end because the housing is not spherical. There are three different types of mountings in which these bearings may be used as shown, and the angle of misalignment is governed by the type of mounting adopted.

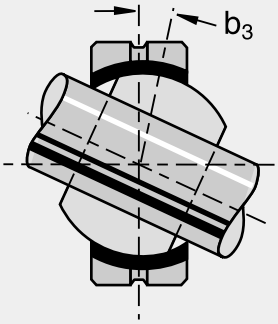
Shown below are the common mountings for spherical bearings and the corresponding formula for calculating the angle of misalignment.



$$b_1 = SIN^{1}\frac{W}{V} - SIN^{1}\frac{H}{V}$$



$$b_1 = SIN^{1}\frac{W}{E} - SIN^{1}\frac{H}{E}$$



$$b_1 = SIN^{1}\frac{B}{E} - SIN^{1}\frac{B}{E}$$

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