



SECTION 5

ROD END BEARINGS – Metal-to-Metal

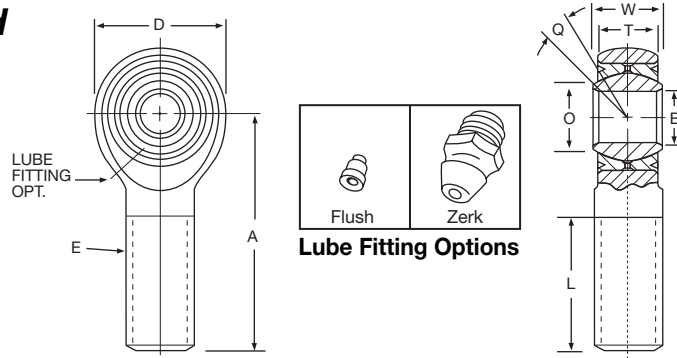
Metal-to-Metal

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ROD END BEARINGS – Metal-to-Metal

3-Piece Male Thread



Part Number	(B) Bore Diameter	(D) Head Diameter	(W) Ball Width	(T) Body Width	(O) Shoulder Diameter	Ball Diameter	(Q) Misalignment	(A) Ball C/L to End	(E) Thread Size	(L) Thread Length	Ultimate Static Radial Load*	Weight
	Inch +.0000 -.0005	Inch Max.	Inch +.000 -.005	Inch +.005 -.005	Inch Ref.	Inch Ref.	Ref.	Inch +.06 -.06	UNF - 3A	Inch +.06 -.06	lbs.	lbs. Ref.
AB3E101	.1900	.875	.500	.337	.318	.593	23°	1.812	3/8 - 24	1.062	6840	.09
AB3E	.1900	.781	.437	.337	.301	.531	16°	1.562	5/16 - 24	1.000	5170	.07
AB4E101	.2500	.875	.500	.327	.318	.593	23°	1.812	3/8 - 24	1.062	6840	.09
AB4E	.2500	.781	.437	.337	.301	.531	16°	1.562	5/16 - 24	1.000	5170	.07
ARB4E	.2500	.750	.375	.281	.376	.531	13°	1.562	5/16 - 24	1.000	4550	.06
AB5E	.3125	.875	.437	.327	.402	.593	14°	1.875	5/16 - 24	1.062	6840	.08
ARB5E	.3125	.875	.437	.344	.402	.593	12°	1.875	3/8 - 24	1.250	6940	.09
AB6E101	.3750	1.312	.812	.577	.468	.937	22°	2.531	7/16 - 20	1.500	15150	.28
AB6E	.3750	1.000	.500	.406	.472	.687	10° 30'	1.938	3/8 - 24	1.250	9540	.12
ARB6E	.3750	1.000	.500	.406	.472	.687	10° 30'	1.938	7/16 - 20	1.250	9540	.13
AB7E	.4375	1.125	.562	.442	.544	.781	11° 30'	2.125	7/16 - 20	1.375	10430	.17
ARB7E	.4375	1.125	.562	.437	.544	.781	12°	2.125	1/2 - 20	1.375	10350	.19
AB8E	.5000	1.312	.625	.515	.614	.875	9° 30'	2.438	1/2 - 20	1.500	18620	.28
ARB8E	.5000	1.312	.625	.500	.614	.875	10° 30'	2.438	5/8 - 18	1.500	18210	.30
AB10E	.6250	1.500	.750	.567	.752	1.062	12° 30'	2.625	5/8 - 18	1.625	20030	.41
ARB10E	.6250	1.500	.750	.562	.752	1.062	13°	2.625	3/4 - 16	1.625	19890	.47
AB12E	.7500	1.750	.875	.640	.894	1.250	13° 30'	2.875	3/4 - 16	1.750	28200	.63
ARB12E	.7500	1.750	.875	.687	.894	1.250	11°	2.875	7/8 - 14	1.750	29740	.70
AB14E	.8750	2.000	.875	.750	1.060	1.375	7°	3.375	7/8 - 14	1.875	42390	.90
ARB14E	.8750	2.000	.875	.765	1.062	1.375	6°	3.375	1 - 12	1.875	43040	1.07
AB16E	1.0000	2.750	1.375	1.000	1.275	1.875	15°	4.125	1 1/4 - 12	2.125	77500	2.50
ARB16E	1.0000	2.750	1.375	1.015	1.275	1.875	14° 30'	4.124	1 1/4 - 12	2.125	78410	2.50
AB20E	1.2500	2.875	1.500	1.140	1.460	2.093	12°	5.000	1 1/2 - 12	3.125	66620	3.10
ARB20E	1.2500	2.875	1.500	1.250	1.460	2.093	7° 30'	5.000	1 1/2 - 12	3.125	86380	3.80

* Load ratings are for rod ends without lubricators.

Notes:

- Radial Clearance: .002 max.
- † Plating: When specified in materials block, ball spherical diameter and ends are hard chrome plated per AMS-QQ-C-320, CL. 2 (.0002 to .0005 thickness). All external surfaces of race and/or body are cadmium plated per AMS-QQ-P-416.
- Dimensions: All dimensions apply after plating.
- Options: Radial clearance, lubrication holes and groove in ball, lubrication fittings, dry film lubrication, keyways, left hand or AS8879 threads see page 39.

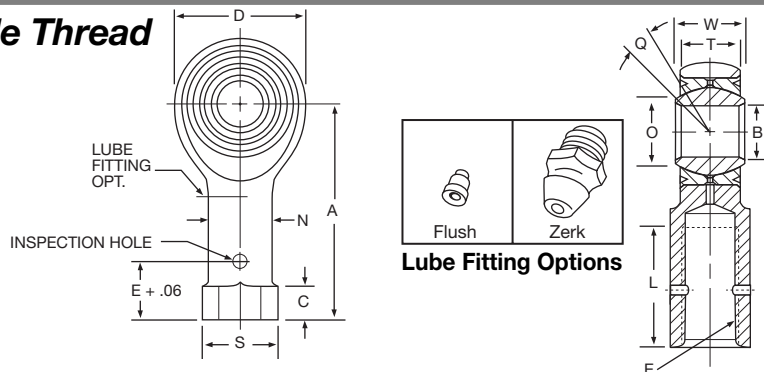
Materials

Part No.	Ball	Race	Body
Catalog No. †	52100 Alloy Steel, H.T., Chrome Plated Rc59-63	Aluminum Bronze (AMPCO® 15), Cadmium Plated	4130 Alloy Steel, H.T., Cadmium Plated
Catalog No. + S†	“	4130 Alloy Steel, H.T., Cadmium Plated	“
Catalog No. + SS†	“	CRES 17-4PH AMS5643	CRES 17-4PH AMS5643
Catalog No. + CR	CRES 440C AMS5630	“	“
Catalog No. + CRP†	CRES 440C, AMS5630 Chrome Plated	“	“

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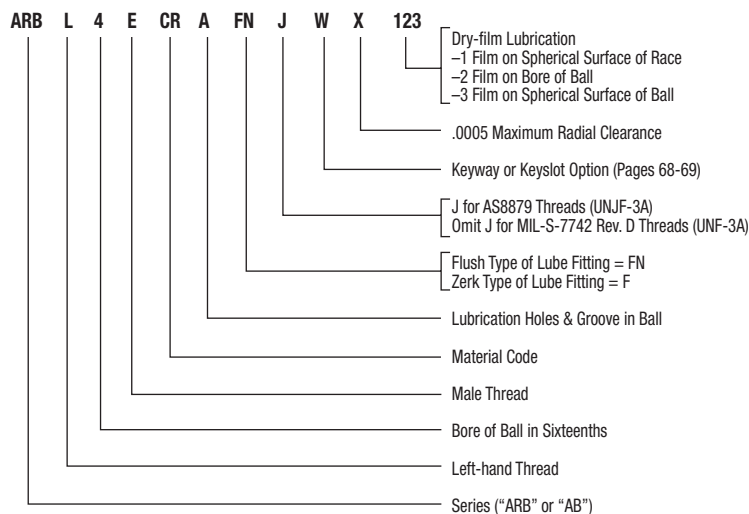
3-Piece Female Thread



Part Number	(B) Bore Diameter	(D) Head Diameter	(W) Ball Width	(T) Body Width	(O) Shoulder Diameter	Ball Diameter	(A) Ball C/L to End	(E) Thread Size	(Q) Misalignment	(L) Thread Depth	(N) Shank Diameter	(S) Flange Diameter	(C) Flange Thickness	Ultimate Static Radial Load*	Weight
	Inch +.0000 -.0005	Inch Max.	Inch +.000 -.005	Inch +.005 -.005	Inch Ref.	Inch Ref.	Inch +.06 -.06			Inch +.00 -.09	Inch +.010 -.010	Inch Ref.	Inch Ref.	lbs.	lbs. Ref.
AB3	.1900	.781	.437	.337	.301	.531	1.375	5/16 - 24	16°	.750	.437	.500	.180	5170	.06
AB3-101	.1900	.781	.437	.337	.301	.531	1.000	1/4 - 28	16°	.375	.375	.440	.180	5170	.06
AB3-102	.1900	.781	.437	.337	.301	.531	1.375	1/4 - 28	16°	.750	.375	.440	.180	5170	.07
AB3-103	.1900	.875	.500	.337	.318	.593	1.625	5/16 - 24	23°	.750	.500	.560	.180	6840	.11
AB4	.2500	.781	.437	.337	.301	.531	1.375	1/4 - 28	16°	.750	.375	.440	.180	5170	.07
AB4-101	.2500	.781	.437	.337	.301	.531	1.469	5/16 - 24	16°	.750	.437	.500	.180	5170	.08
AB4-102	.2500	.875	.500	.327	.318	.593	1.625	5/16 - 24	24°	.750	.500	.560	.180	6680	.10
AB4-103	.2500	.750	.375	.296	.376	.531	1.312	1/4 - 28	11°	.750	.375	.440	.180	4750	.06
ARB4	.2500	.750	.375	.281	.376	.531	1.312	1/4 - 28	13°	.750	.375	.437	.180	4550	.06
AB5	.3125	.875	.437	.327	.402	.593	1.375	5/16 - 24	14°	.750	.437	.500	.180	6680	.08
ARB5	.3125	.875	.437	.344	.402	.593	1.375	5/16 - 24	12°	.750	.437	.500	.180	6940	.07
AB6	.3750	1.000	.500	.406	.472	.687	1.625	3/8 - 24	10° 30'	.937	.562	.620	.180	9540	.12
ARB6	.3750	1.000	.500	.406	.472	.687	1.625	3/8 - 24	10° 30'	.937	.562	.625	.180	9540	.12
AB7	.4375	1.125	.562	.442	.544	.781	1.812	7/16 - 20	11° 30'	1.062	.625	.680	.180	10430	.18
ARB7	.4375	1.125	.562	.437	.544	.781	1.812	7/16 - 20	12°	1.062	.625	.750	.180	10350	.18
AB8	.5000	1.312	.625	.515	.614	.875	2.125	1/2 - 20	9° 30'	1.125	.750	.870	.180	18620	.28
ARB8	.5000	1.312	.625	.500	.614	.875	2.125	1/2 - 20	10° 30'	1.187	.750	.875	.180	18210	.28
AB10	.6250	1.500	.750	.567	.752	1.062	2.625	5/8 - 18	12° 30'	1.500	.875	.930	.250	20030	.42
ARB10	.6250	1.500	.750	.562	.752	1.062	2.500	5/8 - 18	13°	1.500	.875	.937	.250	19890	.42
AB12	.7500	1.750	.875	.640	.894	1.250	2.875	3/4 - 16	13° 30'	1.750	1.000	1.060	.250	28200	.63
ARB12	.7500	1.750	.875	.687	.894	1.250	2.875	3/4 - 16	11°	1.750	1.000	1.062	.250	29740	.63
ARB14	.8750	2.000	.875	.765	1.062	1.375	3.375	7/8 - 14	6°	1.875	1.125	1.187	.312	43040	.90
ARB16	1.0000	2.750	1.375	1.015	1.275	1.875	4.125	1 - 12	14° 30'	2.125	1.250	1.312	.375	78410	2.00
ARB20	1.2500	2.875	1.500	1.250	1.460	2.093	5.000	1 1/4 - 12	7° 30'	3.125	1.688	1.750	.375	86380	3.10

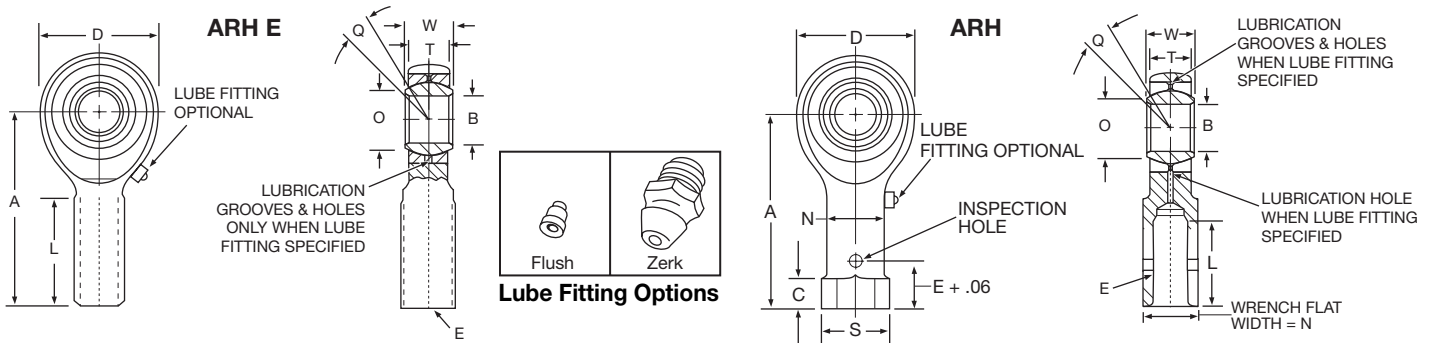
* Load ratings are for rod ends without lubrication fittings.

NHBB P/N



ROD END BEARINGS – Metal-to-Metal

3-Piece Heavy Duty – Male & Female Threads



Part Number	(B)	(D)	(W)	(T)	(O)	Ball Diameter	(A)	(E)	(L)	(Q)	(N)	(S)	(C)	Static Radial Limit Load**		Weight
	Bore Diameter	Head Diameter	Ball Width	Body Width	Shoulder Diameter		Ball C/L to End	Thread Size	Thread Length	Misalignment	Shank Diameter	Flange Diameter	Flange Thickness	Steel Race	Bronze Race	
	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch		Inch	Inch	Inch	lbs.	lbs.	lbs.
	+0.0005	+0.010	+0.000	+0.005	Ref.	Ref.	+0.010	UNF - 3A*	+0.062		Ref.	Ref.	+0.010			Ref.
	-0.0005	-0.010	-0.005	-0.005			-0.010	UNF - 3B*	-0.031				-0.062			
ARH4E	.2500	.806	.375	.337	.375	.531	1.562	5/16 - 24	.968	5°	.485	.562	.188	6060	6060	.067
ARH4							1.469		.750							.084
ARH5E	.3125	.900	.437	.327	.401	.593	1.875	3/8 - 24	1.187	14°	.547	.625	.250	7290	7290	.095
ARH5							1.625		.875							.102
ARH6E	.3750	1.025	.500	.416	.471	.687	1.938	7/16 - 20	1.187	9°	.610	.687	.250	8860	8860	.140
ARH6							1.812		1.000							.160
ARH7E	.4375	1.150	.562	.452	.542	.781	2.125	1/2 - 20	1.281	10°	.735	.875	.250	9560	9560	.210
ARH7							2.000		1.125							.230
ARH8E	.5000	1.337	.625	.515	.612	.875	2.438	5/8 - 18	1.468	9°	.860	1.000	.250	18560	18560	.330
ARH8							2.225		1.250							.340
ARH10E	.6250	1.525	.750	.577	.752	1.062	2.625	3/4 - 16	1.562	12°	.985	1.125	.375	20610	20610	.480
ARH10							2.500		1.375							.490
ARH12E	.7500	1.775	.875	.644	.892	1.250	2.875	7/8 - 14	1.687	13°	1.110	1.250	.375	27640	27640	.730
ARH12							2.875		1.625							

* UNF-3A = Male Thread, UNF-3B = Female Thread, per MIL-S-7742 Rev. D.

** Load ratings are based on male rod ends without lubrication fitting. For rod end load ratings with lubrication fittings please contact NHBB engineering department.

Notes:

- Radial Clearance: .002 max.
- † Plating: When specified in materials block, ball spherical diameter and ends are hard chrome plated per AMS-QQ-C-320, CL. 2 (.0002 to .0005 thickness). All external surfaces of race and/or body are cadmium plated per AMS-QQ-P-416.
- Unless otherwise noted, part number designation as shown furnished with CRES 410 race material. To specify CRES 17-4PH, add suffix "H" to designation. Example: ARH8ECRPLH or ARH8CRPLH.
- Dimensions: All dimensions apply after plating.
- Options: Radial clearance, lubrication holes and groove in ball, lubrication fittings, dry film lubrication, keyways, left hand or AS8879 threads see page 41.

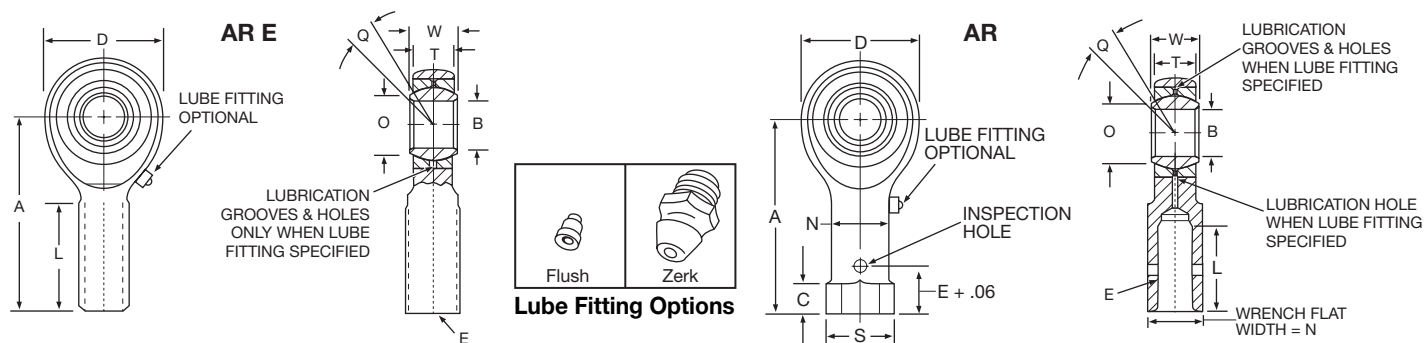
Materials

Designation	Ball	Race	Body
Basic Part No.†	52100 Alloy Steel, H.T. & Chrome Plated	4130 Alloy Steel, H.T. & Cad. Plated	C.M. Steel, H.T. & Cad. Plated
Part No. + SS†	52100 Alloy Steel, H.T. & Chrome Plated	Stainless Steel† H.T.	C.M. Steel, H.T. & Cad. Plated
Part No. + CR†	CRES 440C H.T.	Stainless Steel† H.T.	CRES 17-4PH H.T.
Part No. + CRPL†	CRES 440C H.T. & Chrome Plated	Stainless Steel† H.T.	CRES 17-4PH H.T.
Part No. + 501†	52100 Alloy Steel H.T. & Chrome Plated	Aluminum Bronze (AMPCO® 15) Cad. Plated	C.M. Steel, H.T. & Cad. Plated

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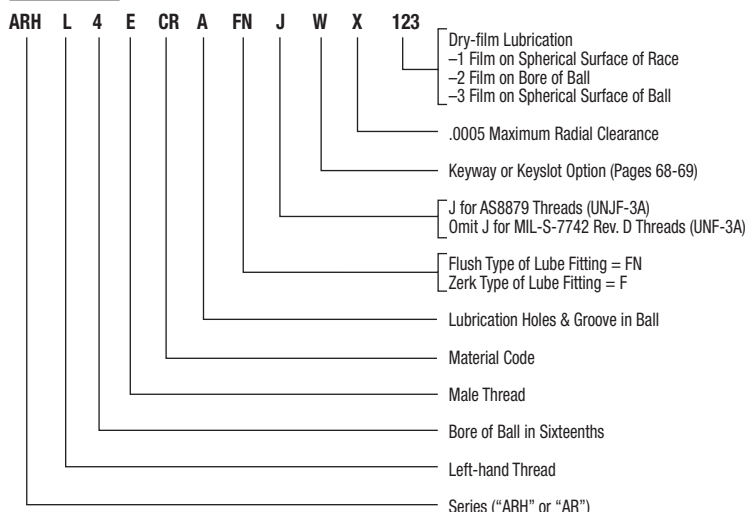
3-Piece Standard – Male & Female Threads



Part Number	(B)	(D)	(W)	(T)	(O)	Ball Diameter	(A)	(E)	(L)	(Q)	(N)	(S)	(C)	Static Radial Limit Load**		Weight
	Bore Diameter	Head Diameter	Ball Width	Body Width	Shoulder Diameter		Ball C/L to End	Thread Size	Thread Length	Misalignment	Shank Diameter	Flange Diameter	Flange Thickness	Steel Race	Bronze Race	
	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch		Inch	Inch	Inch	lbs.	lbs.	lbs.
	+ .0015 - .0005	+ .010 - .010	+ .000 - .005	+ .005 - .005	Ref.	Ref.	+ .010 - .010	UNF - 3A* UNF - 3B*	+ .062 - .031	Ref.	+ .010 - .010	+ .010 - .010	+ .010 - .062			Ref.
AR3E AR3	.1900	.806	.437	.337	.301	.531	1.562 1.375	5/16 - 24	.968 .750	16°	.422	.500	.188	4060 [◇]	4060 [◇]	.07 .08
AR4E AR4	.2500	.806	.437	.337	.301	.531	1.562 1.469	5/16 - 24	.968 .750	16°	.422	.500	.188	6060	6060	.07 .08
AR5E AR5	.3125	.900	.437	.327	.401	.593	1.875 1.625	5/16 - 24	1.187 .875	14°	.485	.580	.250	7290	7290	.08 .10
AR6E AR6	.3750	1.025	.500	.416	.471	.687	1.938 1.812	3/8 - 24	1.187 1.000	9°	.547	.660	.250	8860	8860	.13 .16
AR7E AR7	.4375	1.150	.562	.452	.542	.781	2.125 2.000	7/16 - 20	1.281 1.125	11°	.610	.720	.250	9560	9560	.18 .21
AR8E AR8	.5000	1.337	.625	.515	.612	.875	2.438 2.250	1/2 - 20	1.468 1.250	9°	.735	.880	.250	18560	18560	.27 .32
AR10E AR10	.6250	1.525	.750	.577	.752	1.062	2.625 2.500	5/8 - 18	1.562 1.375	12°	.860	1.020	.375	20610	20610	.42 .48
AR12E AR12	.7500	1.775	.875	.640	.892	1.250	2.875 2.875	3/4 - 16	1.687 1.625	14°	.985	1.160	.375	27640	27640	.63 .87
AR14E AR14	.8750	2.025	.875	.765	1.061	1.375	3.375 3.375	7/8 - 14	2.000 1.875	6°	1.110	1.300	.500	32140	32140	.96 .95
AR16E AR16	1.0000	2.775	1.375	1.015	1.275	1.875	4.125 4.125	1 1/4 - 12	2.343 2.125	14°	1.688	2.020	.563	72270	72270	2.54

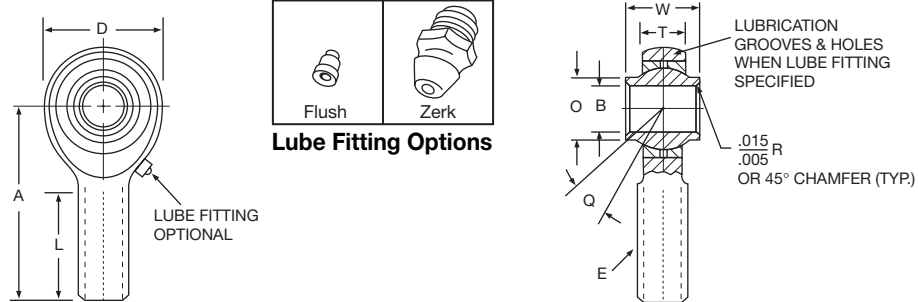
* UNF-3A = Male Thread, UNF-3B = Female Thread, per MIL-S-7742 Rev. D.
 ** Load ratings are based on male rod ends without lubrication fitting.
 For rod end load ratings with lubrication fittings please contact NHBB engineering department.
 ◇ Load based on pin limitation.

NHBB P/N



ROD END BEARINGS – Metal-to-Metal

3-Piece High Misalignment – Male Thread



Part Number	(B) Bore Diameter	(D) Head Diameter	(W) Ball Width	(T) Body Width	(O) Shoulder Diameter	Ball Diameter	(A) Ball C/L to End	(E) Thread Size	(L) Thread Length	(Q) Misalignment	Limit Static Radial Load**	Weight
	Inch +.0000 -.0005	Inch Max.	Inch +.000	Inch +.005 -.005	Inch Ref. -.005	Inch Ref.	Inch +.06 -.06	UNF - 3A* UNF - 3B*	Inch +.06 -.06	Ref.	lbs.	lbs. Ref.
ARY3	.1900	.781	.560	.337	.301	.531	1.562	5/16 - 24	1.000	16°	4060 \diamond	.07
ARY3-101	.1900	.750	.500	.220	.319	.437	1.500	5/16 - 24	1.000	15°	4060 \diamond	.07
ARY4	.2500	1.000	.593	.265	.390	.593	1.938	3/8 - 24	1.250	23°	7040 \diamond	.11
ARY5	.3125	1.125	.813	.355	.512	.781	2.125	7/16 - 20	1.375	23°	8260	.16
ARY5-101	.3125	.875	.625	.265	.418	.593	1.875	5/16 - 24	1.062	16°	5290	.09
ARY 6	.3750	1.125	.813	.355	.512	.781	2.125	7/16 - 20	1.375	23°	8260	.15
ARY7	.4375	1.312	.875	.355	.618	.875	2.437	1/2 - 20	1.500	22°	12420	.25
ARY8	.5000	1.500	.937	.411	.730	1.000	2.625	5/8 - 18	1.625	20°	17430	.39
ARY10	.6250	1.750	1.200	.577	.856	1.250	2.875	3/4 - 16	1.750	20°	23620	.62
ARY12	.7500	2.000	1.280	.630	.970	1.375	3.375	7/8 - 14	1.875	18°	30550	.90
ARY14	.8750	2.200	1.400	.635	1.140	1.531	3.750	7/8 - 14	2.000	18° 30'	31970	1.08
ARY16	1.0000	2.750	1.875	.845	1.278	1.875	4.125	1 1/4 - 12	2.125	21°	59510	2.20
ARY20	1.2500	3.125	1.875	1.015	1.523	2.250	5.000	1 1/4 - 12	2.875	21°	70060	3.10

* UNF-3A = Male Thread, per MIL-S-7742 Rev. D.

** Load ratings are for rod ends without lubrication fittings.

\diamond Based on pin limitation.

Notes:

- Radial Clearance: .002 max.
- † Plating: When specified in materials block, ball spherical diameter and ends are hard chrome plated per AMS-QQ-C-320, CL. 2 (.0002 to .0005 thickness). All external surfaces of race and/or body are cadmium plated per AMS-QQ-P-416.
- Dimensions: All dimensions apply after plating.
- Options: Radial clearance, lubrication holes and groove in ball, lubrication fittings, dry film lubrication, keyways, left hand or AS8879 threads see page 43.

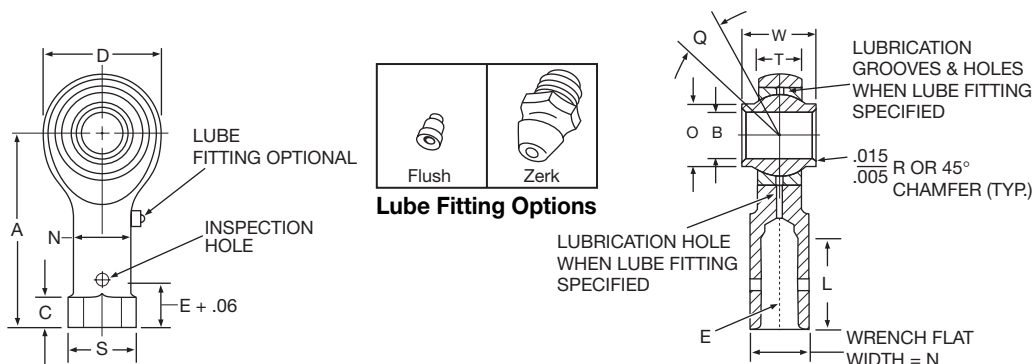
Materials

Part No.	Ball	Race	Body
Catalog No. †	52100 Alloy Steel, H.T., Chrome Plated Rc59-63	Aluminum Bronze, (AMPCO® 15), Cadmium Plated	4130 Alloy Steel, H.T., Cadmium Plated
Catalog No. + S†	“	4130 Alloy Steel, H.T., Cadmium Plated	“
Catalog No. + SS†	“	CRES 17-4PH AMS5643	CRES 17-4PH AMS5643
Catalog No. + CR†	CRES 440C AMS5630	“	“
Catalog No. + CR†	CRES 440C, AMS5630 Chrome Plated	“	“

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3-Piece High Misalignment – Female Thread



Part Number	(B) Bore Diameter	(D) Head Diameter	(W) Ball Width	(T) Body Width	(O) Shoulder Diameter	Ball Diameter	(A) Ball C/L to End	(E) Thread Size	(L) Thread Length	(Q) Misalignment	(N) Shank Diameter	(S) Flange Diameter	(C) Flange Thickness	Limit Static Radial Load**	Weight
	Inch +.0000 -.0005	Inch Max.	Inch +.000 -.005	Inch +.005 -.005	Inch Ref.	Inch Ref.	Inch +.06 -.06	UNF - 3A* UNF - 3B*	Inch +.06 -.06	Ref.	Inch +.010 -.010	Inch Ref.	Inch Ref.	lbs. Ref.	lbs. Ref.
ARYF3	.1900	.781	.560	.337	.301	.531	1.625	5/16 - 24	.750	16°	.500	.562	.250	4060 \diamond	.08
ARYF3-101	.1900	.750	.500	.220	.319	.437	1.375	5/16 - 24	.750	15°	.437	.500	.250	4060 \diamond	.06
ARYF4	.2500	1.000	.593	.265	.390	.593	1.625	3/8 - 24	.937	23°	.562	.625	.250	7040 \diamond	.11
ARYF5	.3125	1.125	.813	.355	.512	.781	1.812	7/16 - 20	1.062	23°	.625	.688	.250	8260	.18
ARYF5-101	.3125	.875	.625	.265	.418	.593	1.375	5/16 - 24	.750	16°	.437	.500	.250	5290	.10
ARYF6	.3750	1.125	.813	.355	.512	.781	1.812	7/16 - 20	1.062	23°	.625	.688	.250	8260	.17
ARYF7	.4375	1.312	.875	.355	.618	.875	2.125	1/2 - 20	1.125	22°	.750	.812	.250	12420	.26
ARYF8	.5000	1.500	.937	.411	.730	1.000	2.625	5/8 - 18	1.500	20°	.875	.938	.375	17430	.40
ARYF10	.6250	1.750	1.200	.577	.856	1.250	2.875	3/4 - 16	1.750	20°	1.000	1.125	.375	23620	.63
ARYF12	.7500	2.000	1.280	.630	.970	1.375	3.375	7/8 - 14	1.875	18°	1.125	1.250	.500	30550	.87
ARYF14	.8750	2.200	1.400	.635	1.140	1.531	3.750	7/8 - 14	2.000	18° 30'	1.125	1.250	.500	31970	1.01
ARYF16	1.0000	2.750	1.875	.845	1.278	1.875	4.125	1 1/4 - 12	2.125	21°	1.688	1.813	.562	59510	2.31
ARYF20	1.2500	3.125	1.875	1.015	1.523	2.250	5.000	1 1/4 - 12	3.125	21°	1.688	1.813	.562	70060	3.15

* UNF-3B = Female Thread per MIL-S-7742 Rev. D.
 ** Load ratings are for rod ends without lubrication fittings.
 \diamond Based on pin limitation.

NHBB P/N

